B. JORGENSEN.

MACHINE FOR WORKING UPPERS OVER LASTS.

APPLICATION FILED MAY 3, 1918.

1,430,559.

Patented Oct. 3, 1922.

6 SHEETS—SHEET 1.

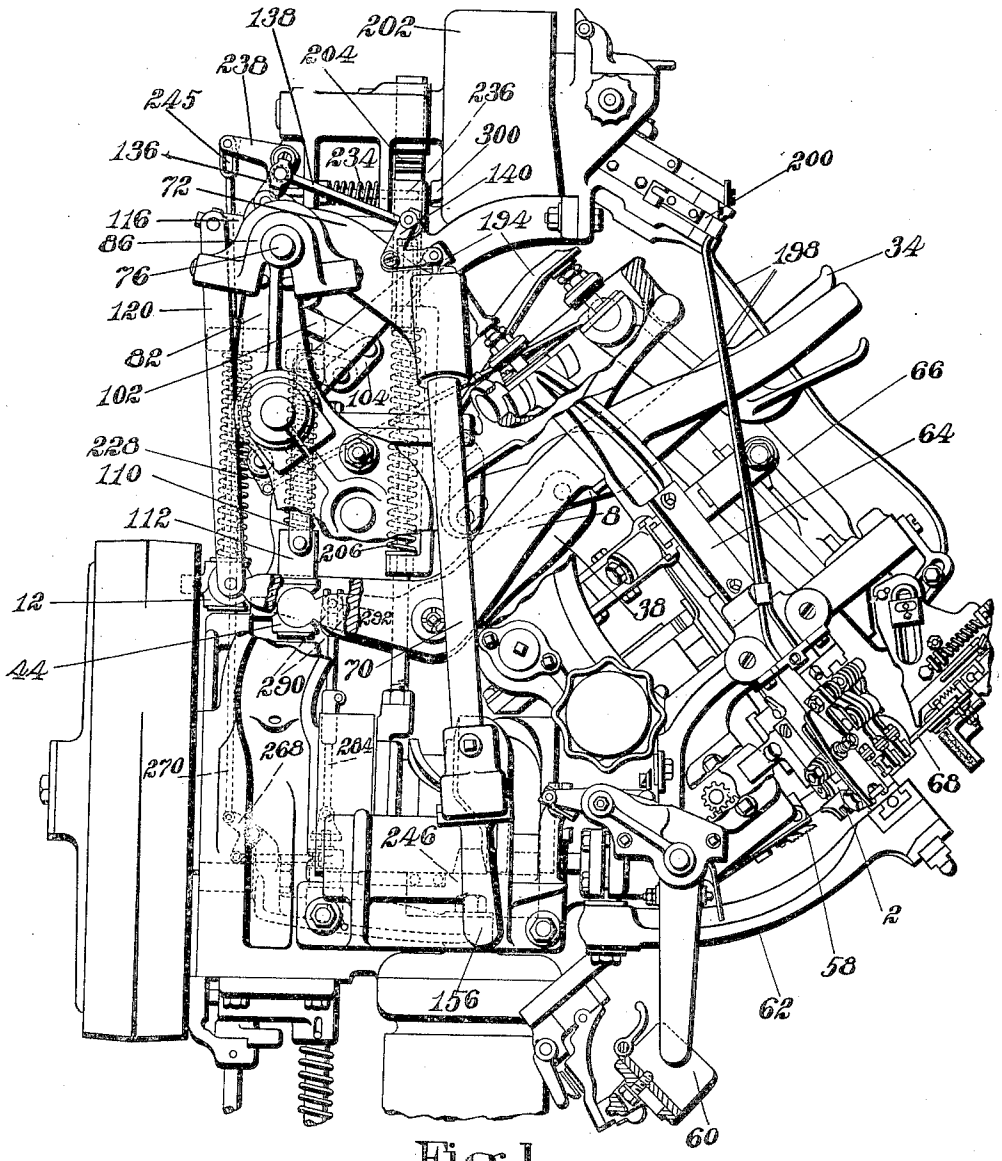


Fig. 1.

INVENTOR.

Bernhard Jorgensen

By his Attorney,

Nelson B. Howard

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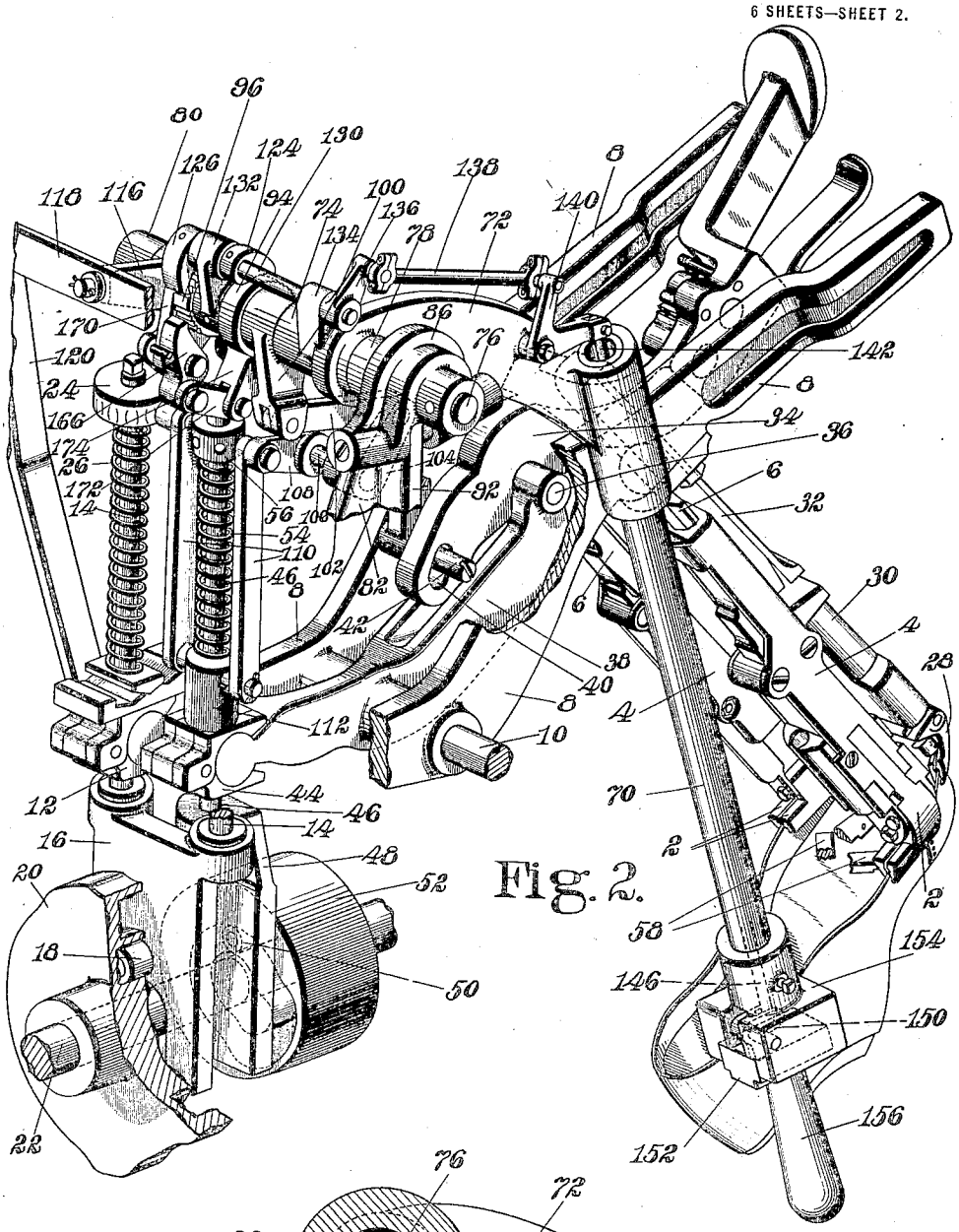


Fig. 2.

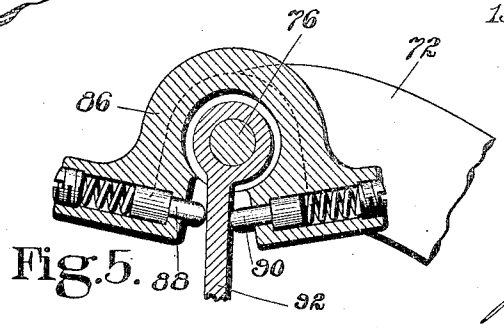


Fig. 5.

INVENTOR.

Bernhard Jorgensen

By his Attorney

Nelson H. Howard

B. JORGENSEN.

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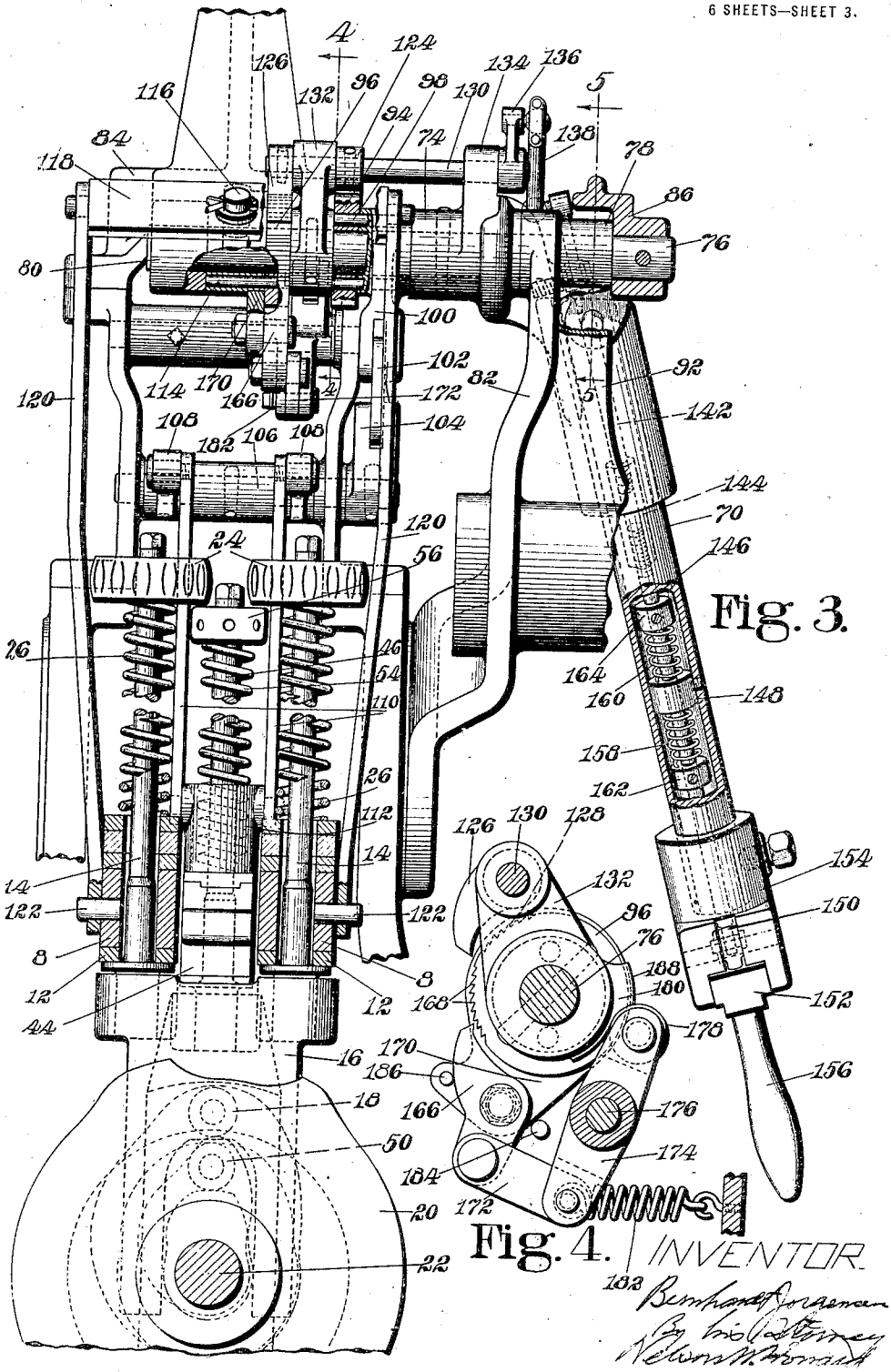


Fig. 3.

Fig. 4.

INVENTOR.

