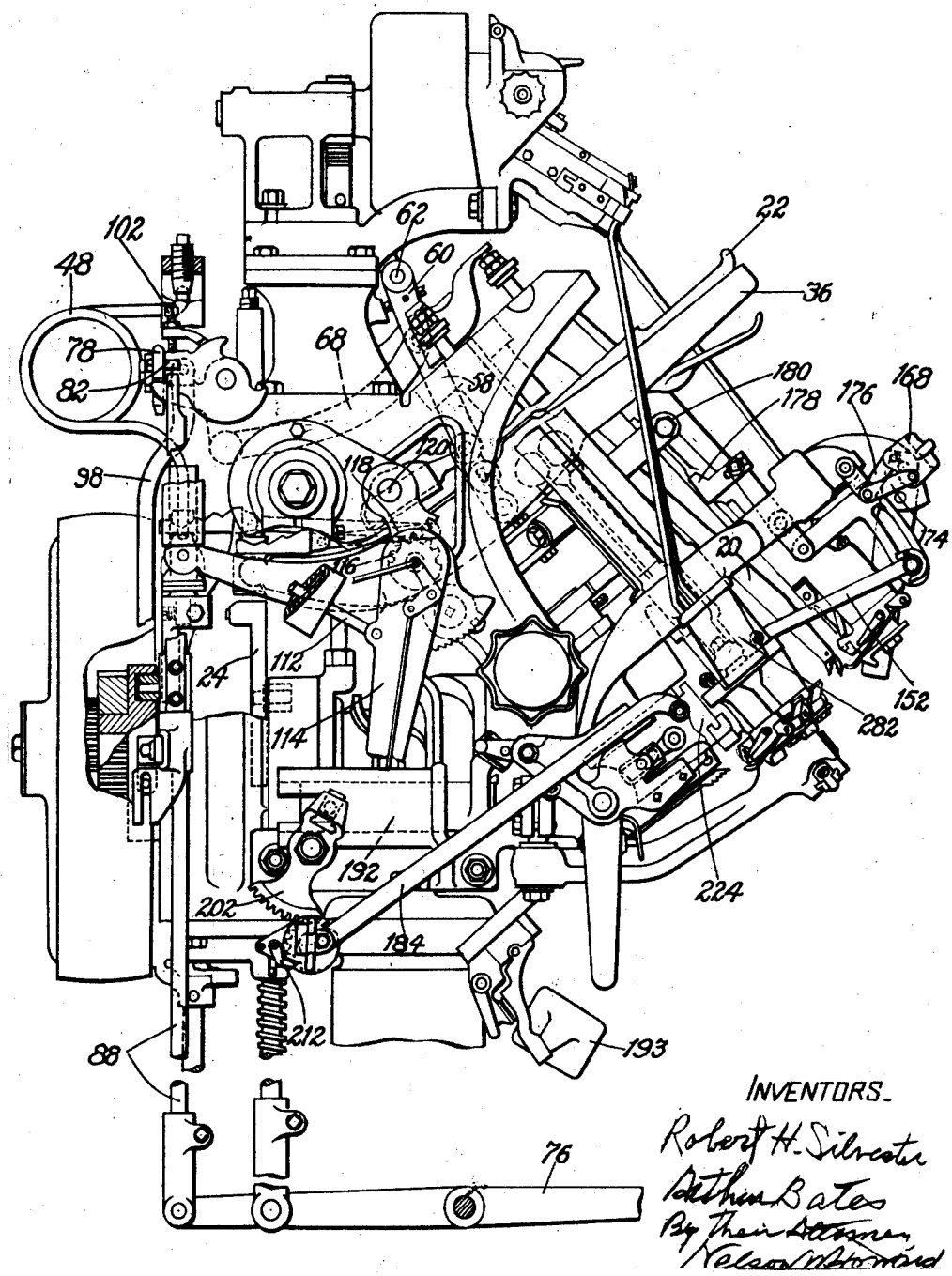
Jan. 17, 1928. 1,656,365

R. H. SILVESTER ET AL.

PULLING-OVER MACHINE

Filed Nov. 7, 1925 4 Sheets-Sheet 1

Fig. 1.



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PULLING-OVER MACHINE

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4 Sheets-Sheet 2

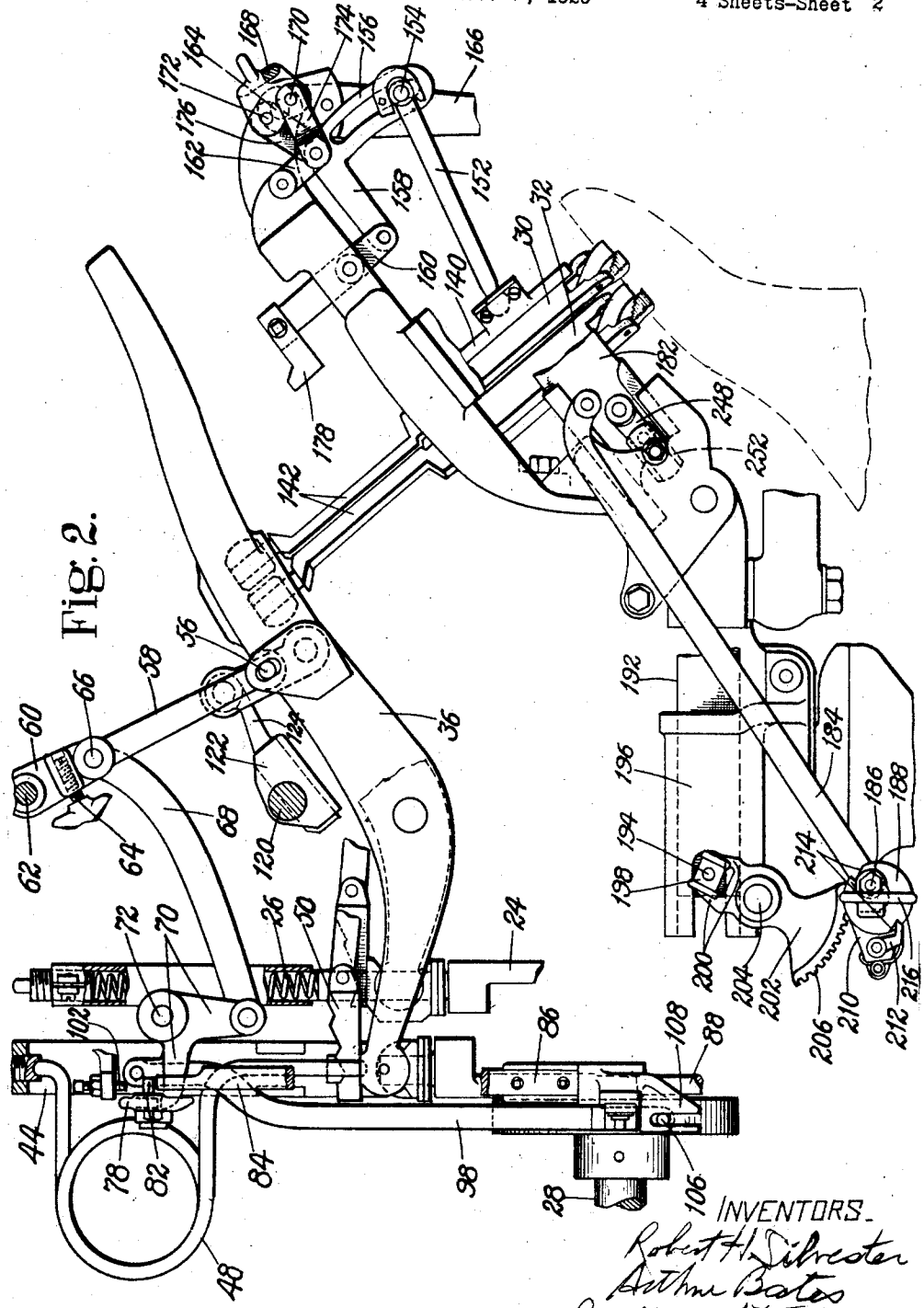


Fig. 2.

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PULLING-OVER MACHINE

Filed Nov. 7, 1925 4 Sheets-Sheet 3

Fig. 5.