Bernhard Jorgensen

By his Attorney

Edwin M. Howard

B. JORGENSEN.

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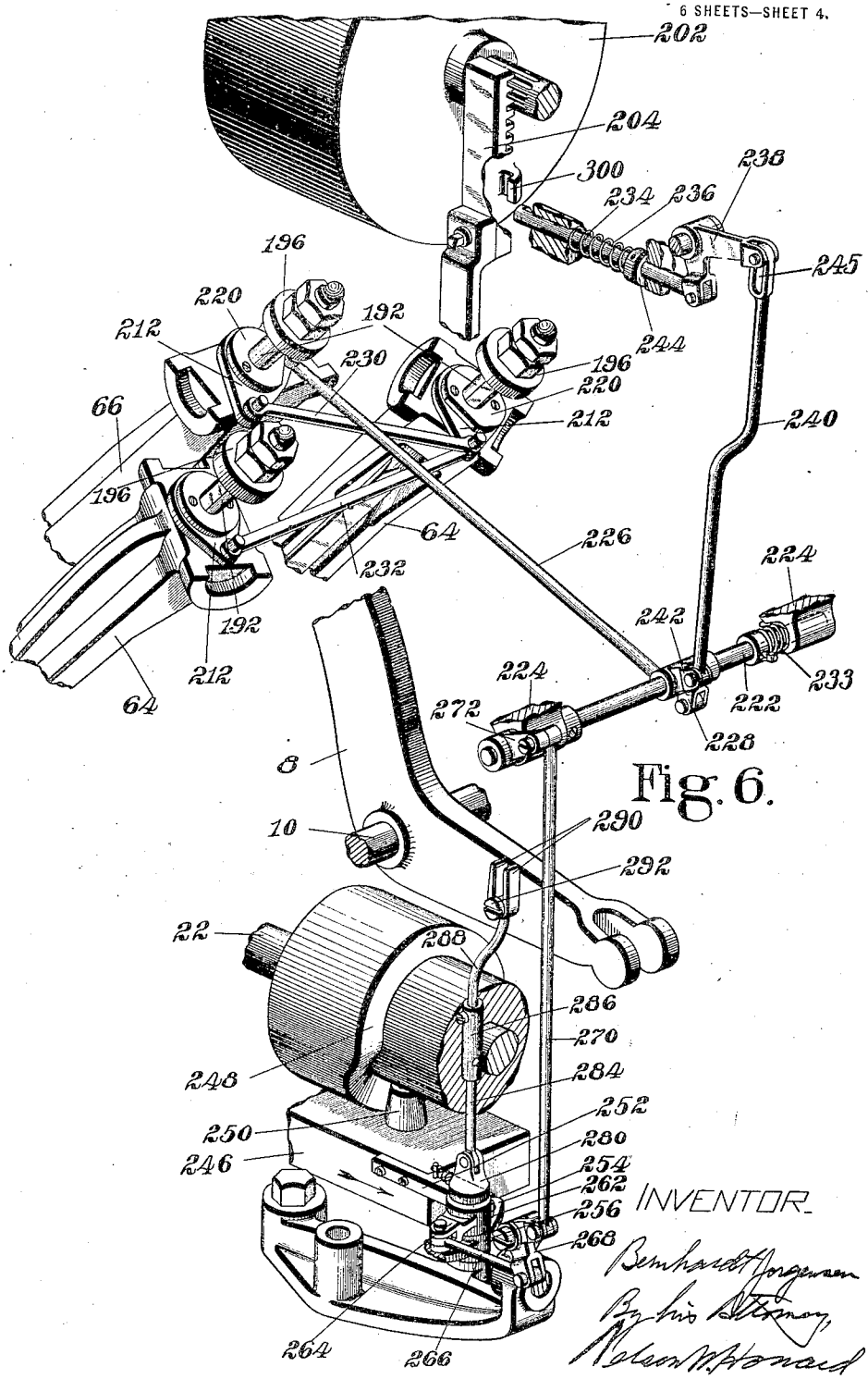


Fig. 6.

INVENTOR.

Bernhard Jorgensen

By his Attorney

Nelson W. Stanard

B. JORGENSEN.

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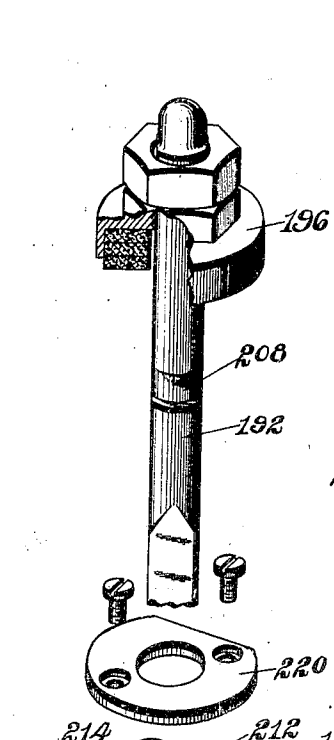


Fig. 7.

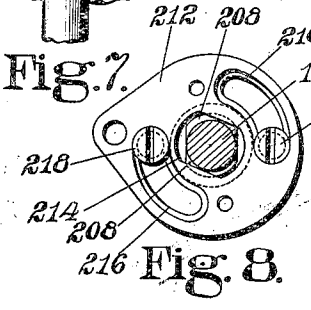


Fig. 8.

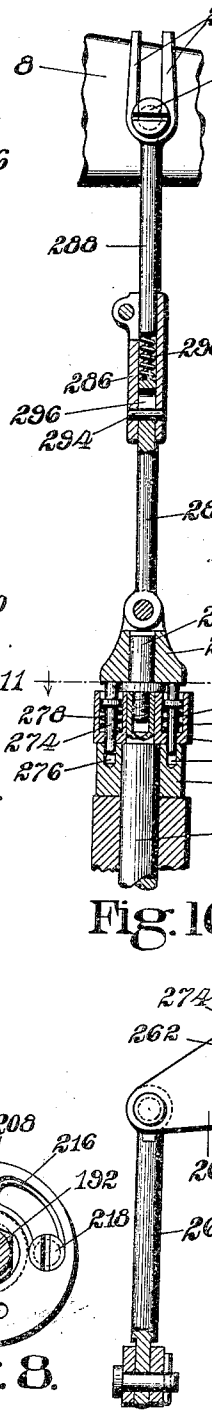


Fig. 10.

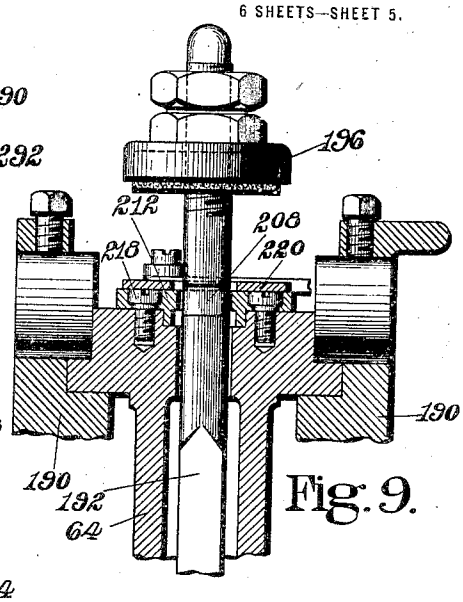


Fig. 9.

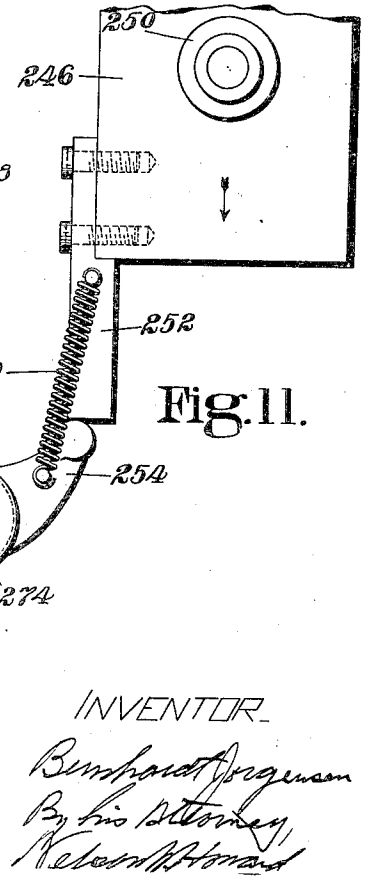


Fig. 11.

INVENTOR.

Bernhard Jorgensen

By his Attorney,

Nelson B. Howard

B. JORGENSEN.

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6 SHEETS-SHEET 6.

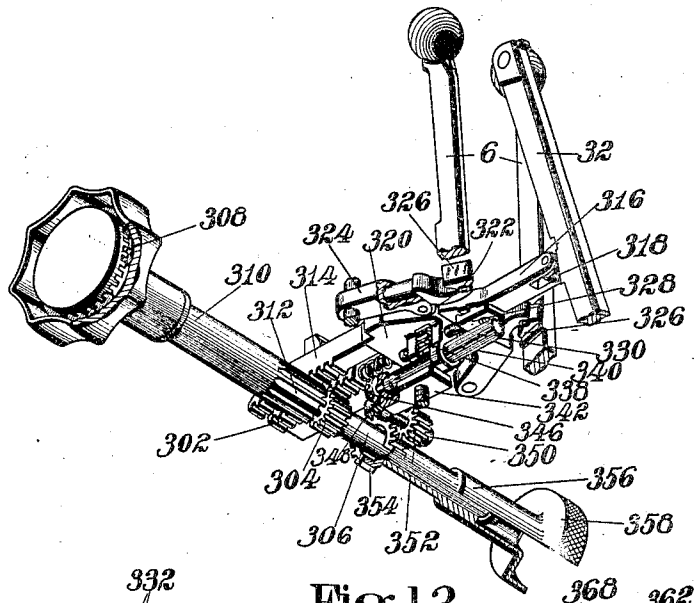


Fig. 12.

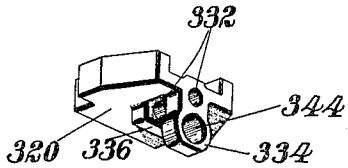


Fig. 13.

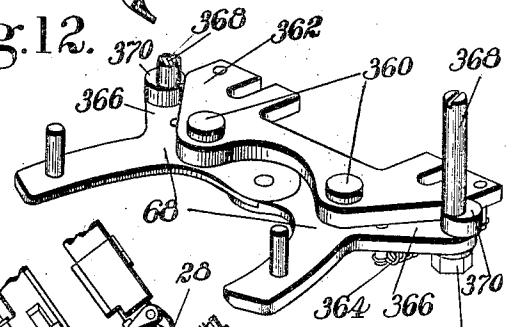


Fig. 14.

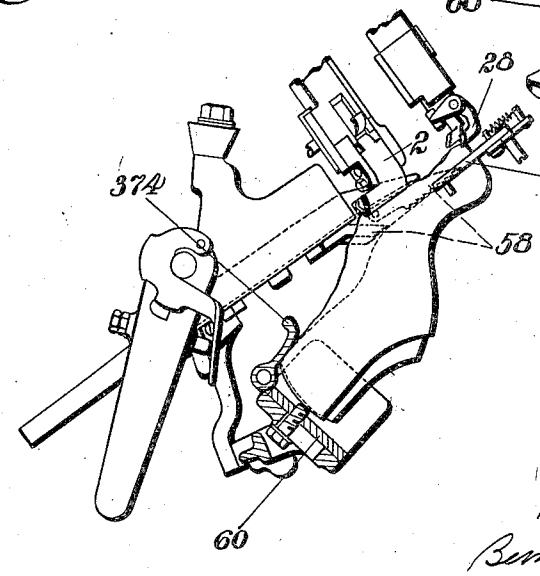


Fig. 15.

INVENTOR.

Bernhard Jorgensen

By his Attorney

Nelson M. Howard

Patented Oct. 3, 1922. 1,430,559

UNITED STATES PATENT OFFICE.

BERNHARDT JORGENSEN, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR WORKING UPPERS OVER LASTS.

Application filed May 3, 1918. Serial No. 232,238.

To all whom it may concern:

Be it known that I, BERNHARDT JORGENSEN, a subject of the King of Denmark, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Machines for Working Uppers Over Lasts, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for use in the manufacture of boots and shoes and in some of its important aspects has particular reference to machines for working uppers over lasts. The invention is herein shown in its application to a well-known type of machine having means for pulling the upper over the last and also means for lasting the toe portion of the shoe, machines comprising such combination of lasting means with pulling-over means being used at the present time principally in the manufacture of turn shoes. In its broader aspects, however, and in many of its features the invention is not limited to machines for performing both pulling-over and lasting operations nor to machines designed particularly for turn shoe work.

Machines of the illustrative type include in their organization a gripper or grippers for engaging the margin of the upper at the toe end of the last and other grippers for engaging the upper at opposite sides of the forepart of the last, together with means for effecting relative movement of the last and the several grippers to stretch the upper longitudinally and transversely of the last. After the upper has been stretched the machine comes to rest with the upper held under tension by the grippers to permit the operator to inspect the work and to make any adjustment that may be necessary for the purpose of correcting the position of the upper in its relation to the last or of changing the relative tension of different portions of the upper prior to the subsequent operation of the machine to carry the margin of the upper over the bottom of the sole or insole and fasten it in place. The several grippers are under the control of springs which are tensioned more or less in the upper stretching operation and thus cause the pull upon the upper to be effected yieldingly and also permit the different grippers to be moved by hand during the pause in the machine's operations for the purpose of increasing or relaxing the tension of the upper at the toe or at the sides of the shoe or for the purpose of adjusting portions of the upper transversely or lengthwise of the last.

The best results in the pulling-over operation frequently require that an additional upper pulling movement be imparted to the toe gripper after the machine has come to rest with the upper held under tension. Such necessity may arise from the common practice of adjusting the toe gripper operating mechanism to impart to the upper a tension less than the required final tension, in order to avoid displacement of the tip seam, lengthwise displacement of the last under the strain of the upper against the toe end of the last, or on some styles of shoes to avoid bridging of the upper over the top of the forepart of the last in such manner as to prevent the upper from being drawn down to the wood of the last by the action of the side grippers. It has accordingly been the usual practice heretofore for the operator to reach upward and manipulate the toe gripper lever to increase the strength of the pull of the gripper upon the upper. In order to facilitate such additional stretching of the upper lengthwise of the last and over the toe, it is desirable that the tension of the upper across the forepart be somewhat relaxed and that such transverse tension be restored subsequently to the additional lengthwise stretching. In some cases also it is desirable to impart to the side grippers a supplemental pulling movement irrespective of any conditions dependent upon a supplemental pulling movement of the toe gripper, in order to tension the upper properly across the last. In order to accomplish these results more or less manipulation of the side gripper levers is required in addition to the manipulation of the toe gripper lever in the manner above explained.