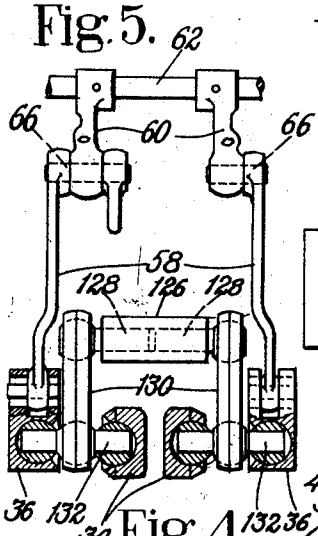


Fig. 3.

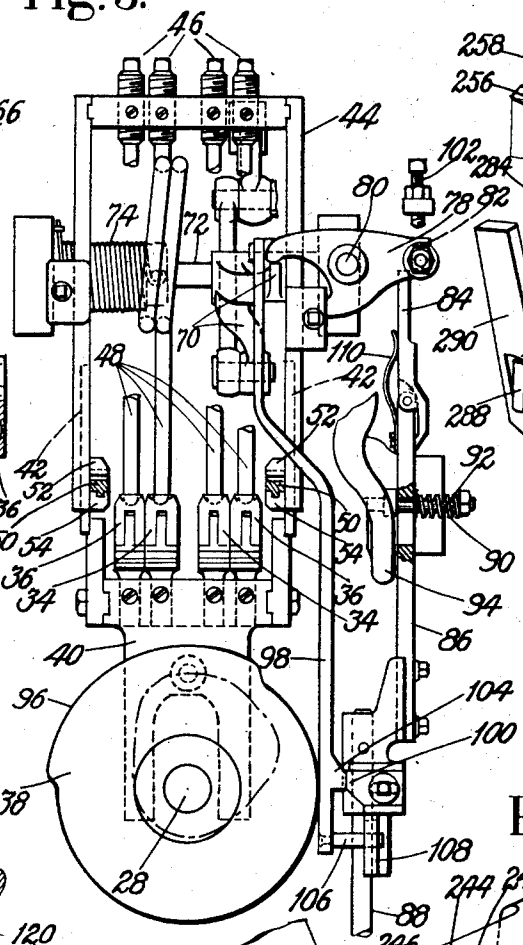


Fig. 11.

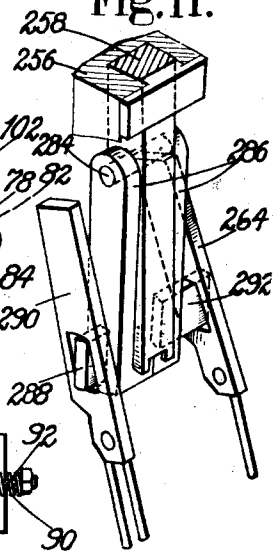


Fig. 4.

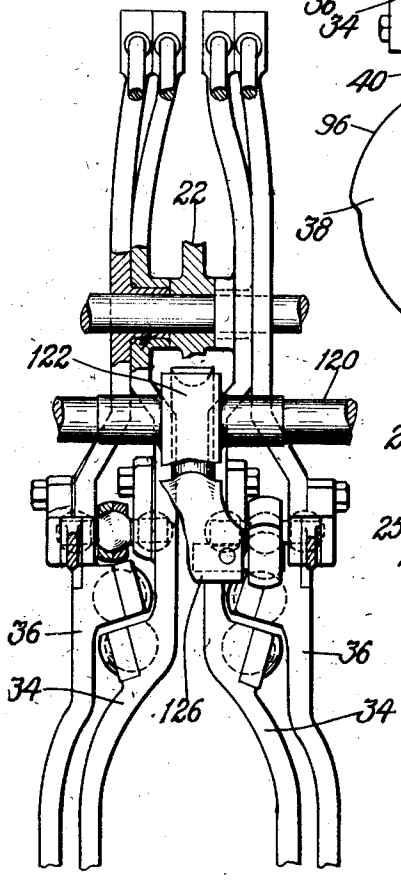
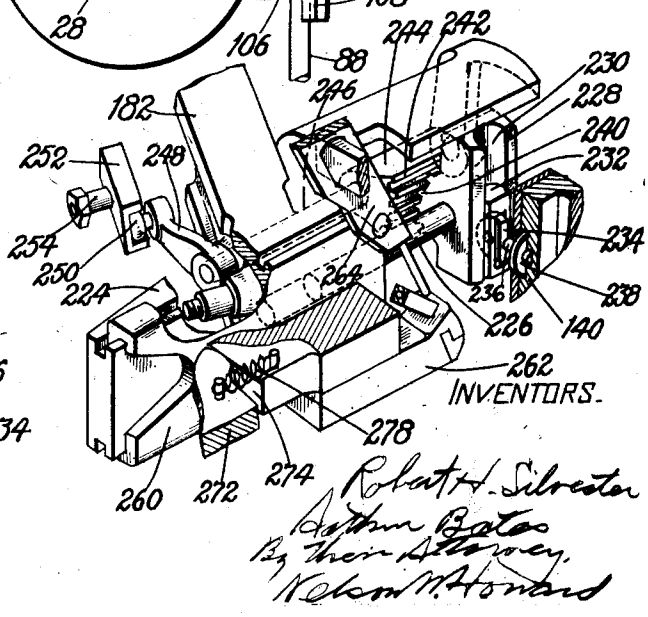


Fig. 6.



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4 Sheets-Sheet 4

Fig. 8.

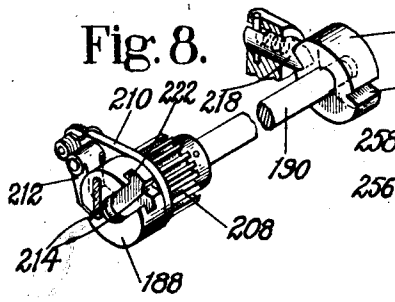


Fig. 10.

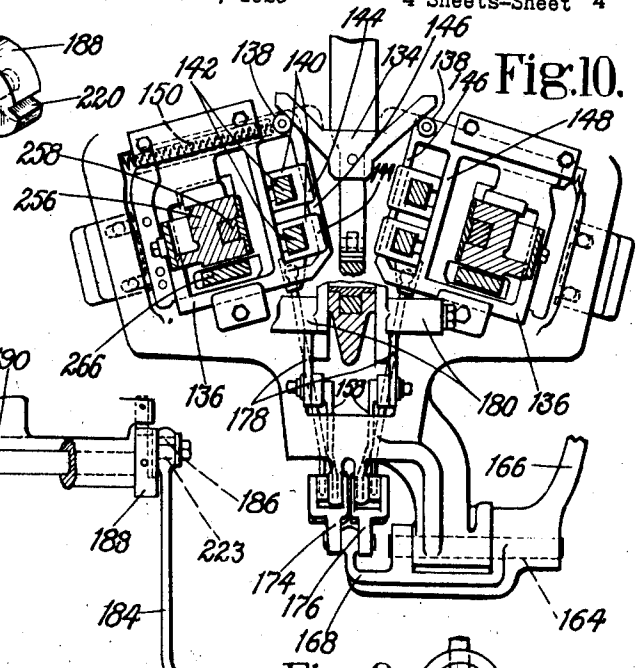


Fig. 7.

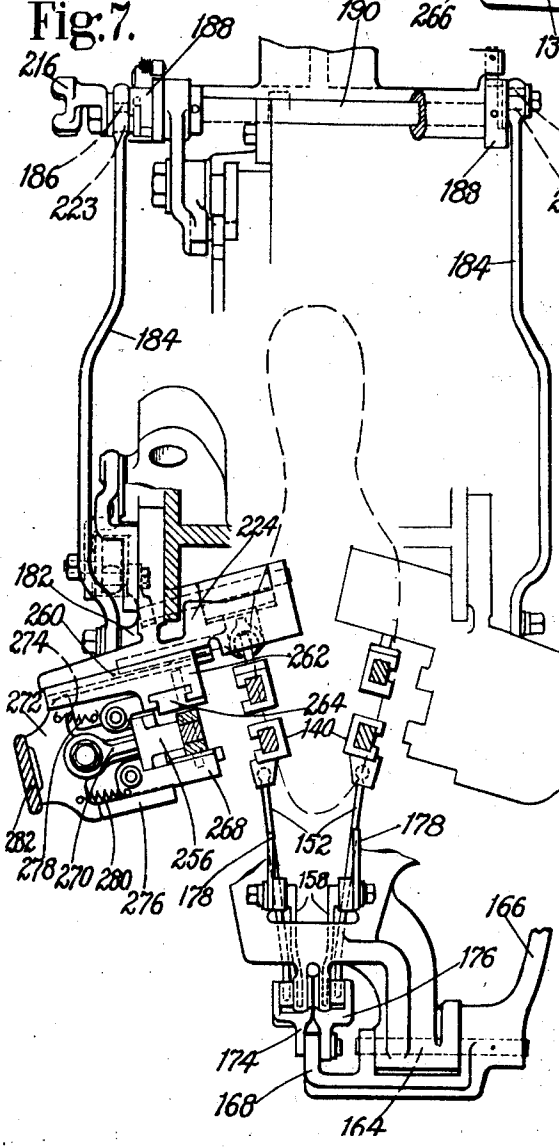
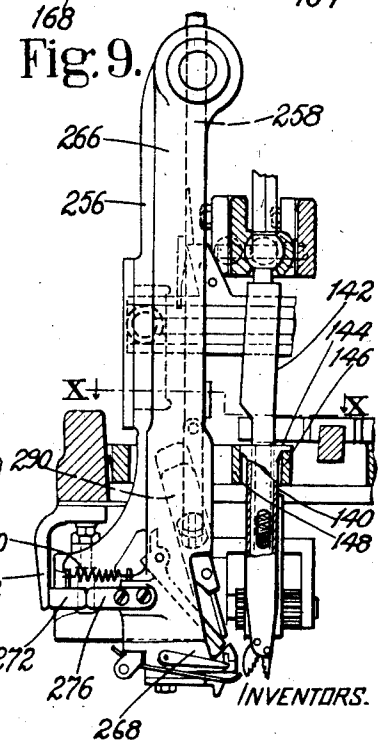


Fig. 9.



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Patented Jan. 17, 1928. 1,656,365

UNITED STATES PATENT OFFICE.

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PULLING-OVER MACHINE.

Application filed November 7, 1925, Serial No. 67,594, and in Great Britain November 27, 1924.

This invention relates to machines for use in the manufacture of boots and shoes for pulling uppers over lasts, and has for one of its important objects the provision of means for accomplishing better results than heretofore in the pulling of the upper at the side of the last. The invention is herein illustrated in its application to a well-known type of pulling-over machine, the general organization of which is shown and described in detail in various prior United States Letters Patent granted upon applications of R. F. McFeely, particularly Patent No. 663,777, granted on December 11, 1900 and Patent No. 1,029,387, granted on June 11, 1912. It will be recognized, however, that the invention is not limited to machines of the type shown in said patents.

In pulling-over machines as heretofore constructed it has been the general practice, where more than one gripper is provided for pulling the upper at each side of the last, to utilize at each side a pair of grippers so arranged as to act substantially as a unit in the upper-pulling operation, so that the portions of the upper which are acted upon by the different grippers are subjected to substantially the same treatment in respect to the force and the direction of the pull. The present invention provides an organization having, for the purpose of pulling the upper at the side of the last, a plurality of grippers which are operated with relative movements such as to subject the different portions of the upper which are tensioned by the respective grippers to different treatment, having regard particularly to the differences in contour of the last which are encountered at different portions of its length. In accordance with one feature of the invention there is provided, in combination with front and rear grippers for pulling the upper at the side of the last, means for effecting relative movement of said grippers lengthwise of the last in the upper-pulling operation. The best results may involve such movement of either the front or the rear gripper toward or from the other gripper at the same side of the last, or movements of both these grippers in different relations to each other, in accordance with the differing characteristics of different styles of shoes or of right and left shoes, and the construction shown is, in fact, so designed as to permit various relative movements of the grippers to be effected selectively. It is contemplated that the rear side gripper which pulls the upper at the outer side of a shoe, either right or left, will usually best be operated with a rearward or reardrawing movement during the updraw, to pull the upper smoothly and tightly over the instep portion of the last, while the rear gripper that operates at the inner side of the shoe receives a foredrawing movement. By the construction shown the extent of such movement at either side may be varied, or either rear gripper may be operated, if desired, without any component of movement lengthwise of the shoe. Preferably the front side grippers will have a foredrawing movement, the mechanism provided for this purpose being so designed that the extent of the foredrawing movement may be varied or such movement may be eliminated.

The invention further provides for variably positioning a gripper or grippers lengthwise of the shoe, and as herein illustrated automatic mechanism is provided for positioning the rear side gripper which operates at the outer side of a shoe farther rearwardly than the corresponding gripper at the opposite side. Conveniently also the machine includes means for determining the direction of the pulling movement of the rear gripper lengthwise of the shoe, where such movement occurs, in accordance with the initial position of the gripper lengthwise of the shoe. Since the machine will customarily be used to pull over right and left shoes successively, it further includes automatic means for reversing, in each cycle, the conditions affecting the opposite side grippers in respect to their initial relative positions and in respect to the relative movements that they receive, with further means whereby the machine may be set, if desired, to pull over a plurality of right shoes or of left shoes in succession.

To render the machine more effective to accomplish the objects hereinabove set forth, as well as for other purposes, it is considered preferable that the upper be pulled by different grippers at different times, the ma-

chine herein shown having means for operating the front side grippers, with their updrawing and foredrawing movement, before the rear side grippers are closed on the upper. More particularly, the construction shown comprises mechanism for delaying the action of the rear side grippers until after the machine has come to a stop at the end of the first stage of the cycle, thus affording opportunity for manipulation of the front side grippers to straighten the tip before the rear grippers are closed. As one embodiment of this feature, the machine is provided with toggles which prevent movement of the rear side grippers in response to the tensioning of their updraw springs in the first stage of the cycle, and manually operated means for thereafter breaking the toggles to permit the springs to act.

To render the machine effective in securing the tensioned upper to the best advantage, the invention further provides novel means for varying relatively the positions of different upper-fastening tacks or the like, the construction shown comprising mechanism whereby the devices for driving the rearmost side tacks, as well as for wiping the upper over the insole in the corresponding locations, receive positioning movements lengthwise of the last together with the corresponding rear side grippers.

The above and other features of the invention, including also novel mechanism for controlling one or more grippers singly, novel foredrawing and tip straightening devices, and various details of construction and combinations of parts will now be more particularly described by reference to the accompanying drawings and pointed out in the claims.

In the drawings,

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

Fig. 2 shows in side elevation, in greater detail than Fig. 1, portions of the mechanism provided for operating and controlling the side grippers;

Fig. 3 is a view in rear elevation of that portion of the gripper-operating means which is shown at the left-hand side of Fig. 1, with parts broken away;

Fig. 4 is substantially a plan view of the side gripper levers and associated parts, with portions broken away;

Fig. 5 is a view partly in elevation and partly in section, showing the side gripper levers and portions of their controlling means;

Fig. 6 is a perspective view, with parts broken away, showing the connections to one of the rear side grippers and the associated overwiping and tacking mechanism;

Fig. 7 is substantially a plan view, with parts in section, illustrating more fully the arrangement of the side pulling and tacking mechanisms;

Fig. 8 is a detail perspective view of a portion of the means for controlling the rear side grippers;

Fig. 9 is a view substantially in front elevation, with parts in section, showing the upper-pulling and tacking mechanisms at one side of the shoe;

Fig. 10 is a view partly in plan and partly in section on the line X—X of Fig. 9, illustrating the control of the side grippers in respect to movement laterally of the shoe; and

Fig. 11 shows in detail the connections between the tack drivers and their operating mechanism at one side of the shoe.

In view of the full disclosure in prior patents, including those hereinabove mentioned, of the general organization of machines of the type illustrated, the present description will be confined to such portions of the machine as it is necessary to refer to for an understanding of this invention.