It is one important object of this invention to provide improved means for effecting more expeditiously and with less fatigue for the operator than heretofore such movement of a gripper or grippers as to produce in the upper the precise degree of tension desired. In its illustrative embodiment the invention provides novel means convenient for

manipulation by the operator for moving different grippers in different directions. The construction shown comprises means for imparting an upper pulling movement to the toe gripper and for imparting to the side grippers during such movement of the toe gripper a movement in a direction to relax the transverse tension of the upper. A further advantageous characteristic of the novel construction wherein this feature of the invention is shown as embodied is that the relaxing movement of the side grippers is limited irrespective of continued pulling movement of the toe gripper, thus permitting the upper to be pulled at the toe as hard as desired without danger of unduly relaxing the transverse tension. The construction shown also includes provision for movement of the side grippers to increase the transverse tension of the upper independently of any movement of the toe gripper. Conveniently the operator is enabled, in the use of the construction shown, by movement of a hand lever in one direction to impart a supplemental pulling movement to the toe gripper and a relaxing movement automatically limited in extent to the side grippers, and by a movement of the hand lever in the opposite direction, either subsequently or irrespective of any previous operation of the lever to move the side grippers in a direction to increase the transverse tension of the upper.

Another important feature of the invention consists in novel means arranged to be rendered operative under abnormal conditions for suspending a normal function of a portion of a machine. A particular object in view as applied to a machine equipped for inserting fasteners such, for example, as tacks, is to prevent under abnormal conditions driving of fasteners or wasteful discharge of the fasteners. In the operation of machines of the illustrative type it sometimes happens that after the machine has stopped at the end of its upper pulling movement it becomes necessary, by reason of an abnormal condition in respect to the action of one or more of the grippers, to perform the upper pulling operation a second time before the upper is fastened. In such case the shoe is usually released manually from the upper pulling means, and the machine is then caused to complete its operating cycle to bring the parts again to starting position ready to receive and pull the upper the second time. The construction herein shown comprises means which acts automatically upon premature release of the shoe by a gripper, or in the absence of a shoe, to prevent, during the completion of the cycle of movements of the machine, any discharge or driving of the several tacks which the machine would normally have driven for securing the upper in place. Included in the illustrative construction embodying this feature is also means for preventing the delivery of additional tacks to the drivers until after the utilization of the tacks already in position to be driven and which the machine would normally have driven if the operation of the driving means had not been interrupted.

Further features of the invention reside in novel means for varying the normal distance between the grippers at the opposite sides of the shoe, novel means for varying the limit of opening movement of the end lasting wipers, novel means for positioning the shoe and the last, and in various details of construction and combinations of parts which will now be described with reference to the accompanying drawings and pointed out in the claims.

In the drawings,

Figure 1 is a view in side elevation of the head portion of a pulling-over and toe lasting machine in which the invention is embodied;

Fig. 2 is a perspective view, with portions broken away, of the updrawn mechanism of the machine together with the means provided for effecting a manipulation of the toe and side grippers;

Fig. 3 is a view substantially in rear elevation of the mechanism shown in Fig. 2;

Fig. 4 is a view in vertical section on the line 4—4 of Fig. 3;

Fig. 5 is a vertical section on the line 5—5 of Fig. 3;

Fig. 6 shows in perspective mechanism with which the machine is provided for controlling the operation of the tack supplying and driving means;

Fig. 7 shows in disassembled relation parts of the mechanism associated with one of the tack drivers for controlling the operation of the driver;

Fig. 8 is a plan view of one of the parts seen in Fig. 7, showing the driver bar in section;

Fig. 9 is a view in section showing the parts seen in Fig. 7 as they appear in their assembled relation;

Fig. 10 is a view in vertical section of a portion of the controlling mechanism shown in Fig. 6;

Fig. 11 is a plan view of a portion of the controlling mechanism shown in Fig. 6, parts being shown in section on the line 11—11 of Fig. 10;

Fig. 12 is a perspective view showing mechanism with which the machine is provided for adjusting the spread of the side grippers;

Fig. 13 is a detail view of one of the parts shown in Fig. 12;

Fig. 14 is a view of the end lasting wipers with which the machine is provided, including the novel means for adjusting the limit

of opening movement of the wipers, the wipers being shown in inverted position, and

Fig. 15 is a view in side elevation, and partly in vertical section, of a portion of the mechanism seen in Fig. 1, illustrating the construction of the novel work positioning means.

The drawings illustrate the application of the invention to a pulling-over machine of a well-known type including means for lasting the toe portion of the shoe, the general organization and construction of machines of this type being more fully set forth in the United States Letters Patent No. 1,029,387, granted on June 11, 1912 upon an application of R. F. McFeely and further, with respect to the lasting means, in Letters Patent No. 1,280,613 granted on Oct. 1, 1918 upon an application of Orrell Ashton. In view of the disclosure in said patents, the general organization of the machine herein shown, in so far as the construction is common to prior machines of the illustrative type, will be described herein only briefly.

The upper pulling instrumentalities of the machine include side grippers comprising gripper jaws 2 for engaging the upper at opposite sides of the forepart of the last, gripper casings 4 on which the jaws 2 are mounted, and gripper bars 6 whereby the closing and uplifting movements of the jaws 2 are effected, the bars 6 being supported by ball joints in side updraw levers 8 which are pivotally mounted on a bar 10 supported by the frame of the machine. The levers 8 at their rear ends have swiveled connection with blocks 12 which are slidably mounted on rods 14 secured to a cam slide 16, this slide being provided with a roll 18 which engages in a groove in a cam 20 on a cam shaft 22. Mounted on the rods 14 between the blocks 12 and nuts 24 on the upper ends of the rods are springs 26 which serve to transmit movement from the cam slide 16 to the levers 8 for applying tension yieldingly to the upper through the side grippers. The machine is also provided with a toe gripper comprising two pairs of gripper jaws 28 mounted on a gripper casing 30 and operated through a gripper bar 32 which is pivotally connected to a lever 34. The lever 34 in the construction shown is pivotally supported between its ends at 36 upon the front end of a main updraw lever 38 mounted on the bar 10, and at its rear end is provided with a slot 40 to receive a fixed pin 42 whereby in the operation of the main updraw lever 38 a relative increase in the extent of movement of the toe gripper is effected, as more fully explained in the Ashton patent hereinbefore referred to. The rear end of the lever 38 has swiveled connection with a block 44 mounted on a rod 46 which is secured to a cam slide 48 carrying a roll 50 engaging in a groove in an operating cam 52 on the shaft 22. A spring 54 mounted between the block 44 and a nut 56 on the rod 46 serves to transmit movement of the slide 48 to the lever 38 to effect a yielding updraw movement of the toe gripper. It will be understood that the updraw movements of the side grippers and the toe gripper are effected by downward movement of the operating slides 16 and 48, whereby the springs 26 and 54 are tensioned and transmit movements of variable extent to the levers 8 and 38 to stretch the upper yieldingly over the toe of the last and transversely across the forepart, and that at the end of the gripper operating movement of the slides 16 and 48 the machine comes to rest with the upper held under tension in order to permit in spection of the shoe and any adjustments which may be necessary in order to position the upper correctly upon the last or to change the relative tension applied to different portions of the upper.

Other instrumentalities herein shown which in their general characteristics are likewise common to prior machines of the illustrative type comprise a sole rest 58 which engages the sole of the shoe on the bottom of the last at the forepart and is rocked downwardly in unison with the gripper movements to assist in stretching the upper, a heel rest 60 which is moved up automatically into engagement with the heel end of the shoe, side clamp arms 62 which are swung inward into holding and supporting engagement with the shoe at the sides of and underneath the forepart, and upper fastening instrumentalities comprising opposite side tacker arms 64 and a toe tacker arm 66 which carry tack holding and driving means and are swung inward over the bottom of the shoe into posiiton for driving the tacks. Mounted upon the front tacker arm 66 are also wipers 68 which serve to wipe the toe portion of the shoe into lasted position during the inward swinging movement of the tacker arms.

It will be understood that the operation of the machine, in common with other machines of this general type, is effected in successive periods or stages, the machine coming to rest at the end of the first period with the upper under tension, as above explained. Some machines of this general type complete their cycle of operation in two periods or stages, while others require three stages for the completion of the cycle of operations. The precise number of stops which the machine makes in its cycle of operations is immaterial to the present invention, but for purposes of illustration the drawings show a construction in which the cycle of operations is completed in three stages. In the opera-

tion of this machine, the second stage of the operations comprises an inward swinging movement of the side clamp arms 62 into work supporting and holding position, after which the machine again comes to rest. While the machine is thus at rest, the toe gripper is tripped by hand to cause the jaws 28 to release the upper and the wipers 68 are positioned in end embracing relation to the toe of the shoe. Upon a subsequent actuation of the starting treadle, the side grippers are swung inward to carry the margin of the upper over the bottom of the sole and at the same time the side and toe tacker arms are swung inward to tack driving position, the wipers 68 being simultaneously operated to last the toe portion of the shoe. As the side tacker arms swing inward the side grippers are tripped to cause them to release the upper, and tacks are finally driven at the sides of the forepart and round the toe to secure the upper. Before the machine comes to rest the parts are returned to starting position and the shoe is released.

To enable the operator to manipulate the grippers for effecting a relative adjustment of the tension of different portions of the upper while the machine is at rest at the end of the first period of the cycle of operations, the machine herein shown is provided at one side and within convenient reach of the operator with a hand lever 70 secured on the forward end of an arm 72 provided with a hub portion 74 pinned to a rock shaft 76 which is mounted in bearings 78 and 80 carried respectively by supporting brackets 82 and 84. A block 86 secured to one end of the rock shaft 76 carries spring pressed plungers 88 and 90 which engage respectively at opposite sides of a rib 92 formed on the supporting bracket 82 and thus determine a normal position for the rock shaft and the lever 70 while permitting the shaft to be rocked a limited distance in either direction by the operation of the lever. Mounted loosely on the rock shaft 76 are ratchet wheels 94 and 96 which are provided respectively for imparting movement to the toe gripper lever 38 and the side gripper levers 8. The ratchet wheel 94 is permanently connected by means of pins 98 to the hub of a lever arm 100 which also is loosely mounted on the rock shaft 76, and the arm 100 is connected by a link 102 to an arm 104 fast on a rock shaft 106 mounted in stationary bearings in the frame of the machine. Secured to the shaft 106 are arms 108 which are connected by links 110 to a block 112 mounted slidably on the toe gripper operating rod 46 between the lower end of the spring 54 and the block 44 in which the rear end of the lever 38 is swiveled. Through these connections movement of the ratchet wheel 94 in a clockwise direction as viewed in Fig. 2 will serve, after the main updraw movement of the grippers has been effected, to move the rear end of the lever 38 farther downwardly and thus to impart an additional updraw movement to the toe gripper. The ratchet wheel 96 is permanently connected by means of pins 114 to the hub of a lever arm 116 normally loose on the shaft 76 and upon the outer end of which is swiveled a bar 118 connected by links 120 to pins 122 projecting laterally from the rear ends of the side gripper levers 8. Through these connections movement of the ratchet wheel 96 in a counter clockwise direction, as viewed in Fig. 2, will serve, after the main updraw movement of the grippers has been effected, to move the rear ends of the levers 8 downwardly and thus to impart an additional updraw movement to the side grippers while permitting said grippers to assume different positions relatively to each other.

In order to render the hand lever 70 effective to operate the ratchet wheels 94 and 96 as desired, the machine is provided with a pawl 124 arranged for engagement with the teeth on the ratchet wheel 94 and with a pawl 126 arranged for engagement with teeth 128 on the ratchet wheel 96. The pawls 124 and 126 are fast on a rock shaft 130 which is mounted in bearings in arms 132 and 134 fast on the rock shaft 76, the arm 134 projecting from the hub 74 previously mentioned. Secured to one end of the shaft 130 is an arm 136 connected by a link 138 to one arm of a bell crank 140 pivoted on the lever arm 72, the other arm of the bell crank 140 being connected to a rod 142 which extends downwardly within the tubular lever 70 and at its lower end is threaded in a turnbuckle 144. Threaded in the lower end of the turnbuckle 144 is a rod 146 which is slidably supported in a bearing block 148 and is connected at its lower end to one arm of a bell crank 150. The other arm of the bell crank 150 is arranged to enter a recess in a block 152 mounted slidably in a holder 154 secured to the lower end of the lever 70. Fast on the slide block 152 is a handle 156. Within the tubular lever 70, on opposite sides of the fixed bearing block 148 are springs 158 and 160 the outer ends of which are in engagement respectively with blocks 162 and 164 fast on the rod 146. These springs in their action upon the blocks 162 and 164 serve through the connections described to hold the pawls 124 and 126 normally in a neutral position in which they are out of engagement with the respective ratchet wheels, and also to maintain the block 152 in an intermediate location in its slideway. It will be evident that movement of the handle 156 and the slide 152 toward the left from the position indicated in Fig. 2 will cause the pawl 124 to engage the teeth of the ratchet wheel 94, and that movement of the handle and the slide in the opposite

direction will cause the pawl 126 to engage the teeth 128 on the ratchet wheel 96.

If the operator desires, after the main updraw movement of the grippers has been effected, to impart a supplementary updraw movement to the toe gripper, he grasps the handle 156 and pushes it toward the rear of the machine. The first result of the push upon the handle 156 is to slide the block 152 rearwardly relatively to the lever 70 thus moving the pawl 124 into engagement with the ratchet wheel 94, this movement of the pawl being effected against the tension of the positioning spring 160 in the lever 70. Continued pressure upon the handle 156 then causes the rock shaft 76 and the ratchet wheel 94 to be moved together as a unit against the pressure of the spring plunger 90 (Fig. 5) and through the connections described, to impart a downward movement to the rear end of the lever 38 and thus to impart an additional pull to the toe gripper. If it is desired to impart an additional updraw movement to the side grippers, the handle 156 is pulled in a direction toward the front of the machine. The first effect of this pulling movement upon the handle is to move the pawl 126 against the tension of the positioning spring 158 into engagement with the teeth 128 of the ratchet wheel 96. As the operator continues to pull upon the handle 156 the rock shaft and the ratchet wheel 96 are moved together as a unit against the tension of the spring plunger 88, which serves through the connections described to impart further downward movement to the rear ends of the side gripper levers 8 and thus to impart an additional updraw movement to the side grippers. The operator may thus manipulate the lever 70 at will either to increase the tension with which the upper is pulled at the toe of the last or to increase the tension of the upper transversely of the last. As soon as the handle 156 is released by the operator the rock shaft 76 and the pawls are immediately returned to their neutral positions through the action of one or the other of the plungers 88 and 90 and of one or the other of the centralizing springs 158 and 160 without affecting the positions of the grippers.

By reference to Fig. 3 it will be seen that when the parts of the machine are in starting position previous to the operation of the machine upon a shoe, the blocks 12 and 44 are positioned by the springs 26 and 54 in such manner as to afford no freedom for further downward movement of the blocks relatively to the cam slides. It will be understood, however, particularly by reference to Fig. 2, which shows the parts in the positions which they assume at the end of the main updraw movement of the grippers, that due to the compression of the springs 26 and 54 against the resistance of the upper stock, the cam slides 16 and 48 move downward in the upper tensioning operation a considerable distance relatively to the blocks 12 and 44 and thus provide a space between the blocks and the cam slides such as to permit the blocks to be moved down relatively to the slides by means of the hand lever 70 for further tensioning the upper. It will be further understood that during such manually effected additional upper tensioning movement of the side grippers or the toe gripper, the updraw springs react and serve effectively to retain the grippers substantially in the positions to which they are moved by the operation of the hand lever.

As hereinbefore explained it is desirable that further tensioning of the upper at the toe end of the last subsequent to the main updraw movement of the grippers be accompanied by a relaxation of the tension of the upper transversely of the forepart. For this purpose the machine is provided with means whereby the ratchet wheel 96 is caused to move in unison with the ratchet wheel 94 in the same direction during the supplemental pull of the toe gripper, thus causing the lever arm 116 to uplift the links 120 and the connected ends of the side gripper levers 8 and move the side grippers downwardly to relax the tension. To this end, a pawl 166 is provided for engagement with teeth 168 on the ratchet wheel 96, these teeth pointing in the reverse direction from the teeth 128 previously mentioned. The pawl 166 is pivotally mounted on a plate 170 which is sleeved on an annularly reduced portion of the hub of the lever arm 116. The pawl is connected by a link 172 to the lower arm of a lever 174 pivoted on a fixed shaft 176, the upper arm of the lever 174 carrying a roll 178 arranged to be operated by a cam 180 formed on the front side of the hub portion of the arm 132 hereinbefore referred to as secured to the rock shaft 76. A spring 182 connected to the lower end of the lever 174 tends to position the parts normally with the plate 170 in engagement with a fixed stop 184 and the pawl 166 in engagement with a pin 186 on the plate 170. It will be evident that the main updraw movement of the grippers is accompanied by a simultaneous movement of the ratchet wheels 94 and 96 in opposite directions respectively by reason of the permanent connections between these ratchet wheels and the grippers, and such movement will cause the ratchet wheel 96 to be displaced in a counter clockwise direction from the position indicated in Fig. 4 to bring the teeth 128 under the pawl 126. It will be understood, however, that the position of the rock shaft 76 is not affected by the main updraw movement of the grippers and there-

fore that the cam 180 at the time when the supplemental updraw movement of the toe gripper is to be effected, is positioned with relation to the roll 178 as indicated in Fig. 4. As the rock shaft 76 begins to turn in a clockwise direction, as viewed in Fig. 4, under the influence of the hand lever 70 when the latter is moved in the direction for operating the toe gripper to increase the tension of the upper, the cam 180 fast with the rock shaft immediately begins to operate upon the roll 178 to swing the lever 174 about its axis 176 against the tension of the spring 182. Through the link 172 the pawl 166 is thus moved immediately into engagement with the teeth 168 of the ratchet wheel 96, and as the lever 174 continues its movement effected by the cam 180, the pawl 166 and the plate 170 are turned together with the rock shaft 76, thus moving the ratchet wheel 96 in a direction to uplift the lever arm 116 and the rear ends of the gripper levers 8 and move the side grippers downwardly to relax the tension of the upper transversely of the last. It will be seen by reference to Fig. 4 that the outer surface 188 of the cam 180 is concentric with the axis of the rock shaft 76. This construction insures a limit to the relaxing movement of the side grippers irrespective of the continued upper tensioning movement of the toe gripper, since after the concentric surface 188 of the cam has come into engagement with the roll 178, no further movement is imparted to the lever 174 during continued movement of the rock shaft 76. When the rock shaft 76 is returned to its neutral position by the action of the spring plunger 90 and the cam 180 is withdrawn from the roll 178, the spring 182 causes the pawl 166 to be disengaged from the teeth 168 and returns the lever 174 and the plate 170 to the respective positions indicated in Fig. 4.

The general characteristics of the mechanism with which the machine is provided for driving tacks to hold the upper in place subsequently to the pulling-over operation are described in detail in the prior patents hereinbefore referred to, and with respect to certain features also in Patent No. 1,082,487, granted on December 30, 1913 upon an application of Arthur Bates. As hereinbefore explained, the machine is provided with side tacker arms 64 and a front tacker arm 66 which are swung inwardly over the bottom of the shoe in the final stage of the cycle of operations of the machine, these arms being swiveled in supports 190, as shown in Fig. 9. Mounted slidably in each of these tacker arms is a driver bar 192, these driver bars being normally held in uplifted position against the pressure of spring operated arms 194 which operate at the upper ends of the bars and serve to impel them downwardly for driving the tacks when they are released in the final stage of the cycle of operations. Adjustable caps 196 on the bars serve by engagement with suitable abutments to limit the driving movement of the bars. The tacks are delivered periodically to the several tacking mechanisms through tubes 198 which receive the tacks from a tack separator 200, not shown herein in detail but constructed, for example, as shown in Patent No. 1,002,421, granted on September 5, 1911 upon an application of R. F. McFeely, this separator being reciprocated once in each cycle of operations of the machine to cause a tack to be delivered to each of the tubes 198 near the end of the cycle of operations, such tacks being conducted by the tubes into position to be driven by the tack drivers during a subsequent operation of the machine upon another shoe. The reciprocatory movements of the tack separator are effected by the oscillatory movement of a tack hopper 202 having the usual means for elevating the tacks and depositing them in suitable raceways for delivery to the separator. The connections between the hopper 202 and the separator whereby the latter is reciprocated may be, for example, such as those illustrated in prior United States Letters Patent No. 663,777 granted on December 11, 1900, upon an application of R. F. McFeely. The tack hopper receives its oscillatory movement from a rack bar 204 which is reciprocated once during each cycle of operations of the machine by means of an eccentric on the cam shaft 22, as set forth in detail in United States Letters Patent No. 1,107,337, granted on Aug. 18, 1914 upon an application of R. F. McFeely. As explained in said patent, the rack bar 204 is moved yieldingly in both directions through connections including a spring herein shown at 206 which cushions the movements of the hopper 202 and is arranged to permit a relative movement under certain conditions of different portions of the operating connections between the rack bar and cam shaft.

As hereinbefore explained, it is sometimes necessary in the operation of machines of this type to release the shoe subsequently to the updraw movement of the grippers and then to cause the machine to complete its cycle of operations idly in order to bring the parts again to starting position. In order to prevent, under such conditions, the discharge of the tacks which are already in position to be driven by the drivers, this machine is provided with mechanism shown in detail in Figs. 6 to 11 inclusive for preventing operative movement of the drivers. By reference to Figs. 7 and 8 it will be seen that the upper end portion of each of the driver bars 192, where the bar is of generally cylindrical shape, in flattened at opposite sides and that grooves 208 are formed

transversely of the bar in its opposite curved portions, providing between the grooves a substantially cylindrical portion equal in diameter to the distance between the opposite flat sides of the bar. Mounted on the upper end of each of the two tacker arms 64 and also of the tacker arm 66, is a locking plate 212 provided with a recess 214 of substantially the same breadth and contour as that portion of the driver bar 192 the opposite sides of which are flattened. The plate 212 is mounted with provision for turning movement about the axis of the driver bar within limits determined by curved slots 216 and co-operating stop screws 218 which also serve to retain the plate in position. By reference to Fig. 9 it will be seen that the grooves 208 are formed in a portion of the driver bar which, in the normal uplifted position of the bar, is located within the recess 214 in the plate 212. By reference to Fig. 8 it will be evident that when the plate 212 is in the reversed position from that indicated in said figure with the screws 218 in engagement with the opposite ends of the slots 216, the recess 214 will be so disposed relatively to the driver bar as to oppose no obstruction to the driving movement of the bar, but that with the plate in the position indicated in Fig. 8, the straight edge portions of the plate at the opposite sides of the recess 214 by their engagement in the grooves 208 effectively lock the driver bar against driving movement. Upon the plates 212 are secured caps 220 which cover the slots 216 and the screws 218 and serve, moreover, as abutments to be engaged by the stop caps 196 on the driver bars to limit the driving movement of the bars.

In order to operate the plates 212 and to position them normally with their recesses 214 in such relation to the bars 192 that the plates oppose no obstruction to the driving movement of the bars, the plates are connected to a rock shaft 222 mounted in bearings 224 in the frame of the machine. The connections between the plates and the rock shaft comprise a link 226 connected at one end to a crank arm 228 on the rock shaft and at its opposite end to a pin on that one of the three plates 212 which is mounted on the front tacker arm 66, this plate being connected by a link 230 to the plate 212 on one of the side tacker arms 64 and the latter plate being connected by a link 232 to the plate 212 which is mounted on the other side tacker arm. It will be evident that by this construction the three plates 212 are turned together through movement imparted to the front plate by means of the link 226. The plates 212 are normally held in unlocking position by means of a torsion spring 233 on the rock shaft 222, this position of the plates being determined by the stop screws 218.

Mounted slidably in bearings in the frame of the machine adjacent to the hopper 202 is a rod 234 upon which is a spring 236, the rod 234 being connected by a bell crank 238 and a link 240 to a crank arm 242 on the rock shaft 222. A stop collar 244 fast on the rod 234 serves by engagement with the frame of the machine to limit movement of the rod in one direction under the influence of the spring 236. The connection between the link 240 and the bell-crank 238 comprises a slot 245 in the link which permits a limited relative movement between the link and the bell-crank. This construction provides means whereby the normal movement of the hopper 202 is interrupted at the time when the drivers are locked by the plates 212, as will be more fully explained hereinafter.

In order to turn the plates 212 into position to lock the driver bars against driving movement in the event of premature removal of a shoe from the machine, the construction shown conveniently utilizes the movement of a slide 246 with which machines of this type are provided for effecting movement of the side clamp arms 62 into shoe engaging position. The slide 246 is operated by a cam 248 on the cam shaft 22, this cam engaging a roll 250 on the slide and moving the slide in the direction of the arrow in Figs. 6 and 11 in the second period of the cycle of operations of the machine to operate the clamp arms. Secured to the slide 246 is a bar 252 in engagement at one end with a lever arm 254 which is fast on a clutch hub 256 mounted to turn on a fixed upright rod 258 (Fig. 10). A spring 260 connected at its opposite ends respectively to the bar 252 and the lever arm 254 serves to hold the arm in engagement with the end of the bar and to move the arm reversely when the slide 246 is returned to its starting position.

Pivotally mounted upon a reduced upper end portion of the rod 258 immediately above the hub 256 is a co-operating clutch hub 262 having integral therewith an arm 264 which is connected by a link 266 to one arm of a bell crank 268, the other arm of which is connected by means of a link 270 to an arm 272 fast on one end of the rock shaft 222. Mounted in sockets in the hub 262 are two plungers 274 which, in the normal relative positions of the two hubs 256 and 262 prior to the beginning of the cycle of operations of the machine, are in line with sockets 276 formed in the adjacent side of the hub 256. The plungers 274, however, are normally upheld by means of springs 278 with their lower ends above the plane of the upper face of the hub 256. Normally, therefore, the hub 256 turns idly upon the rod 258 under the impulse of the slide 246, without any effect upon the rock

shaft 222 and the connected plates 212 which are maintained in their normal locations by the spring 233. The machine is provided, however, with means whereby the plungers 274 will be forced into the sockets 276 in the event of premature removal of a shoe from the machine and thus effect an operative connection between the two hubs 256 and 262 to cause the rock shaft 222 and its connected mechanism to be operated through movement of the slide 246. This means comprises a presser member 280 which is slidably mounted upon the upper end of a stud 282 the lower end of which is threaded within a recess in the end of the rod 258. Pivotally connected to the presser member 280 is a rod 284 the upper end of which is in slidable engagement with a tubular connecting member 286, this member being fast at its upper end to an upwardly extending rod 288 which is provided with a forked upper end portion 290 partially embracing a pin 292 secured to one side of one of the side updraw levers 8. The connecting member 286 carries a pin 294 which projects through a slot 296 extending lengthwise of the rod 284, this construction affording provision for limited relative movement between the two members 284 and 286. A spring 298 within the member 286 tends to effect relative separating movement between this member and the rod 284 while permitting a limited downward movement of the member 286 and its connected rod 288 relatively to the rod 284.