The machine is provided, as usual heretofore, with means for gripping and pulling the upper at the end of the toe and at the opposite sides of the forepart, the means for pulling the upper at the end of the toe comprising a toe gripper 20 which is operated by an updraw-lever 22 from a cam slide 24 through an updraw-spring 26, the slide 24 being operated, as usual, by a cam on a cam shaft 28 which receives movement intermittently in the cycle of the machine. For purposes of this invention there are provided, for pulling the upper at each side of the shoe, a front side gripper 30 and a rear side gripper 32 (Fig. 2) which are separate from each other and are operated respectively by separate updraw levers 34 and 36. There are thus two front side gripper levers 34 and two rear side gripper levers 36, as shown in Figs. 3 and 4, all these levers being operated from the cam shaft 28 by means of a single cam 38 acting on a cam slide 40. This cam slide has projecting upwardly from it two guides 42 upon which is slidingly mounted a yoke 44. Confined between adjustable plugs 46 in the upper end of the yoke 44 and the rear ends of the several side gripper levers are four springs 48 affording yielding connections between the yoke and the levers. The position of the yoke 44 relatively to the slide 40, and therefore the main initial tension of the several springs 48, is determined by wedge members 50, such as commonly used heretofore for a similar purpose, these members being inserted between brackets 52 on the guides 42 and projections 54 on the yoke 44. It will be understood that these wedge members are adjustable to vary simultaneously the tensions of the several springs 48, and it will be seen, more-

over, that the tension of each of the springs may be varied independently of the others by adjusting its plug 46, so that the forces applied to the upper by different side grippers may be independently varied.

While the front and rear side grippers are thus operated by a single cam slide 40, the machine is provided with means for delaying the action of the rear side grippers until the front side grippers have been operated to pull the upper. For this purpose there is pivoted at 56 to each rear side gripper lever 36 (Fig. 2) one arm 58 of a toggle, the other arm 60 of which is fast on a rock shaft 62 mounted in the frame of the machine. Movement of the toggle arms 58 and 60 to straighten the toggle is limited by an adjustable stop 64 which is carried by the arm 60 and is arranged to engage a portion of the frame. The two toggle arms of each toggle are pivoted together at 66, and at the same point on one of the toggles there is connected to the arms a link 68 which is connected at its rear end to a vertical arm of a bell crank lever 70 which is fast on a spindle 72, this spindle being turned in the direction to straighten both toggles 58, 60 by means of a spring 74 (Fig. 3) when the yoke 44 is in its uppermost position. During the first stage of the cycle of operations of the machine the toggles are thus in straightened condition, so that the rear side gripper levers 36 are prevented from operating, notwithstanding the fact that their springs 48 are tensioned by the downward movement of the yoke 44 whereby upper pulling movement is imparted to the front side grippers 30. The machine thus comes to a stop with the upper pulled and held under tension at the sides of the shoe by the front side grippers only, affording opportunity for tip straightening by the use of mechanism connected to these grippers, as hereinafter more particularly described, before the rear side grippers 32 have closed on the upper.

The operation of the rear side grippers 32 to grip and pull the upper results from release of the side gripper levers 36 to the action of their updraw springs 48 by the breaking of the toggles 58, 60. In the machine herein shown this is accomplished by a short depression of the starting treadle 76 which controls the power operation of the machine, the treadle thus being depressed while the machine is at rest after the first stage of the cycle, and its movement at this time being so limited as to prevent the actuation of the starting mechanism. For the purposes in view there is provided a rocking lever 78 pivoted at 80 on the frame of the machine and projecting at one end over a horizontal arm of the bell crank lever 70. The other end of the lever 78 carries a block 82 which is arranged to be engaged on its lower face by the upper end of an arm 84 mounted on a vertically movable bar 86, this bar being fast on the upper end of a rod 88 which is connected at its lower end to the treadle 76 in such manner as to permit the rod to swing laterally. Normally the parts are positioned as shown in Fig. 3 with the arm 84 rocked from underneath the block 82 by the action on the bar 86 of a spring 90 which is mounted on a pin 92 that passes through a slot in the bar and is fast on a bracket 94 on the frame. For swinging the rod 88 and the bar 86 to the right (Fig. 3), so as to carry the arm 84 into position under the block 82, there is provided on the cam member 38, which operates the slide 40, a peripheral cam 96 which acts through an interposed member 98 upon a lug 100 fast on the rod 88. It will be understood that this action of the cam 96 takes place in the first stage of the cycle, so that the parts are positioned to cause the breaking of the toggles 58, 60 by the action of the arm 84 on the lever 78 when the treadle 76 is again depressed. In order to prevent the treadle 76 from being moved at this time far enough to start again the power operation of the machine, movement of the rocking lever 78, and consequently movement of the treadle, is limited by an adjustable stop 102 which is arranged to be engaged by the block 82 on the lever 78.

In order to render the starting treadle 76 again effective to start the machine after the rear side grippers have been released and have pulled the upper, the member 98 above referred to as interposed between the cam 96 and the lug 100 is provided with a laterally projecting nose portion 104 which is arranged to be moved downwardly from between the cam and the lug to render the spring 90 effective to swing the arm 84 from underneath the block 82. For this purpose the member 98 is pivotally connected at its upper end to the horizontal arm of the bell crank lever 70. When, therefore, the toggles 58, 60 are broken, the member 98 is moved downwardly by the bell crank lever 70 to release the rod 88 and the parts thereon to the action of the spring 90. The member 98 at its lower end is provided with a pin 106 which extends into a slot formed in a lug 108 on the rod 88 to guide the member 98 in its upward and downward movements. It will further be noted that the arm 84 is pivotally mounted on the slide 86 so that it may yield laterally against the resistance of a spring 110 to avoid possible danger of breakage.

Machines of the type shown in the prior patents herein before mentioned are now usually provided with a fluid check or dashpot for retarding the upper pulling movement of the two opposite side gripper levers, as described in Letters Patent No. 1,169,414, granted on January 25, 1916, upon an application of R. F. McFeely, and in the ma-

chine herein shown the four side gripper levers are controlled by such retarding mechanism through connections arranged to permit different levers to move at different times. This is especially desirable in the case of the rear side grippers, which are suddenly released to the action of their previously tensioned updraw springs. By reference to Fig. 1, it will be seen that the plunger rod 112 of the usual fluid check is connected to a hand lever 114, and this lever is connected by gear sectors 116, 118 to a rock shaft 120. This rock shaft is provided with a housing 122 in which there is mounted for sliding and rocking movements a bar 124 having at its front end a boss 126 which has fixed in each end thereof a pin 128 (Fig. 5). Each of the pins 128 is connected by a link 130 and a spindle 132 to both the side gripper levers 34 and 36 at the corresponding side of the machine, there being provided ball and socket connections between the link 130 and the pin 128 and the spindle 132, and also between the spindle and the gripper levers. By these connections the different gripper levers are permitted to move relatively to one another, and the retarding mechanism is rendered effective on the different side grippers irrespective of the time of action and the extent of movement of the different grippers.

The machine is further provided with means of the same general character as that shown in the prior patents mentioned for effecting and controlling movements of the side grippers toward and from each other laterally of the shoe. There is thus a wedge member 134 (Fig. 10) which is moved longitudinally of the machine to force the opposite side grippers apart or to permit them to move toward each other, this wedge member in the machine herein shown being arranged to act upon gripper controlling slides or cages 136 each of which carries a roll 138 in engagement with the wedge member. Each of the front and rear side grippers 30 and 32 comprises a gripper casing 140 and an updraw bar 142, and each of the gripper casings 140 has thereon a projection 144 to stop its downward movement, substantially as in prior machines of the same general type. In the construction herein shown the projections 144 on the gripper casings are arranged to engage a front bar 146 of the cage 136, the front and rear side grippers being confined between this bar and an intermediate bar 148 so that they will be moved laterally of the shoe by movement of the cage 136, there being provision for movement of each of the side grippers lengthwsie of the shoe relatively to the cage. Each cage 136 is pressed inwardly by means of a compression spring 150, so that this spring imparts overdraw movement to the grippers when permitted by the wedge member 134.

Connected to the front side grippers, in the machine herein shown, is mechanism for imparting to these grippers in their updraw movements foredrawing movements toward the toe end of the shoe, this mechanism being constructed also for use in moving these grippers relatively to each other lengthwise of the shoe for straightening the tip. By reference to Fig. 2 it will be seen that the casing 140 of the front side gripper 30 is connected by a ball-and-socket joint to a long link 152 which extends forwardly and at its front end is connected to a pivot pin 154 adjustably secured to a slotted link 156 which is mounted indirectly, as hereinafter described, on the frame of the machine. When the gripper receives its updraw movement, the pivot pin 154 is held by the link 156 in a fixed position, so that the link 152 acts in response to the updraw movement of the gripper to impart to the latter also a foredrawing movement, the extent of which is determined by the position of the pivot pin 154 on the link 156. By adjustment of the pin 154 along the slot in the link 156 the extent of the foredraw may be varied from a maximum practically to zero. It will be understood that the connection between the link 152 and the pin 154 is such as to permit the link to swing to some extent from side to side as well as vertically, thus allowing for the in and out movements of the gripper laterally of the shoe. There are separate slotted links 156 and connecting links 152 for the opposite front side grippers, as indicated in Fig. 7, so that the extent of the foredrawing movement of either of these grippers may be varied independently of that of the other gripper.