By reference to Fig. 1 it will be seen that as the parts are normally positioned prior to the beginning of the cycle of operations, the pin 292 on the updraw lever 8 is positioned at some distance above the lower end of the slot in the fork 290, the rod 288 being positioned at this time by the action of the spring 298 at its upper limit of movement determined by the pin 294 and the slot 296. In this position of the parts also the springs 278 uphold the plungers 274 with the lower ends of the plungers outside of the sockets 276, notwithstanding the fact that these sockets are at this time in line with the plungers. A shoe having been placed in position to be pulled and the machine started, the rear ends of the updraw levers in the first period of the cycle of operations are moved downwardly, thus causing the pin 292 to approach the lower end of the slot in the fork 290. This slot, however, is of such length and is so located initially relatively to the pin that during any normal upper pulling movement of the levers the pin 292 imparts no movement to the fork 290 and the rod 288. In the event, therefore, that the machine completes its normal cycle of operations, the plungers 274 are maintained by their springs outside of the sockets 276 until the hub 256 has been turned by the movement of the slide 246 into such a location that the sockets 276 are out of line with the plungers, the hub 256 being of course maintained in such location until after the work upon the shoe has been completed and the parts are again returned to starting position. The driver bars 192 are thus permitted at the proper time to have their normal tack driving movement. When the grippers release their hold upon the upper, immediately prior to the tack driving operation, they of course spring upwardly under the influence of their updraw springs 14 and 54, the rear end portions of the levers being depressed as far as permitted by the cam slides. During such movement the rod 288 is forced downward by the action of the pin 292, but since the sockets 276 are at this time out of line with the plungers 274, the latter are restrained from downward movement by engagement with the upper face of the hub 256. The downward movement of the rod 288 is therefore effected against the tension of the spring 298, the connecting member 286 sliding idly upon the rod 284. When the hub 256 is returned to its starting position the gripper levers also are of course returned to starting position and the parts are again located in the positions indicated in Fig. 1.

In case the operator finds it necessary to remove the shoe from the machine while the machine is at rest following the updraw movement of the grippers, the updraw levers, when the grippers are released from the upper are, of course, forced to their limits of movement by the updraw springs 14 and 54 precisely as they would have been subsequently upon their release from the shoe at the normal time. When the grippers are thus prematurely released, the pin 292 becomes effective to impart downward movement to the rod 288 in the manner hereinbefore explained, and since the hub 256 is at this time still in position to cause the sockets 276 to align with the plungers 274, these plungers are forced downwardly by the action of the presser member 280 under the influence of the rod 288, the tension of the spring 298 being considerably stronger than that of the springs 278. The two hubs 256 and 262 are thus locked together and when, upon the next subsequent actuation of the starting treadle, the slide 246 is operated to swing the clamp arms 62 inward, the hub 262 is turned with the hub 256 and imparts, through the connections hereinbefore described, such movement to the rock shaft 222 and the plates 212 as to turn these plates into the positions indicated by Fig. 8, causing them to enter the grooves 208 in the driver bars 192 and lock the bars against downward movement. Upon the actuation of the

clutch for the third time, whereby the machine is caused to complete it cycle of movements, the driver bars 192 are thus held from operating and no discharge of tacks takes place. As the parts of the machine are finally returned to starting position, a reverse movement of the plates 212 is effected by the return of the locked hubs 256 and 262, and by the action of the spring 233, the plungers 274 being finally permitted to spring upward out of the sockets 276 in consequence of the upward return movement of the rear ends of the levers 8, the parts of the tacker controlling mechanism thus assuming their normal relation.

By reference to Fig. 6 it will be noted that upon one side of the hopper 202 is a projecting lug 300. This lug is so located with reference to the slide rod 234 hereinbefore referred to that movement of this rod against the tension of the spring 236 brings it into position to engage the lug 300 and thus to prevent further movement of the hopper 202 and of the rack bar 204 during continued movement of the rack bar operating means against the tension of the spring 206. Such movement of the rod 234 is effected by the rock shaft 222 through the connections 240, 238 when the shaft is operated to move the plates 212 into locking position. During the completion of the cycle of operative movements of the machine, therefore, no movement will be imparted to the tack separator 200 such as to effect a discharge of tacks into the tubes 198, the tacks already in position under the drivers being of course retained for subsequent use. In order to obviate any shock through release of the hopper 202 to the action of the rack bar operating spring 206 while this spring is under heavy compression, the lug 300 and the rod 234 are so shaped that they interlock and thus cause the lug to prevent return of the rod to its starting position until after the tension of the spring 206 has been relieved by the reverse movement of the rack bar operating connections and movement has been imparted to the hopper in the direction to withdraw the lug from the rod. The slot 245 in the rod 240 permits the rock shaft 222 and its connected mechanism to be returned to starting position while the rod 234 is held by the lug. When the rod 234 is released it is returned by its spring 236.

As explained in detail in Patent No. 1,029,387, the side grippers and the toe gripper in machines of this type, after they have pulled the upper, are moved inwardly by the action of springs to draw the margin of the upper over the bottom of the last into position to be fastened, the inward movement of the grippers being controlled by mechanism which is subsequently operated to spread the grippers during their return to starting position, this spreading mechanism being adjustable to vary the initial position of the grippers for shoes of different sizes. This mechanism, as shown in detail in Fig. 12, comprises an operating rack bar 302 which engages a pinion 304 fast on a rotatable shaft 306. Mounted on the shaft 306 and connected thereto normally by means of a clutch 308 is a sleeve 310 having formed thereon a pinion 312 which engages teeth on a rack bar 314. The bar 314 has a forward extension 316 provided with a roll 318 in engagement with the rear side of the toe gripper bar 32, and mounted also on the bar 314 is a wedge member 320 for controlling the inward and outward movements of the side grippers. The inclined side faces of the member 320 engage rolls 322 mounted on pivoted blocks 324 which carry bearing plates 326 in engagement with the inner sides of the side gripper bars 6. By this mechanism the grippers are held normally spread apart and are permitted to move inwardly in response to the pressure of their springs when the bar 314 and its wedge 320 are retracted through the action of the rack 302 on the pinion 304. The construction provides also for adjustment of the bar 314 and its connected wedge 320 to vary the initial spread of the grippers, such adjustment being effected by moving the sleeve 310 lengthwise of the shaft 306 to disengage the parts of the clutch 308 and then by turning the sleeve relatively to the shaft for moving the bar 314 relatively to the operating rack 302, after which the sleeve 310 is again forced outwardly by its controlling spring (not shown) to cause the sleeve to be again connected to the shaft through the clutch 308.

In the use of the machine on some classes of work, as for example on shoes that vary considerably in width with but little if any variation in length, it is sometimes desirable to adjust the side grippers toward or from each other independently of any adjustment of the toe gripper. For this purpose there is provided in the construction shown novel mechanism whereby the operator is enabled readily to effect a quick adjustment of the wedge block 320 lengthwise along the bar 314 to vary the normal spread of the side grippers. This mechanism comprises a block 328 secured upon the lower side of the front arm 316 of the bar 314, this block having fast thereon a screw threaded rod 330 which projects loosely through holes 332 formed in lugs 334 and 336 on the wedge block 320. Threaded on the rod 330 between the lugs 334 and 336 is a pinion 338 which is in mesh with an elongated pinion 340 carried by a shaft which is mounted in bearings in a fixed bracket 342, the pinion projecting loosely through a hole 344 in the lug 334. On one

end of the shaft upon which the pinion 340 is mounted is secured a beveled gear 346 which is in mesh with a beveled gear 348 secured to a short shaft 350 mounted in bearings in the frame. The shaft 350 carries a pinion 352 which is in mesh with a pinion 354 on a sleeve 356 mounted rotatably upon the shaft 306. On the outer end of the sleeve 356 is formed a hand wheel 358. By turning the hand wheel 358 in one direction or the other movement is imparted through the gearing above described to the pinion 340 and thence to the pinion 338 threaded upon the rod 330. Since the rod 330 is fixed relatively to the bar 314, the rotation of the pinion 338 serves to adjust the wedge block 320 lengthwise of the bar in either direction as desired, the wedge block being forced along the bar by the engagement of the pinion 338 with one or the other of the lugs 334 or 336. In the normal movements of the bar 314 and the wedge block 320 to spread or to permit inward movement of the grippers or to adjust the normal spread of all the grippers, the pinion 338 and the lug 334 travel idly along the pinion 340 without affecting the adjustment of the wedge block relatively to the bar.

As explained in the Ashton patent hereinbefore referred to, it is the practice in the use of machines of the illustrated type, including wipers for lasting the toe portion of the shoe, for the operator to press the wipers closely about the toe end of the shoe in position to start their overwiping movement and to open the toe gripper to cause it to release the upper before the clutch is actuated to effect the final stage of the cycle of operations of the machine. In order that the upper about the toe of the shoe shall be held without substantial loss of the pulling-over tension during the interval between the release of the toe gripper and the overwiping of the upper, it is desirable that the inner edges of the wipers conform closely to the contour of the last round the toe, at the sides as well as at the end of the toe. In order to permit such initial conformation of the wipers to the last in a satisfactory manner on shoes of different widths, the machine herein shown is provided with means for adjusting the normal limit of opening movement of the wipers. By reference to Fig. 14 it will be seen that the wiper plates 68 are mounted on pivots 360 on the wiper support 362 and are normally retracted to their open position by means of springs 364 connected respectively to the wipers and to the support. Mounted on extensions 366 of the wiper plates 68 are studs 368 provided with eccentric portions 370 in position to engage the edges of the supporting plate 362 to limit the opening movement of the wipers under the influence of the springs 364. By turning the studs 368 the eccentrics 370 may thus be positioned for variably determining the initial spread of the wiper plates. Threaded on the studs at the opposite side of the extensions 366 from the eccentrics are nuts 372 which are tightened to secure the studs and eccentrics in adjusted position. In this manner the normal spread of the wiper plates 68 may be adjusted to conform to differences in width of different lines of work.

By reference to Fig. 15, which illustrates the relation of parts of the machine to a shoe of small size such as a child's shoe, it will be evident that the side gripper jaws 2 and the rear portion of the sole rest 58 engage the work in a location relatively much nearer the heel end of the last than in the case of a shoe of adult's size. By reason of this relation between the last and the parts of the pulling-over mechanism in the case of a small shoe, it has been found that when the toe gripper is released from the stock and the wipers are pressed inward by hand against the upper adjacent to the edge of the sole there is a tendency for the toe end of the shoe to be forced downward slightly by the pressure of the wipers, the last tending to rock or swing about a portion of the sole rest approximately between the locations where the side grippers engage the upper. A further reason for such a tendency in the case of a child's shoe is that it is necessary that the heel rest engage the heel end of such a shoe under less pressure than in the case of an adult's shoe in order to avoid pushing the last and the shoe forwardly, and the heel rest therefore is comparatively ineffective as a means for holding the rear end of the shoe frictionally against upward tilting movement. In the use of machines of this type on children's work, moreover, it is the practice to use a controlling cam so shaped as to cause the machine to complete its cycle of operations in two stages instead of three, and therefore at the time when the toe gripper is tripped and the wipers are positioned against the shoe, the side clamp arms have not as yet been swung inward into supporting engagement with the forepart of the shoe. A result of this tendency for the toe end of the last to be depressed prior to the lasting operation is that the upper is wiped over the sole with less effective wiping pressure than is desirable. In order to avoid this tendency for rocking movement of the last the machine herein shown is provided with an abutment 374 which is fast on the heel rest 60 and is arranged to project over the heel seat portion of the sole on the last in position to prevent any upward tilting movement of the heel end portion of the shoe and consequently any depressing movement of the toe end of the shoe. While this con-

struction is, as above explained, of particular advantage in the operation of the machine upon small size shoes, it will be evident that it is not thus limited in utility but is equally applicable to use on any size of shoe as an additional security against displacement of the work.