Each link 156 has extending rearwardly therefrom at one end an arm 158 which is hung by means of substantially parallel links 160 and 162 on the frame of the machine, so that the link 156 and its arm 158 may be moved bodily lengthwise of the shoe. Such movement of these parts is utilized for tip-straightening purposes, under control of a rock shaft 164 which has fast thereon a hand lever 166. Fast on the rock shaft 164 is a member 168 provided with a pair of crank pins 170 and 172 mounted 180° apart and connected respectively by links 174 and 176 to the different respective link members 156. It will thus be evident that when the hand lever 166 is moved in one direction or the other, the front side grippers will be moved simultaneously in opposite directions respectively lengthwise of the shoe. In order to return the parts of the tip-straightening mechanism to normal position at the end of the cycle of operations, each of the links 160 has an upward extension on which is mounted an abutment member 178, and the members 178 are arranged to be engaged, as illustrated in Fig. 10, by members 180 (cor-

responding to the members 882 of Patent No. 663,777), which are a part of the means provided for imparting inward and outward movements to the overwiping and tacking mechanisms and in the return of the parts of the machine to starting position have a downward and forward movement such as to move one or the other of the members 178 forwardly.

It is preferred that, in operating on right and left shoes, the opposite rear side grippers 32 be differently positioned lengthwise of the shoe, in such manner, for example, that the gripper which pulls the upper at the outer side of a shoe shall be positioned farther from the toe end of the shoe than the gripper which pulls at the inner side of the shoe. The machine is accordingly provided with a pair of slides 182 connected respectively to the different rear side grippers by mechanism hereinafter described, these slides being mounted for movements lengthwise of the shoe and connected by rods 184 to crank pins 186 which are mounted on crank discs 188 fast on a transverse shaft 190 (Fig. 7). For operating the shaft 190 there is utilized a slide 192 (Fig. 2) which is provided in machines of this general type for controlling the shoe-supporting heel rest 193, this slide being moved toward the left (Fig. 2) in the first stage of the cycle, and moved toward the right near the end of the cycle. Mounted on the slide 192 is a stud 194 projecting through a slot in a casing 196 which encloses the slide, this stud having mounted thereon a block 198 which is slidably positioned between jaws 200 formed upon one end of a lever 202 which is pivoted at 204 on the frame. The other end of the lever 202 is provided with gear teeth 206 meshing with a pinion 208 (Fig. 8) which is mounted to turn about the shaft 190. The pinion 208 carries a plate 210 which has mounted thereon a pawl 212 adapted to enter one or the other of two notches 214 formed at opposite sides of one of the crank discs 188. It will thus be seen that in the first stage of the cycle of the machine the pawl 212 is carried from one to the other of the notches 214, and that near the end of the cycle, after the operations on a shoe have been completed, the shaft 190 is turned by the pawl through 180°. The crank pins 186 are positioned 180° apart and are so arranged that when the shaft 190 is turned, as above described, one of the slides 182 is moved forwardly and the other slide is moved rearwardly, thus reversing the positions lengthwise of the shoe of the opposite rear side grippers prior to the operation of the machine on the next shoe, it being assumed that the two shoes of a pair will be pulled successively. In order to provide for pulling over a plurality of right or of left shoes successively, when it is desired to operate the machine in this manner, there is fixed to one of the crank discs 188 a hand piece 216 so that the shaft 190 can be turned independently of the action of the pawl 212. In order to indicate to the operator when the shaft 190 has thus been turned the proper distance, a spring-pressed catch 218 is arranged to enter one or the other of two notches 220 located 180° apart in that crank disc 188 which is on the opposite side of the machine from the pawl 212. As herein shown, each of the crank discs 188 is provided with a slot 222 in which the crank pin 186 is adjustable to vary the throw of the crank pin from zero to a maximum. In this manner the positions of the rear side grippers lengthwise of the shoe may be varied, or the grippers may be positioned invariably at the same distance from the toe end of the shoe in operating upon successive shoes. There is also provision for varying the initial position of either rear side gripper for any given throw of the crank pin, each rod 184 having a slot 223 therein to permit it to be adjusted lengthwise relatively to the crank pin.

The connections between each of the slides 182 and the rear side gripper adjacent thereto are shown in detail in Figs. 6 and 7. Each slide 182 is provided with a head 224 extending laterally in both directions, and mounted in this head is a spindle 226 on which is a block 228 provided with a guideway 230. Mounted in the guideway 230 is a slide 232 provided with a recess in which is pivotally mounted a disc 234 extending from which is a link 236 having thereon a collar 238 located in a recess in the gripper casing 140. As the slide 182 is moved lengthwise of the shoe the gripper is thus carried with it, since the parts are so formed that the slide 232 is confined within the guideway 230.

The spindle 226 is rotatably mounted in the head 224 so that the block 228 may be positioned with its guideway 230 and slide 232 in different angular relations to the direction of the updraw movement of the rear side gripper, and in this manner the gripper may be made to have a component of movement lengthwise of the shoe, either forwardly or rearwardly, in the upper-pulling operation. The machine is further provided with means for controlling the guide blocks 228 and for positioning them in response to the gripper-positioning movements of the slides 182 so as to determine the direction and extent of the movements of the rear side grippers lengthwise of the shoe in accordance with their positions lengthwise of the shoe. For this purpose each block 228 is provided with gear teeth 240 in engagement with teeth 242 formed on a sleeve 244 which is fast on a rock shaft 246 mounted in the slide 182, and on one end of the rock shaft 246 is a crank arm 248 connected to a member 250 arranged to slide in a guideway formed in a guide block 252 which is ad-

justably pivoted on a pin 254 on the frame of the machine. The guide block 252 may be set manually in different positions so that its guideway is in any desired angular relation to the direction of movement of the slide 182 or is parallel thereto. In this manner the rock shaft 246 may be made to turn in either direction, to any desired extent, in response to the gripper-positioning movement of the slide 182, so as to position the guide block 228 to impart to the rear side gripper either foredrawing or reardrawing movement of any desired extent, or by the setting of the block 252 any such movement of the gripper lengthwise of the shoe in the upper-pulling operation may be eliminated. It may be preferred, for example, to adjust the parts so that the rear side gripper which operates at the outer side of the shoe shall have a reardrawing movement as it pulls the upper, while the gripper which operates at the inner side of the shoe has a foredrawing movement. The guide block 252, when set in angular relation to the direction of movement of the slide 182, causes a reversal of the inclination of the guide 228 relatively to the direction of the updraw movement of the gripper in response to movement of the slide 182 from one extreme to the other, and in this manner the direction of the movement of each rear gripper lengthwise of the shoe is changed as its position is shifted for rights and lefts. As the grippers are moved laterally of the shoe, the guide blocks 228 are carried with them, each spindle 226 being slidably mounted for this purpose and the teeth 242 on the sleeve 244 being long enough to permit the teeth 240 to continue to engage them in any position of the gripper. It will further be understood that the connections described between the slide 232 and the gripper casing are such as to permit the required relative movements between the gripper and the guide block 228.