Since the operation of the different features of the construction has been set forth in connection with the detailed description of the different features, a brief explanation of the manner of operation of the machine as a whole will suffice for an understanding of the invention. After a shoe has been placed in position with the margin of the upper projecting within the open jaws of the grippers, the clutch is tripped and the updraw movement of the grippers is effected. If, upon inspection of the work, the operator determines that it is necessary to effect an additional pull of the toe gripper in order to stretch the upper properly lengthwise of the last, he grasps the handle 156 and pushes it rearwardly, thus connecting the pawl 124 with the ratchet wheel 94 and operating the rock shaft 76 and the connections between this shaft and the toe gripper lever 38 to effect an additional updraw movement of the toe gripper to the extent desired. Simultaneously, as hereinbefore explained in detail, the pawl 166 is caused to engage the teeth 168 of the ratchet wheel 96 connected to the side gripper levers and to effect a limited movement of these levers in a direction to relax the tension of the upper transversely of the last. After the upper has been thus tensioned by the toe gripper in the manner desired, the operator pulls the handle 156 in the opposite direction, thus disconnecting the pawls 124 and 166 from their ratchet wheels and bringing the pawl 126 into engagement with the teeth 128 of the wheel 96, continued movement of the handle and the lever 70 in the same direction serving to move the wheel 96 in the direction to impart to the side grippers an upper tensioning movement to stretch the upper finally across the forepart to the extent desired. In case it is found to be unnecessary to stretch the upper additionally by means of the toe gripper, the operator may of course omit a movement of the handle 156 and the lever 70 in the direction to effect this result, and if it is found to be desirable simply to effect an additional stretching of the upper transversely of the last, the handle and the lever may simply be pulled to updraw the side grippers without having previously been manipulated for operating the toe gripper. When the proper final tensioning of the upper has been obtained and any other adjustment characteristic in the use of machines of this type which it is desired to make has been effected, the clutch is tripped a second time and the side clamp arms are swung into engagement with the shoe. The wipers are now adjusted by hand in position to begin their wiping action upon the stock and the toe gripper is opened to cause it to release the upper at the end of the toe. With the wipers thus positioned, the clutch is actuated for the third time, causing the machine to complete its cycle of operations by operating the wipers and the side grippers to wipe and draw the upper over the bottom of the sole and by operating the tackers to drive the securing tacks, the parts of the machine then being returned to their starting positions and the shoe released.

In case it is observed during the pause in the operation of the machine at the end of the updraw movement of the grippers that the edges of the upper are incorrectly positioned in the grippers in such manner that it is necessary for the shoe to be pulled a second time, the several grippers are opened in the usual manner to cause them to release the stock and the clutch is then tripped to cause the machine to complete its cycle of movements idly. Immediately upon such premature release of the shoe, operative connection is established in the manner hereinbefore explained between the slide 246 and the mechanism for locking the driver bars 192 and for stopping the movements of the tack hopper 202, and by the operation of this mechanism discharge of the tacks under the drivers and delivery of additional tacks to the drivers are prevented during the remaining portion of the cycle of movements of the machine.

It will be evident that the mechanism for suspending the normal operation of the tack driving and tack supplying means is equally as effective in case the machine is caused to go through its entire cycle of movements idly as it is if a shoe is first pulled and then prematurely released, since if the grippers are operated idly in the first stage of the cycle of operations of the machine, the gripper levers are forced immediately to their extreme limit of movement and operative connection is established between the different portions of the mechanism whereby the driver locking devices and the stop for the tack hopper are operated. It will also be evident that even if the shoe should not be entirely removed from the machine, no tacks will be driven during the completion of the cycle if that side gripper lever which controls the tacking has released the upper or has moved beyond the position which it normally assumes in subjecting an upper to proper tension.

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 of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the up-

per of the shoe, power operated means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, said power operated means being constructed and arranged to come automatically to rest with the upper held under tension, manually controlled means for moving one gripper subsequently in a direction to increase the tension of the upper, and connected mechanism for insurnig a co-operative movement of another gripper in a direction to relax the tension of the upper.

2. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, operating means movable into operative connection with a gripper after the upper has been pulled for moving said gripper in a direction to increase the tension of the upper, and connections between said operating means and another gripper constructed to insure a co-operative movement of said other gripper in a direction to relax the tension of the upper.

3. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, power operated means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, said power operated means being constructed and arranged to come automatically to rest with the upper held under tension, operating means for effecting subsequent movement of the grippers, and connections between said operating means and different grippers constructed to cause a movement of said operating means in one direction to effect movements of said different grippers simultaneously in different respective directions for increasing and for relaxing respectively the tension of the upper.

4. In a machine of the class described, the combination with shoe positioning means of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a controlling member, and means normally disconnected from said controlling member and arranged to be connected thereto to enable the operator by a movement of said member in one direction to cause a movement of one gripper in a direction to increase the tension of the upper and a movement of another gripper in a direction to relax the tension.

5. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, connections between said member and one gripper arranged to be rendered operative after the upper has been pulled for operating said gripper to increase the tension of the upper, and means operative through movement of said member for connecting it to another gripper and for simultaneously operating said other gripper to relax the tension of the upper.

6. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and operating means normally disconnected from the grippers and movable into operative connection with different grippers after the upper has been pulled, said operating means being constructed to move said different grippers in unison to increase the tension of one portion of the upper and to relax the tension of another portion.

7. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, and means normally disconnected from said member for effecting manually through movement of said member in one direction co-operative movements of different grippers in different respective directions to change the relative tensions of different portions of the upper.

8. In a machine of the class described the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for operating said grippers to pull the upper, manual means normally disconnected from said grippers for imparting supplemental movements thereto, and means automatically operative upon a movement of said manual means in one direction to effect a connection with different grippers and to move them in different respective directions to change the tension of the upper.

9. In a machine of the class described, the combination with shoe positioning means, of an upper engaging gripper, manual means for imparting movement to said gripper, means for maintaining said manual means normally disconnected from the gripper, and means automatically operative through a movement of said manual means in one direction to effect a connection with the gripper and then to move the gripper.

10. In a machine of the class described, the combination with shoe positioning means, of an upper engaging gripper, operating means for said gripper, means for maintaining said operating means normally disconnected from the gripper, and means

automatically operative through a movement of said operating means in one direction to effect a connection with the gripper and then by further movement in said direction to move the gripper.

11. In a machine of the class described, the combination with shoe positioning means, of a gripper for engaging the upper of the shoe, means for operating said gripper to pull the upper, supplemental gripper operating means normally disconnected from said gripper, and means automatically operative through a movement of said supplemental operating means in one direction first to effect a connection with the gripper and then to move the gripper in a direction to increase the tension of the upper.

12. In a machine of the class described, the combination with shoe positioning means, of a gripper for engaging the upper of the shoe, means for operating said gripper to pull the upper, supplemental gripper operating means comprising a manually operative member normally disconnected from said gripper, and clutch means automatically movable relatively to said member upon a movement of the member in one direction to effect a connection between said member and the gripper through which to move the gripper during continued movement of the member in the same direction.

13. In a machine of the class described, the combination with shoe positioning means, of a gripper for engaging the upper of the shoe, means for operating said gripper to pull the upper, a ratchet wheel connected to the gripper, a pawl normally disconnected from said ratchet wheel, and means for moving the pawl into engagement with the ratchet wheel and for operating the ratchet wheel to effect a subsequent movement of the gripper.

14. In a machine of the class described, the combination with shoe positioning means, of a gripper for engaging the upper of the shoe, means for operating said gripper to pull the upper, a ratchet wheel connected to the gripper, a pawl, means for maintaining said pawl normally out of engagement with said ratchet wheel, and means movable in one direction first to cause the pawl to engage said ratchet wheel and then to operate the ratchet wheel to effect a movement of the gripper in a direction to change the tension of the upper.

15. In a machine of the class described, the combination with shoe positioning means of an upper engaging gripper, an operating member, connections comprising a ratchet wheel and a pawl between said member and the gripper, means for maintaining the pawl normally disconnected from the ratchet wheel, and means automatically operative upon a movement of said member in one direction to cause the pawl to engage the ratchet wheel and then to effect a movement of the gripper.

16. In a machine of the class described, the combination with an upper engaging gripper, of a ratchet wheel connected to the gripper, a hand lever for operating said ratchet wheel to effect a movement of the gripper, a pawl for connecting said hand lever to the ratchet wheel, a handle on said lever arranged to be grasped by the operator to manipulate the lever, said handle being mounted for limited movement relatively to the lever in the same direction as the operative movement of the lever, and means connecting said handle to the pawl to cause the movement of the pawl into and out of engagement with the ratchet wheel to be controlled by said handle.

17. In a machine of the class described, the combination with an upper engaging gripper, of a ratchet wheel connected to the gripper, a hand lever for operating said ratchet wheel to effect a movement of the gripper, a pawl for connecting said hand lever to the ratchet wheel, a handle on said lever arranged to be grasped by the operator to manipulate the lever, said handle being mounted for limited movement relatively to the lever in the same direction as the operative movement of the lever, connections between said handle and the pawl, and yieldable means for normally positioning the pawl out of engagement with the ratchet wheel while permitting it to be moved into engagement with the wheel by an initial movement of the handle in the direction to operate the lever.

18. In a machine of the class described, the combination with shoe positioning means, of an upper engaging gripper an operating member, and connections comprising a ratchet wheel and a pawl between said member and the gripper for imparting movement to said gripper.

19. In a machine of the class described, the combination with an upper engaging gripper and means for operating said gripper to pull the upper, of supplemental gripper operating means comprising a ratchet wheel connected to the gripper, a pawl for operating said wheel, and means for maintaining the pawl out of engagement with the ratchet wheel during said first operation of the gripper.

20. In a machine of the class described, the combination with shoe positioning means, of a plurality of upper engaging grippers, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, clutch members connected respectively to different grippers to cause said grippers to be moved respectively in substantially opposite directions through movement of the clutch members in the same direction for changing the relative tensions

of different portions of the upper, and means for operating said clutch members.

21. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising rotatable clutch members, means connecting said clutch members respectively to different grippers to cause said grippers to be moved respectively in substantially opposite directions though movements of the clutch members in the same direction, and manual means for operating said clutch members to effect supplemental movements of said grippers.

22. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and means for operating different grippers to change the tension of the upper, said operating means comprising ratchet wheels connected respectively to said different grippers, and pawls for operating said ratchet wheels in any position of said wheels.

23. In a machine of the class described, the combination with a shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a pair of ratchet wheels, means connecting said ratchet wheels respectively to different grippers to cause said grippers to be moved respectively in substantially opposite directions through movement of the ratchet wheels in the same direction, pawls for engaging said ratchet wheels, and means for operating said pawls to turn the ratchet wheels.

24. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a rock shaft, a pair of ratchet wheels mounted to turn about said rock shaft, means connecting said ratchet wheels respectively to different grippers to cause said grippers to be moved respectively in substantially opposite directions by movement of said ratchet wheels in the same direction, pawls mounted to turn about the axis of said rock shaft, and means for connecting said pawls to the ratchet wheels and for operating said pawls and ratchet wheels through a movement of the rock shaft.

25. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a rock shaft, a pair of ratchet wheels mounted to turn about the axis of said rock shaft, means connecting said ratchet wheels respectively to different grippers to cause said grippers to be moved respectively in substantially opposite directions by movement of said ratchet wheels in the same direction, pawls for imparting operative movement to said ratchet wheels, one of said pawls being carried by the rock shaft, means for operating the rock shaft, and means carried by the rock shaft for imparting operative movement to the other pawl.

26. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a rock shaft, a pair of ratchet wheels mounted to turn about the axis of said rock shaft, means connecting said ratchet wheels respectively to different grippers to cause said grippers to be moved respectively in substantially opposite directions by movement of said ratchet wheels in the same direction, pawls for imparting operative movement to said ratchet wheels, one of said pawls being carried by the rock shaft and the other mounted with provision for relative movement between it and the rock shaft, means for operating said rock shaft, and a cam carried by said rock shaft for imparting operative movement to said other pawl.

27. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a rock shaft, a pair of ratchet wheels mounted to turn about the axis of said rock shaft, means connecting said ratchet wheels respectively to different grippers to cause said grippers to be moved respectively in substantially opposite directions by movement of said ratchet wheels in the same direction, pawls for imparting operative movement to said ratchet wheels, one of said pawls being carried by the rock shaft and the other mounted with provision for relative movement between it and the rock shaft, means for operating said rock shaft, and a cam carried by said rock shaft for imparting operative movement to said other pawl, said cam being constructed to limit the movement imparted to its pawl irrespective of continued movement of the other pawl.

28. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for ef-

fecting relative movement of said shoe positioning means and grippers to pull the upper, and operating means for subsequently moving said grippers to change the tension of the upper, said operating means being constructed to limit the movement imparted to one gripper irrespective of the continued movement of another gripper.

29. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and grippers to pull the upper, and means for subsequently imparting a movement of indeterminate extent to one of the grippers in a direction to increase the tension of the upper and for imparting to another of the grippers a movement of predetermined extent in a direction to relax the tension.

30. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and grippers to pull the upper, manually operative means for moving one of the grippers subsequently in a direction to increase the tension of the upper, and means for rendering said manually operative means effective to impart to another of the grippers a movement automatically limited in extent in a direction to relax the tension of the upper.

31. In a machine of the class described, the combination with shoe positioning means, of an upper engaging gripper, a ratchet wheel connected to said gripper, a pawl for operating said ratchet wheel to impart an upper tensioning movement to the gripper, and means comprising a rotatable cam for imparting operative movement to said pawl.

32. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, means for subsequently moving one of the grippers in a direction to increase the tension of the upper, a ratchet wheel connected to another of the grippers, a pawl for operating said ratchet wheel to move the gripper in a direction to relax the tension of the upper, and operating means for said pawl comprising a cam constructed to impart to the pawl a movement of predetermined extent.

33. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and operating means for subsequently effecting movements of said grippers, said operating means being constructed and arranged for movement in opposite direction to operate different grippers alternately.

34. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and gripper operating means constructed and arranged for movement in one direction to operate one of the grippers to increase the tension of the upper and for a movement in another direction to operate another of the grippers to increase the tension without affecting the position of said first gripper.

35. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, and means for connecting said member alternatively to different grippers after the upper has been pulled constructed to cause a movement of the member in one direction to operate one gripper to increase the tension of the upper and a movement of the member in the opposite direction to operate another gripper to increase the tension of the upper.

36. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, clutch members connected respectively to different grippers for moving said grippers in substantially the same direction through movements of said members in opposite directions, and means for imparting operative movements to said clutch members alternately.

37. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, ratchet wheels connected respectively to different grippers, pawls for operating said ratchet wheels, and means for operating different pawls alternately for imparting movement to the different respective grippers.

38. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, ratchet

wheels connected respectively to different grippers to move them in substantially the same direction through movements of said wheels in opposite directions, pawls for operating said ratchet wheels, means for maintaining said pawls normally out of engagement with said wheels, and a manually operative member movable in one diretcion to operate one of said pawls and in the opposite direction to operate the other pawl.

39. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, ratchet wheels connected respectively to different grippers to move them in substantially the same direction through movements of said wheels in opposite directions, a rock shaft, pawls carried by said rock shaft for operating the respective ratchet wheels, means for maintaining said rock shaft normally in a neutral position with said pawls out of engagement with the ratchet wheels, and means for rendering said pawls alternately effective to operate the respective ratchet wheels.

40. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, operating means movable to cause one of the grippers to increase the tension of the upper, means automatically operative during said movement of the operating means to cause another gripper to be moved in a direction to relax the tension, and means for rendering said operating means subsequently effective to move said other gripper in a direction to increase the tension.

41. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and operating means constructed for movement in one direction to cause one gripper to increase the tension of the upper and another gripper to relax the tension, said means being movable subsequently in a different direction to cause said other gripper to increase the tension without affecting the position of said first-mentioned gripper.

42. In a machine of the class described, the combination with shoe positioning means, of a plurality of grippers for engaging the upper of the shoe, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, and connections whereby the operator is enabled by movement of said member in one direction to cause one gripper to increase the tension of the upper and another gripper to relax the tension and by movement of said member in another direction to cause said other gripper to increase the tension without affecting the position of said first-mentioned gripper.

43. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and a single operating means constructed and arranged to move the several grippers substantially simultaneously to increase the tension of the upper at the toe and to relax the tension at the sides of the shoe.

44. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, operating means for moving the toe gripper in a direction to increase the tension of the upper, and means automatically operative through said movement of the toe gripper operating means for moving the side grippers in a direction to relax the tension of the upper.

45. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and manually operative means constructed for connection at the will of the operator to both the toe gripper and the side grippers for moving the toe gripper in a direction to increase the tension of the upper and the side grippers in a direction to relax the tension.

46. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, operating means for effecting subsequent movements of said grippers to change the tension of the upper, and connections between said operating means and the grippers constructed to cause a movement of said operating means in one direction to effect movements of the toe gripper and of the side grippers in different respective directions.

47. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper

of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a controlling member, and means whereby the operator is enabled through a movement of said member in one direction to cause the toe gripper to move in a direction to increase the tension of the upper and the side grippers to move in a direction to relax the tension.

48. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, connections between said member and the toe gripper for operating said gripper to increase the tension of the upper, and connections between said member and the side grippers for simultaneously operating the side grippers to relax the tension of the upper.

49. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, and connections between said member and the toe gripper and side grippers constructed to cause a movement of said member in one direction to effect co-operative movements of the different grippers for changing the relative tensions of the portions of the upper at the toe and at the sides of the shoe.

50. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and operating means comprising a member arranged to be connected to the toe gripper and the side grippers for subsequently moving said grippers in directions to increase the tension of the upper at the toe and to relax the tension at the sides, the connections between said operating means and the side grippers being constructed to permit said grippers to assume different relative positions.

51. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising rotatable clutch members connected respectively to the toe gripper and to the side grippers, and manually operative means normally disconnected from said clutch members and movable to operate said members to increase the tension of the upper at the toe and to relax the tension at the sides of the shoe.

52. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a pair of ratchet wheels, means connecting said ratchet wheels respectively to the toe gripper and to the side grippers to cause the toe gripper and the side grippers to be moved respectively in substantially opposite directions through movement of the ratchet wheels in the same direction, pawls for engaging said ratchet wheels, and means for operating said pawls to turn the ratchet wheels.

53. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a rock shaft, a pair of ratchet wheels mounted to turn about the axis of said rock shaft and connected respectively to the toe gripper and to the side grippers, a pawl carried by said rock shaft for operating one of said ratchet wheels to impart an upper pulling movement to the toe gripper, a pawl for operating the other ratchet wheel, and a cam carried by said rock shaft for imparting operative movement to said other pawl.

54. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for operating said grippers to pull the upper, and supplemental gripper operating means comprising a rock shaft, a pair of ratchet wheels mounted to turn about the axis of said rock shaft and connected respectively to the toe gripper and to the side grippers, a pawl carried by said rock shaft for operating one of said ratchet wheels to impart an upper pulling movement to the toe gripper, a pawl for operating the other ratchet wheel, and a cam carried by said rock shaft for imparting movement to said other pawl, said cam being constructed to limit the movement imparted to its pawl irrespective of continued movement imparted to the other pawl.

55. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of

the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and operating means for subsequently moving said toe and side grippers to change the tension of the upper, said operating means being constructed to limit the movement thus imparted to the side grippers irrespective of continued movement of the toe gripper.

56. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and means for subsequently imparting a movement of indeterminate extent to the toe gripper in a direction to increase the tension of the upper and for imparting to the side grippers a movement of predetermined extent in a direction to relax the tension.

57. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, manually operative means for moving the toe gripper subsequently in a direction to increase the tension of the upper, and means for rendering said manually operative means effective to impart to the side grippers a movement automatically limited in extent in a direction to relax the tension of the upper.

58. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and operating means constructed and arranged for movement in one direction to operate the toe gripper to increase the tension of the upper and for movement in another direction to operate the side grippers to increase the tension.

59. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, and means for connecting said member to the toe gripper and to the side grippers constructed and arranged to cause a movement of said member in one direction to operate the toe gripper to increase the tension of the upper and a movement of the member in the opposite direction to operate the side grippers to increase the tension of the upper.

60. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, clutch members connected respectively to the toe gripper and to the side grippers for moving said grippers in substantially the same direction through movements of said members in opposite directions, and means for operating said clutch members alternately.

61. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, operating means for moving the toe gripper subsequently to increase the tension of the upper, means automatically operative during said movement of the operating means to cause the side grippers to be moved in a direction to relax the tension, and means for rendering said operating means subsequently effective to move the side grippers in a direction to increase the tension.

62. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, and operating means constructed for movement in one direction to operate the toe gripper to increase the tension of the upper and to operate the side grippers to relax the tension and for movement in a different direction to operate the side grippers to increase the tension.

63. In a machine of the class described, the combination with shoe positioning means, of grippers for engaging the upper of the shoe at the toe and at opposite sides of the forepart, means for effecting relative movement of said shoe positioning means and the grippers to pull the upper, a manually operative member, and connections whereby the operator is enabled by movement of said member in one direction to operate the toe gripper to increase the tension of the upper and to operate the side grippers to relax the tension and by movement of said member in another direction to operate the side grippers to increase the tension of the upper.

64. In a machine of the class described, the combination with means for performing an operation on a shoe and other means for performing in the same cycle of the machine a subsequent operation on the shoe, of mechanism responsive to a condition of said first named means occurring abnormally at a

time in the cycle of operation for effecting suspension of a normal function of said other means during the completion of said cycle.

65. In a machine of the class described, the combination with means for performing an operation on a shoe and other means for performing a subsequent operation on the shoe in the same cycle of the machine, of mechanism constructed and arranged to be operated under abnormal conditions in the cycle of the machine by an automatically movable part of the machine for effecting suspension of the normal operation of said other means, and a device under control of said first named means for controlling the operation of said mechanism.

66. In a machine of the class described, the combination with means for preparing shoe materials during one portion of the cycle of operations of the machine for the operation thereon of other means in a subsequent portion of the cycle, of mechanism responsive to a condition of said first named means occurring abnormally at a time in the cycle of operations for effecting suspension of a normal function of said other means.

67. In a machine of the class described, the combination with means for preparing shoe materials during one portion of the cycle of operations of the machine for the operation thereon of other means in a subsequent portion of the cycle, of mechanism responsive to control of said first named means and automatically operative in the event of a premature withdrawal of the work from the machine for effecting suspension of a normal function of said other means during the completion of the cycle of movements of the machine.

68. In a machine of the class described, the combination with means for operating on shoe materials during one portion of the cycle of operations of the machine to prepare them for the operation thereon of other means in a subsequent portion of the cycle, of mechanism responsive to a condition of said first named means occurring abnormally at a time in the cycle of operations for restraining a yieldingly effected movement which normally occurs in the operation of said other means.

69. In a machine of the class described, the combination with means for operating on the work to prepare it for the subsequent operation thereon of fastening means in the cycle of operations of the machine, and fastening means for operating subsequently upon the work, of mechanism responsive to a condition of said first named means occurring abnormally at a time in the cycle of operations for effecting suspension of a normal function of said fastening means.

70. In a machine of the class described, the combination with means for operating on the work to prepare it for the subsequent operation thereon of fastening means in the cycle of operations of the machine, and fastening means for operating subsequently upon the work, of mechanism responsive to control of said first-named means in consequence of absence of work from the machine for effecting suspension of a normal function of said fastening means.

71. In a machine of the class described, the combination with means for preparing work during an automatically terminable portion of the cycle of operations of the machine for the operation thereon of other means in a subsequent portion of the cycle after the machine is again started, of mechanism responsive to release of the work while the machine is at rest between the two portions of the cycle and automatically operable to effect suspension of a normal function of said other means.

72. In a machine of the class described constructed to perform its cycle of operation in successive stages with a pause between the successive stages during which the machine is at rest, the combination with means for performing an operation on the work in one stage of the cycle and other means for performing another operation on the work in a subsequent stage after the machine is again started, of mechanism constructed to be rendered operative in consequence of absence of work from the machine at the beginning of said subsequent stage for effecting suspension of a normal function of said other means.

73. In a machine of the class described, the combination with means for performing an operation on a piece of work and means for subsequently inserting a fastener in the work, of mechanism responsive to a condition of said first named means occurring abnormally at a time in the cycle of operations for effecting suspension of a normal function of said fastener inserting means.

74. In a machine of the class described, the combination with means for performing an operation on a piece of work and means for subsequently inserting a fastener in the work, of mechanism responsive to control of said first-named means in consequence of absence of work from the machine for preventing discharge of a fastener during the cycle of movements of the machine.

75. In a machine of the class described, the combination with means for performing an operation on a piece of work and for then holding the work with the machine at rest and means for subsequently inserting a fastener in the work after the machine has been started a second time, of mechanism constructed to operate in consequence of premature withdrawal of the work from the machine to prevent the normal operation of said fastener inserting means upon a fas-

tener during completion of the cycle of movements of the machine.

76. In a machine of the class described, the combination with means for performing an operation on a piece of work, and means for subsequently driving a fastener into the work, of mechanism responsive to a condition of said first named means occurring abnormally at a time in the cycle of operations for restraining said driving means from driving movement during the cycle of movements of the machine.

77. In a machine of the class described, the combination with means for performing an operation on a piece of work, and means for subsequently driving a fastener into the work, of mechanism responsive to control of said first-named means in consequence of absence of work from the machine for preventing driving movement of said fastener driving means during the cycle of movements of the machine.

78. In a machine of the class described, the combination with means for performing an operation on a piece of work, means for inserting a fastener in the work, and means for supplying fasteners to said inserting means, of mechanism constructed to be rendered operative in consequence of a condition of said first named means occurring abnormally at a time in the cycle of operations for effecting suspension of the normal functions of said fastener inserting and fastener supplying means.

79. In a machine of the class described, the combination with means for performing an operation on a piece of work in an automatically terminable portion of the cycle of operations of the machine, means for inserting a fastener in the work after the machine has been started a second time, and means for supplying fasteners to said inserting means, of mechanism constructed to be rendered operative in consequence of absence of work from the machine for effecting suspension of the normal functions of said fastener inserting and fastener supplying means.

80. In a machine of the class described, the combination with means for performing an operation on a piece of work, means for inserting a fastener in the work, and means for supplying fasteners to said inserting means, of mechanism controlled by said first named means and arranged to be rendered operative upon a premature relative separation between said means and the work for effecting suspension of the normal functions of said fastener inserting and fastener supplying means.

81. In a machine of the class described, the combination with means for preparing shoe materials during one portion of the cycle of operations of the machine for the operation thereon of fastening means in a subsequent portion of the cycle, and fastening means for operating subsequently upon said materials, of mechanism constructed to be rendered operative in consequence of an inoperative condition of said first named means for preventing the normal operation of said fastening means.

82. In a machine of the class described, the combination with means for preparing shoe materials during an automatically terminable portion of the cycle of operations of the machine for the operation thereon of fastener driving means in a subsequent portion of the cycle of operations after the machine has been again started, and fastener driving means for operating upon said materials in said subsequent portion of the cycle, of mechanism automatically operative in the absence of work from the machine in the upper fastening portion of the cycle for preventing operative movement of said driving means.

83. In a machine of the class described, the combination with upper pulling means and upper fastening means, of mechanism constructed to be rendered operative in consequence of an inoperative condition of said pulling means for effecting suspension of a normal function of said fastening means.

84. In a machine of the class described, the combination with upper pulling means and upper fastening means constructed and arranged to operate in different respective periods of the cycle of operations of the machine between which the machine comes automatically to rest, of mechanism constructed to be rendered operative in consequence of absence of work from the machine for effecting suspension of a normal function of said fastening means.