The machine is also provided with means for wiping the upper inwardly over the insole and for driving upper-fastening tacks at the toe end and at the opposite sides of the shoe, this mechanism being similar in its general organization to the upper-fastening mechanism of prior machines as shown, for example, in Patent No. 1,029,387, there being provision for driving three tacks at each side, of which two are driven adjacent to the front side gripper and the third adjacent to the rear side gripper. Each of the side wiping and tacking mechanisms comprises, as usual heretofore, a side driver bar arm 256 mounted for swinging movements laterally of the shoe, and a driver bar 258 mounted in the arm 256 for operating the tack drivers. The means for operating and controlling the driver bar arms 256 and the driver bars 258 is of substantially the same construction as in prior machines. In view of the provision in the present machine of means for effecting movements of the rear side grippers lengthwise of the shoe, the machine is provided with means for similarly varying the positions of the overwiping and tacking devices which drive the tacks adjacent to these grippers. It will be seen that there is mounted for sliding movement on the head 224 a carrier 260 which is provided at its inner end with overwiping and tacking devices, indicated generally at 262, which are substantially the same construction as the devices provided for overwiping and tacking the upper at the toe end of the shoe in the machine shown in Patent No. 1,029,387. Since these overwiping and tacking devices are mounted on the head 224, it will be evident that they are moved lengthwise of the shoe with the corresponding rear side gripper when the gripper receives such movement from the operation of the slide 182, the driver bar arm 256 being restrained from movement therewith. Included in the tacking mechanism 262 which is mounted on the carrier 260 is a slide 264 for operating the tack driver.

Mounted for swinging movement coaxially with the arm 256 at the front side thereof is another arm 266 which carries at its lower end overwiping and tacking devices indicated generally at 268, which are similar to the devices 262 but so modified as to drive two tacks adjacent to the front side gripper. The driver bar arm 256 is provided at its lower end with an outwardly projecting boss 270 upon which is pivotally mounted a rocking lever 272, adapted to serve as an equalizing lever, the opposite ends of which are arranged to contact respectively with an abutment face 274 on the carrier 260 and with an abutment 276 on the arm 266. Two springs 278 and 280 connect the lever 272 to the carrier 260 and the arm 266, so that the overwiping and tacking devices 262 and 268 accompany the driver bar arm 256 in its inward and outward movements but are permitted to move relatively to each other to accomodate their positions to shoes of different shapes. The lever 272 has on its outer side two faces which are arranged to contact with a bracket 282 on the frame of the machine when the driver bar arm is moved to its outermost position, so that the wiping and tacking devices are always centralized when they are returned to inoperative position ready to receive tacks preparatory to a new cycle of operations.

The driver bar 258 has near its lower end a pivot 284 upon which are mounted two swinging links 286 provided with claw-shaped lower ends to enter a recess in the lower end of the driver bar to prevent movement of the links away from the driver bar.

One of these links has on its lower end a lug 288 which projects into a slot formed in a driver slide 290 mounted upon the swinging arm 266, this slide carrying at its lower end tack drivers for driving the two tacks adjacent to the front side gripper. The other link 286 carries a lug 292 which provides a similar connection between the link and the driver slide 264 for driving the rear tack, this lug, however, being elongated to allow for the movement lengthwise of the shoe of the rear wiping and tacking mechanism 262. It will be understood that this construction provides a continuous connection between the driver bar 258 and the driver slides 264 and 290 whatever may be the relative positions of the different overwiping and tacking devices.

In the operation of the machine, briefly summarized, the operator presents to the machine a right or a left shoe, depending upon the setting of the side pulling and tacking devices as determined at the end of the preceding cycle, or in case the machine is not set to operate upon that shoe of a pair which he has in hand, the operator may so adjust it by turning the shaft 190 by means of the member 216. In the first stage of the cycle the upper is gripped and pulled by the toe gripper 20 and by the front side grippers 30, the latter receiving a foredrawing movement if the links 152 are adjusted, as they preferably will be, to effect such movement. In this stage of the cycle the rear side grippers 30 are prevented from closing by reason of the action of the toggles 58, 60 on the rear gripper levers 36, notwithstanding the tensioning of the springs 48 that act on these levers. The operator is thus enabled, during the ensuing pause in the cycle of the machine, to straighten the tip or otherwise to adjust the upper by relative movements of the front side grippers while the portions of the margin of the upper at the rear of these grippers are still free.

When the shoe is in proper condition for the rear side grippers 32 to act, the operator again depresses the starting treadle 76, which is prevented by the stop 102 from moving far enough at this time to start the machine, and which, therefore, acts only to break the toggles 58, 60 and thereby to release the rear side gripper levers to the action of their tensioned updraw springs. The rear side grippers are thus closed and operated to pull the upper, and if their controlling devices are adjusted to produce the results hereinbefore described as preferable, that rear gripper which operates at the outer side of the shoe receives a reardrawing movement while the rear gripper at the inner side of the shoe receives a foredrawing movement during the updraw. The operator is then enabled again to inspect the shoe and to effect any further manipulation of the front side grippers that may appear to be necessary or desirable.

When the machine is again started by depression of the starting treadle, the overdrawing and overwiping operations and the upper-fastening operations take place, both at the end of the toe and at the sides of the forepart, in the well-known manner, the spacing of the side tacks being so determined that the rearmost tack at the outer side of the shoe is positioned farther rearwardly than the corresponding tack at the inner side. In the return of the parts of the machine to positions of rest the side pulling and tacking devices are set automatically to operate in the next cycle upon the other shoe of the pair, this setting of the parts including the positioning of that rear side gripper which is to operate at the outer side of the next shoe farther rearwardly than the corresponding gripper at the other side.

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

1. A machine of the class described having, in combination, a plurality of grippers for pulling an upper respectively in different locations at the same side of a last, and means for effecting relative movement of said grippers lengthwise of the last in the upper-pulling operation.

2. A machine of the class described having, in combination, a plurality of grippers for pulling an upper respectively in different locations at the same side of a last, means for effecting relative movement of said grippers and the last heightwise of the last to pull the upper, and mechanism automatically operative in said relative upper-pulling movement to effect relative movement of said grippers lengthwise of the last.

3. A machine of the class described having, in combination, a plurality of grippers for pulling an upper respectively in different locations at the same side of a last, and means for effecting relative upper-pulling movement of said grippers and the last comprising mechanism for imparting to the gripped margin of the upper in one location a foredrawing movement and in another location a reardrawing movement.

4. A machine of the class described having, in combination, a plurality of grippers for pulling an upper respectively in different locations at the same side of a last, and means for imparting to one of said grippers in the upper-pulling operation reardrawing movement relatively to another of said grippers.

5. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, means for imparting to the front side

gripper foredrawing movement, and means for imparting to the rear side gripper reardrawing movement.

6. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, means for effecting relative movement of said grippers and the last heightwise of the last to pull the upper, and mechanism automatically operative in said relative upper-pulling movement to impart to the front side gripper a forward movment toward the toe end of the last and to the rear side gripper a rearward movement.

7. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, operating means for imparting updraw movement to said grippers, a device operative in response to the updraw movement of the front side gripper to impart thereto a foredrawing movement, and a device operative in response to the updraw movement of the rear side gripper to impart thereto a reardrawing movement.

8. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and mechanism automatically operative in the upperpulling operation to impart to the front side gripper a foredrawing movement relatively to the rear side gripper.

9. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and mechanism automatically operative in the upper-pulling operation to impart to the rear side gripper a reardrawing movement relatively to the front side gripper.

10. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and separate controlling devices for the different respective grippers arranged to be positioned to impart to both grippers in the upper-pulling operation foredrawing movement lengthwise of the last.

11. A machine of the class described having, in combination, a plurality of grippers for pulling an upper respectively in different locations at the same side of a last, and automatic means for effecting relative movement of said grippers lengthwise of the last in the upper-pulling operation, comprising mechanism adjustable to vary the extent of said relative movement.

12. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and mechanism automatically operative in the upper-pulling operation to impart to the front side gripper a foredrawing movement relatively to the rear side gripper, said mechanism being adjustable to vary the extent of the foredrawing movement.

13. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and mechanism automatically operative in the upper-pulling operation to impart to the rear side gripper a reardrawing movement relatively to the front side gripper, said mechanism being adjustable to vary the extent of the reardrawing movement.

14. A machine of the class described having, in combination, a plurality of grippers for pulling an upper respectively in different locations at the same side of a last, means for effecting relative movement of said grippers and the last heightwise of the last to pull the upper, and mechanism automatically operative in the upper-pulling operation to effect relative movement of said grippers lengthise of the last, said mechanism being adjustable to eliminate such relative movement of the grippers.

15. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and means adjustable to impart to the rear side gripper in the upper-pulling operation, independently of the front side gripper, either a foredrawing movement or a reardrawing movement.

16. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, mechanism automatically operative in the upper-pulling operation to impart to the front side gripper a foredrawing movement, and mechanism for controlling the rear side gripper independently of the front side gripper to impart thereto in the upper-pulling operation either a foredrawing movement or a reardrawing movement.

17. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and mechanism adjustable at the will of the operator to impart to the rear side gripper in the upper-pulling operation a reardrawing movement relatively to the front side gripper or to eliminate said reardrawing movement.

18. A machine of the class described having, in combination, a gripper for pulling an upper at the side of a last, means for effecting relative movement of said gripper and

the last heightwise of the last to pull the upper, and mechanism automatically operative in said relative movement to impart to the gripper a rearward movement lengthwise of the last.

19. A machine of the class described having, in combination, a gripper for pulling an upper at the side of a last, means for effecting relative movement of said gripper and the last heightwise of the last to pull the upper, and a controlling device automatically operative in said relative movement to impart to the gripper a movement lengthwise of the last, said controlling device being adjustable to cause the gripper to move either forwardly or rearwardly.

20. A machine of the class described having, in combination, a gripper for pulling an upper at the side of a last, means for effecting relative movement of said gripper and the last heightwise of the last to pull the upper, a controlling device automatically operative in said relative movement to impart to the gripper a movement lengthwise of the last either forwardly or rearwardly in accordance with the position of said device, and automatic means for setting said controlling device to impart to the gripper a forward movement in operating on one shoe and a rearward movement in operating on the next shoe.

21. A machine of the class described having, in combination, upper-pulling means comprising a plurality of grippers for pulling an upper at the same side of a last, controlling mechanism for effecting relative movement of said grippers lengthwise of the last in the upper-pulling operation, and automatic means for varying said controlling mechanism to cause different relative movements of said grippers in operating successively on right and left shoes.

22. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, controlling mechanism for imparting to the rear side gripper in the upper-pulling operation a movement relatively to the front side gripper lengthwise of the last either forwardly or rearwardly in accordance with the position of said mechanism, and automatic means for setting said mechanism to impart to said rear side gripper a forward movement in operating on one shoe and a rearward movement in operating on the next shoe.

23. A machine of the class described having, in combination, a gripper for pulling an upper at the side of a last, and automatic means for positioning said gripper to operate at different distances from the toe end of the last in operations of the machine successively on right and left shoes.

24. A machine of the class described having, in combination, a gripper for pulling an upper at the side of a last, and automatic means for imparting to said gripper a forward positioning movement after the operation of the machine on one shoe and a rearward positioning movement after the operation of the machine on the next shoe.

25. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and automatic means for varying the initial distance between said grippers in operations of the machine successively on right and left shoes.

26. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and automatic means for imparting to the rear side gripper a positioning movement toward the front side gripper after the operation of the machine on one shoe and a positioning movement away from the front side gripper after the operation of the machine on the next shoe.

27. A machine of the class described having, in combination, a gripper for pulling an upper at the side of a last, a controlling device for imparting to said gripper in the upper-pulling operation a movement lengthwise of the last either forwardly or rearwardly in accordance with the position of said device, and means for positioning said gripper to operate at different distances from the toe end of the last in operations of the machine successively on right and left shoes and for simultaneously setting said controlling device to impart to the gripper a forward movement in operating on one shoe and a rearward movement in operating on the next shoe.

28. A machine of the class described having, in combination, a gripper for pulling an upper at the side of a last, and means for variably positioning said gripper lengthwise of the last and for imparting thereto either a foredrawing movement or a reardrawing movent in accordance with its position.

29. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, and means for variably positioning the rear side gripper lengthwise of the last relatively to the front side gripper and for imparting to said rear gripper either a foredrawing movement or a reardrawing movement in accordance with its position.

30. A machine of the class described having, in combination, upper-pulling means comprising a plurality of grippers for pulling an upper at the same side of a last, controlling mechanism for effecting relative

movement of said grippers lengthwise of the last in the upper-pulling operation, said controlling mechanism being adjustable to vary said relative movement, and means for varying the initial distance between said grippers and for simultaneously adjusting said controlling mechanism.

31. A machine of the class described having, in combination, upper-pulling means comprising a plurality of grippers for pulling an upper at each side of a last, and mechanism automatically operative in the upper-pulling operation to effect relative movement lengthwise of the last between different grippers at each side of the last.

32. A machine of the class described having, in combination, upper-pulling means comprising a plurality of grippers for pulling an upper at each side of a last, and automatic means for effecting, in the upper-pulling operation, between different grippers at each side of the last relative movement lengthwise of the last differing at one side of the last from that at the other side.

33. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and means for effecting in the upper pulling operation relative movement lengthwise of the last between the front and rear grippers at each side of the last.

34. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and mechanism automatically operative in the upper-pulling operation to impart to the front grippers at the opposite sides of the last foredrawing movement relatively to the rear grippers.

35. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and mechanism automatically operative in the upper-pulling operation to impart to the rear grippers at the opposite sides of the last movements lengthwise of the last relatively to the front grippers.

36. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and controlling devices for the rear grippers arranged to impart to one of said grippers in the upper-pulling operation a foredrawing movement and to the other of said grippers a reardrawing movement.

37. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and means for imparting to the front and rear grippers independently of one another in the upper-pulling operation movements lengthwise of the last.

38. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and means for imparting to the rear grippers in the upper-pulling operation movements lengthwise of the last relatively to the front grippers and differing respectively at the opposite sides of the last.

39. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and automatic means for imparting only to that rear gripper which pulls the upper at the outer side of the last a reardrawing movement in the upper-pulling operation.

40. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and devices for controlling the rear grippers independently of the front grippers to impart to either of said rear grippers a reardrawing movement and to the other rear gripper simultaneously a foredrawing movement.

41. A machine of the class described having, in combination, front and rear side grippers differently movable relatively to each other in the upper-pulling operation at the opposite sides of a last respectively, and automatic means for alternating the different relative movements between the opposite sides of the last in successive operations of the machine on right and left shoes.

42. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, devices for moving one of the rear grippers forwardly and the other rearwardly lengthwise of the last in the upper-pulling operation, and automatic means for alternating the forward and rearward movements of said grippers between the opposite sides of the last in successive operations of the machine on right and left shoes.

43. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and means automatically operative in the upper-pulling operation to impart to the front grippers foredrawing movement and to impart to one

of the rear grippers foredrawing movement and to the other reardrawing movement.

44. A machine of the class described having, in combination, means for pulling over right and left shoes comprising front and rear grippers for pulling the upper at each side of a shoe, and automatic means for imparting to that rear gripper which pulls the upper at the inner side of a shoe a foredrawing movement and to that rear gripper which pulls at the outer side of the shoe a reardrawing movement.

45. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, and controlling devices arranged to be differently positioned to impart to either of the rear grippers independently of the front grippers either a foredrawing movement or a reardrawing movement.

46. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, means for spacing the rear gripper farther rearwardly from the front gripper at the outer side of the last than at the inner side, and automatic means for imparting only to the rear gripper at the outer side a reardrawing movement in the upper-pulling operation.

47. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last, means for imparting updraw movement to said grippers, and links extending forwardly from said grippers and arranged to act in response to the updraw movement of the grippers to impart thereto foredrawing movement.

48. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last, means for imparting updraw movement to said grippers, links extending forwardly from said grippers and arranged to act in response to the updraw movement of the grippers to impart thereto foredrawing movement, and tip-straightening mechanism arranged to act through said links to effect relative movements of the grippers lengthwise of the last.

49. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last, means for imparting updraw movement to said grippers, links arranged to act in response to the updraw movement of the grippers to impart thereto foredrawing movement, members to which said links are adjustably connected for varying the extent of the foredrawing movement, and means for moving said members bodily to impart tip-straightening movement to the grippers.

50. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last, and mechanism automatically operative in the upper-pulling operation to impart to the gripper at one side a foredrawing movement and to the gripper at the other side a reardrawing movement.

51. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last, controlling devices for imparting to the gripper at one side a foredrawing movement and to the gripper at the other side a reardrawing movement, and automatic means for shifting said controlling devices to alternate the foredrawing and reardrawing movements between the opposite side grippers in operations of the machine successively on right and left shoes.

52. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last, and automatic means for positioning said grippers in different relations to each other preparatory to operating respectively on right and left shoes.

53. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last, controlling mechanism for imparting to each of said grippers either foredrawing or reardrawing movement, and automatic means for positioning said grippers in different relations to each other for operating respectively on right and left shoes in successive operations of the machine and for also setting said controlling mechanism to impart to the gripper at the inner side of each shoe a foredrawing movement and to the gripper at the outer side a reardrawing movement.

54. A machine of the class described having, in combination, a plurality of grippers for pulling an upper at the side of a last, means for operating the different grippers at different respective times to pull the upper, and mechanism automatically operative in an upper-pulling operation to effect relative movement of said grippers lengthwise of the last.

55. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, means for effecting relative movements of said grippers and the last to cause first one gripper and then the other to pull the upper, and automatic means for imparting to one of said grippers a movement relatively to the other lengthwise of the last in an upper-pulling operation.

56. A machine of the class described hav-

ing, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, means for effecting relative movements of said grippers and the last to cause first one gripper and then the other to pull the upper, and mechanism automatically operative in the upper-pulling operation of each gripper to impart to that gripper movement relatively to the other lengthwise of the last.

57. A machine of the class described having, in combination, different grippers for pulling an upper at the same side of a last, means for operating one of said grippers to pull the upper before another is closed on the upper, and automatic means for imparting to the first gripper in its upper-pulling operation movement relatively to the other lengthwise of the last.

58. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, means for closing the front side gripper and for operating it to pull the upper before the upper is gripped by the rear side gripper, and mechanism for imparting to said front gripper foredrawing movement in its upper-pulling operation.

59. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, means for closing the front side gripper and for operating it to pull the upper with a foredrawing movement before the upper is gripped by the rear side gripper, and means for thereafter closing the rear side gripper and for operating it with a reardrawing movement.

60. A machine of the class described having, in combination, front and rear side grippers for pulling an upper respectively in different locations at the same side of a last, means for closing and operating the different grippers at different respective times, and automatic means for imparting to each gripper movement relatively to the other lengthwise of the last in the upper-pulling operation.

61. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, means for closing the front grippers and for operating them with a foredrawing movement before the upper is gripped by the rear grippers, and means for thereafter closing the rear grippers and operating them to pull the upper.

62. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, means for closing the front grippers and for operating them with a foredrawing movement before the upper is gripped by the rear grippers, means for thereafter closing and operating the rear grippers, and mechanism automatically operative in the pulling movement of the rear grippers to impart to one of said rear grippers a foredrawing movement and to the other a reardrawing movement.

63. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, means for closing the front grippers and for operating them to pull the upper before the upper is gripped by the rear grippers, and means for thereafter closing the rear grippers and for operating them to pull the upper with movements respectively in different directions lengthwise of the last.

64. A machine of the class described having, in combination, means for pulling over the uppers of right and left shoes comprising front and rear grippers for pulling the upper respectively in different locations at the opposite sides of a last, means for first closing and operating the front grippers and for thereafter closing and operating the rear grippers, and automatic means for imparting to that rear gripper which pulls the upper at the inner side of the shoe a foredrawing movement and to the other rear gripper a reardrawing movement.

65. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the side of a last, and power-driven means for pulling the upper through one of said grippers and for then bringing the machine automatically to a stop prior to the upper-pulling operation of another gripper.

66. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the side of a last, means for closing one of said grippers and for imparting thereto updraw movement to pull the upper, and power-operated means for closing and operating the other gripper after the completion of the updrawing operation of the first gripper.

67. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the side of a last, power-driven cam means for effecting the pulling of the upper through one of said grippers while the other gripper is idle and for then holding the upper under tension with the machine at rest, and manually-controlled spring means for operating the other gripper to pull the upper while the machine is thus at rest.

68. A machine of the class described hav-

ing, in combination, different grippers for pulling an upper respectively in different locations at the side of a last, updraw springs associated respectively with the different grippers for closing and operating them, means for tensioning said springs at one operation, and a device for preventing one of said grippers from closing and operating to pull the upper under the influence of its updraw spring during the operation of the other gripper, said device being movable thereafter to release the first gripper to the operation of its spring.

69. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the side of a last, updraw springs associated respectively with the different grippers for closing and operating them, means for tensioning said springs, a toggle for holding one of said grippers from operating under the influence of its updraw spring while the other gripper is operating, and means for thereafter breaking said toggle to release the first gripper to the action of its spring.

70. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, means for effecting relative movement of the last and the front grippers to pull the upper and for then bringing the machine automatically to a stop before the upper is pulled by the rear grippers, and means for thereafter effecting relative movement of the last and the rear grippers to pull the upper.

71. A machine of the class described having, in combination, grippers for pulling an upper at the opposite sides of a last comprising at each side of the last a front gripper and a rear gripper, automatic means for effecting relative movement of the last and the front grippers to pull the upper and for then bringing the machine to a stop before the rear grippers are closed on the upper, mechanism for effecting relative movement of the front grippers to adjust the upper while the machine is thus at rest, and power-operated means for thereafter effecting relative movement of the last and the rear grippers to pull the upper.

72. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the same side of a last, separate updraw levers for the different respective grippers, means for operating said levers, and a device common to both levers for retarding their operative movements.

73. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the same side of a last, separate updraw levers for the different respective grippers, means for operating said levers, a fluid check common to both levers for retarding their operative movements, and equalizing connections between said levers and the fluid check to permit the levers to move relatively to each other.

74. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the same side of a last, means for operating said grippers respectively at different times, and a device common to both grippers for retarding their operative movements.

75. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the same side of a last, means for operating one of said grippers prior to the other, a spring arranged to be released to operate the other gripper, and a device for retarding the operative movement of said other gripper under the action of the spring.

76. A machine of the class described having, in combination, different grippers for pulling an upper respectively in different locations at the same side of a last, means for operating one of said grippers prior to the other, a spring arranged to be released to operate the other gripper, and mechanism common to both grippers for retarding their operative movements comprising connections arranged to permit said grippers to move relatively to each other.

77. A machine of the class described having, in combination, means for pulling an upper at the opposite sides of a last comprising for each side of the last a plurality of separately controlled grippers, and a device common to all of said grippers for retarding their operative movements.

78. A machine of the class described having, in combination, means for pulling an upper at the opposite sides of a last comprising for each side of the last a plurality of grippers arranged to be operated respectively at different times, a fluid check common to all of said grippers for retarding their operative movements, and equalizing connections between said fluid check and the grippers arranged to permit said grippers to move relatively to one another.

79. A machine of the class described having, in combination, a plurality of grippers for pulling an upper at the same side of a last, said grippers being relatively movable lengthwise of the last, and a plurality of upper-fastening devices also relatively movable lengthwise of the last to vary relatively the positions of the fastenings.

80. A machine of the class described having, in combination, front and rear grippers

for pulling an upper at the same side of a last, one of said grippers being movable relatively to the other lengthwise of the last, a plurality of fastening devices for fastening the upper, and connections for moving one of said fastening devices independently lengthwise of the last with said movable gripper.

81. A machine of the class described having, in combination, front and rear grippers for pulling an upper at the same side of a last, a member connected to said rear gripper for positioning it lengthwise of the last relatively to the front gripper, a plurality of fastening devices for fastening the upper, and connections between said member and one of the fastening devices for imparting thereto positioning movement with the rear gripper.

82. A machine of the class described having, in combination, means for pulling an upper at the opposite sides of a last comprising for each side of the last a plurality of grippers, means for spacing said grippers differently lengthwise of the last at the opposite sides of the machine for operating respectively on right and left shoes, a plurality of fastening devices for each side of the last, and means for varying relatively the spacing of the opposite side fastening devices with that of the grippers.

83. In a machine of the class described, the combination with means for pulling-over an upper, of upper-fastening mechanism comprising a tacker arm movable laterally of the shoe, a plurality of tacking devices relatively movable laterally of the shoe, and an equalizing device carried by said tacker arm for pressing said tacking devices inwardly toward the shoe while permitting their relative movements.

84. In a machine of the class described, the combination with means for pulling-over an upper, of upper-fastening mechanism comprising a tacker arm movable laterally of the shoe, a tacking device mounted independently of said tacker arm for sliding movement laterally of the shoe, another tacking device pivotally supported on said tacker arm for swinging movement laterally of the shoe, and an equalizing lever on said tacker arm for pressing said tacking devices inwardly toward the shoe while permitting them to move relatively to each other.

In testimony whereof we have signed our names to this specification.

ROBERT HENRY SILVESTER.
ARTHUR BATES.