85. In a machine of the class described, the combination with means for pulling an upper and means for subsequently fastening the upper, of means responsive to control of said pulling means upon a premature removal of the shoe from the machine for effecting suspension of a normal function of said fastening means during completion of the cycle of movements of the machine.

86. In a machine of the class described, the combination with means comprising a gripper for pulling an upper and means for subsequently fastening the upper, of means constructed for operation in consequence of an inoperative condition of said gripper to suspend a normal function of said fastening means.

87. In a machine of the class described, the combination with means comprising a gripper for pulling an upper and means for subsequently fastening the upper, of means constructed for operation in consequence of premature release of the upper from the gripper for suspending a normal function of said fastening means.

88. In a machine of the class described, the combination with an upper engaging gripper, means for operating said gripper to pull an upper, and means for subsequently fastening the upper, of mechanism responsive to control of said gripper and arranged to be rendered operative upon a premature release of the gripper from the shoe for preventing the normal operation of said fastening means during the completion of the cycle of movements of the machine.

89. In a machine of the class described, the combination with an upper engaging gripper, means for operating said gripper to pull an upper, and means for subsequently inserting a fastener in the upper, of mechanism responsive to control of said gripper upon a premature release of the gripper from the shoe for restraining said fastener inserting means from operative movement during the completion of the cycle of movements of the machine.

90. In a machine of the class described, the combination with an upper engaging gripper, means for operating said gripper to pull an upper, and means for subsequently inserting a fastener in the upper, of mechanism responsive to control of said gripper and arranged to be rendered operative in consequence of a premature release of the shoe from the gripper for preventing discharge of a fastener during the completion of the cycle of movements of the machine.

91. In a machine of the class described, the combination with means for preparing a shoe for the operation of fastening means during one portion of the cycle of operations of the machine and fastening means for operating upon the shoe during a subsequent portion of the cycle, of mechanism constructed to be rendered operative automatically in consequence of premature relative separation between the shoe and said first named means for rendering said fastening means inoperative during the completion of the cycle of movements of the machine.

92. In a machine of the class described, the combination with means for preparing a shoe for the operation of fastening means during one portion of the cycle of operations of the machine and fastening means for operating upon the shoe during a subsequent portion of the cycle, of mechanism constructed and arranged for operation by an automatically movable part of the machine following a premature relative separation between the shoe and said first named means for preventing the normal operation of said fastening means during the completion of the cycle of movements of the machine.

93. In a machine of the class described, the combination with means for preparing a shoe for the operation of fastening means during one portion of the cycle of operations of the machine and fastening means for operating upon the shoe during a subsequent portion of the cycle, of mechanism constructed and arranged for operation by an automatically movable part of the machine following a premature relative separation between the shoe and said first named means for restraining the fastening means from operative movement, and means for rendering said first named means effective to control the operation of said restraining means.

94. In a machine of the class described, the combination with means for pulling an upper over a last and means for fastening the upper, of mechanism constructed to be rendered operative automatically in consequence of premature release of the shoe from the pulling means for rendering said upper fastening means inoperative during the completion of the cycle of movements of the machine.

95. In a machine of the class described, the combination with means for pulling an upper over a last and means for driving a fastener to fasten the upper, of mechanism constructed to be rendered operative automatically in consequence of premature release of the shoe from the pulling means for preventing discharge of a fastener during the completion of the cycle of movements of the machine.

96. In a machine of the class described, the combination with means for pulling an upper over a last and for holding it under tension with the machine at rest, and upper fastening means comprising a tack driver arranged to operate upon a subsequent starting of the machine, of mechanism constructed to be rendered operative automatically in consequence of premature relative separation between the shoe and the upper pulling means for locking said driver against driving movement during the completion of the cycle of movements of the machine.

97. In a machine of the class described, the combination with means for pulling an upper over a last and upper fastening means comprising a tack driver, of mechanism responsive to control of said pulling means upon a premature relative separation between the shoe and the pulling means and arranged to be rendered operative for locking said driver against driving movement during the completion of the cycle of movements of the machine.

98. In a machine of the class described, having means for pulling an upper over a last and means for fastening the upper with a pause between the upper pulling and the fastening operations to permit inspection of the upper, the combination with the upper pulling means and the upper fastening means, of mechanism constructed

to be rendered operative in consequence of relative separation between the shoe and the pulling means during said pause between the upper pulling and the fastening operations for restraining the upper fastening means from operation during the completion of the cycle of movements of the machine.

99. In a machine of the class described, the combination with upper pulling means, fastener driving mechanism, means for delivering fasteners to said driving mechanism, and means for bringing the machine to a stop between the upper pulling and the fastener driving operations, of means constructed to be rendered operative in consequence of premature relative separation between the shoe and the pulling means for restraining said driving mechanism from operative movement and for preventing delivery of fasteners to said mechanisms during the completion of the cycle of movements of the machine.

100. In a machine of the class described, the combination with upper pulling means, a tack driver, and means comprising a rotatable tack hopper for supplying tacks to said driver, of means constructed to be rendered operative in consequence of premature relative separation between the shoe and the pulling means for locking said driver against operative movement and for stopping rotation of the tack hopper during the completion of the cycle of movements of the machine.

101. In a machine of the class described, the combination with upper pulling means, means for inserting a fastener in the shoe, and means for supplying fasteners to said inserting means, of mechanism responsive to a condition of said pulling means occurring abnormally at a time in the cycle of operations for rendering said fastener inserting means and said fastener supplying means both inoperative during the cycle of movements of the machine.

102. In a machine of the class described, the combination with upper pulling means, means for inserting a fastener in the shoe, and means for supplying fasteners to said inserting means, of mechanism responsive to control of said pulling means and arranged to be rendered operative in consequence of premature release of the shoe from said pulling means for rendering said fastener inserting means and said fastener supplying means both inoperative during completion of the cycle of movements of other parts of the machine.

103. In a machine of the class described, the combination with upper pulling means, means for inserting a fastener in the shoe, and means for supplying fasteners to said inserting means, of mechanism responsive to control of said pulling means and arranged to be rendered operative for preventing discharge of a fastener and also for preventing delivery of a fastener to the inserting means during completion of the cycle of movements of other parts of the machine.

104. In a machine of the class described, the combination with upper pulling means and means for fastening the upper, of means arranged to be controlled by said upper pulling means and to render said fastening means inoperative in the event of relative separation between the shoe and a portion of the machine prior to the normal time of operation of said fastening means.

105. In a machine of the class described, the combination with an upper engaging gripper, means for operating said gripper comprising parts relatively movable against yielding resistance to pull the upper, and means for fastening the upper, of means constructed to be rendered operative by relative movement of said parts of the gripper operating means upon release of a shoe from the machine after the upper pulling operation and prior to the fastening operation and to prevent operative movement of the fastening means during the completion of the cycle of movements of the machine.

106. In a machine of the class described, the combination with upper pulling means and upper fastening means, of means constructed and arranged for operation by an automatically movable part of the machine for preventing the normal operation of said fastening means.

107. In a machine of the class described, the combination with upper pulling means and fastener inserting means, of means constructed and arranged for operation by an automatically movable part of the machine for locking said fastener inserting means against operative movement, and means for rendering the upper pulling means effective to control the operation of said locking means.

108. In a machine of the class described, the combination with upper pulling means, upper fastening means, and power mechanism for operating said upper pulling and fastening means, of means arranged to be rendered effective by premature removal of the work for causing the power mechanism to effect suspension of the fastening operation while the cycle of movements of the machine is completed.

109. In a machine of the class described, the combination with upper pulling means and fastener driving means, of means for locking said fastener driving means against operative movement, and means constructed for operation upon a premature removal of a shoe from the machine to connect said locking means to a movable part of the ma-

chine for rendering it operative to lock the driving means during the completion of the cycle of movements of the machine.

110. In a machine of the class described, the combination with upper pulling means and fastener driving means, of locking means for restraining said driving means from operative movement, means for holding said locking means normally inoperative, and means arranged to be operated by the upper pulling means upon a premature release of a shoe from the machine for connecting said locking means to a movable part of the machine to render it operative to lock the driving means.

111. In a machine of the class described, the combination with upper pulling means and fastener driving means, of locking means for restraining said driving means from operative movement, means for holding said locking means normally inoperative, operating means for moving said locking means to operative position, and means arranged to be operated by the upper pulling means upon a premature removal of a shoe from the machine to establish an operative connection between said locking means and its operating means.

112. In a machine of the class described, the combination with upper pulling means and fastener driving means, of locking means for restraining said driving means from operative movement, means for normally holding said locking means in inoperative position, operating means for moving said locking means to operative position, said operating means comprising parts normally movable and normally stationary respectively in the normal cycle of operations of the machine, and clutch means arranged to be rendered operative upon a premature release of a shoe from the machine for connecting said parts to cause the locking means to be moved to operative position.

113. In a machine of the class described, the combination with upper pulling means and fastener driving means, of locking means for restraining said driving means from operative movement, means for normally holding said locking means in inoperative position, means including a clutch for moving said locking means into operative position in the event of a premature relative separation between the shoe and the pulling means, and means for rendering said upper pulling means effective to control said clutch.

114. In a machine of the class described, the combination with an upper engaging gripper, an updraw lever connected to said gripper, spring means for operating said lever, and means for driving fasteners to fasten the upper, of locking means for restraining said driving means from operative movement, means for normally holding said locking means in inoperative position, means including a clutch for moving said locking means into operative position in the event of a premature removal of a shoe from the machine, and means arranged to be operated by the excess movement of the updraw lever under the influence of its spring when the gripper is released from the shoe for effecting an operative connection between the parts of said clutch.

115. In a machine of the class described, the combination with upper pulling means and upper fastening means, of mechanism constructed and arranged for operation by an automatically movable part of the machine for effecting suspension of the normal operation of said fastening means, and means for rendering the upper pulling means effective to control the operation of said mechanism.

116. In a machine of the class described, the combination with upper pulling means and upper fastening means, of mechanism constructed and arranged for operation by automatically movable part of the machine for effecting suspension of the normal operation of said fastening means, and means responsive to a condition of said pulling means occurring abnormally at a time in the cycle of operations for establishing an operative connection between said mechanism and said movable part.

117. In a machine of the class described, the combination with upper pulling means and upper fastening means, of mechanism constructed and arranged for operation by an automatically movable part of the machine for effecting suspension of the normal operation of said fastening means, and means responsive to premature release of the shoe from said pulling means for establishing an operative connection between said mechanism and said movable part.

118. In a machine of the class described, the combination with a tack driver bar, of a locking device mounted to turn about said bar into or out of position to restrain the bar from driving movement.

119. In a machine of the class described, a tack driver bar provided with a transverse groove, and a locking device arranged to engage the bar in said groove to restrain the bar from driving movement.

120. In a machine of the class described, a tack driver bar provided with a transverse groove, and a plate through which said bar extends, said plate being constructed to enter the groove in the driver bar to restrain the bar from driving movement when the plate is turned from its normal position.

121. In a machine of the class described, the combination with a plurality of driver bars, of locking devices mounted to turn about said bars into or out of locking posi-

tion, and means for turning said devices in unison either into position to lock the bars against driving movement or into position to permit the driving movement of the bars.

122. In a machine of the class described, the combination with a plurality of driver bars, of locking devices mounted to turn about said bars into or out of locking position, means for turning said devices in unison either into position to lock the bars against driving movement or into position to permit the driving movement of the bars, means for supplying tacks to said driver bars, and means movable in unison with said locking devices into position to restrain said supplying means from operative movement.

123. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism including a spacing device adjustable to vary the distance between the side grippers without affecting the position of the toe gripper, and means for adjusting said device comprising a rotatable member arranged to be engaged and turned by the hand of the operator, and operative connections between said member and spacing device.

124. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism including a spacing device adjustable to vary the distance between the side grippers without affecting the position of the toe gripper, and means for adjusting said device comprising a manually operative member positioned at one side of the machine within convenient reach of the operator, and operative connections between said member and spacing device.

125. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism including a spacing member adjustable to vary the distance between the side grippers without affecting the position of the toe gripper, and means for adjusting said member comprising a hand wheel positioned at one side of the machine, and gearing connecting said hand wheel to the spacing member.

126. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism including a spacing device for determining the distance between the opposite side grippers, means comprising a hand wheel at one side of the machine for adjusting said mechanism to vary the spread of the toe and side grippers, and means comprising a hand wheel at the opposite side of the machine for adjusting said spacing device to vary the distance between the side grippers without affecting the position of the toe gripper.

127. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism, a shaft extending transversely of the machine, and manually operative members mounted at opposite ends of said shaft and connected respectively for adjusting the spread of all the grippers and for adjusting the spread of the side grippers alone.

128. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism comprising a lengthwise movable bar for determining the position of the toe gripper and a wedge block on said bar for determining the distance between the side grippers, means comprising a shaft extending transversely of said bar for operating said mechanism, and an adjusting device mounted for rotation on said shaft and connected to said wedge block for adjusting said block relatively to said bar to vary the distance between the side grippers.

129. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism comprising a lengthwise movable bar for determining the position of the toe gripper and a wedge block on said bar for determining the distance between the side grippers, means comprising a shaft extending transversely of said bar for operating said mechanism, a hand wheel mounted on one end of said shaft, and gearing connecting said hand wheel to said wedge block for adjusting the wedge block relatively to the bar to vary the distance between the side grippers.

130. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism comprising a lengthwise movable bar for determining the position of the toe gripper and a wedge block on said bar for determining the spacing of the side grippers, spaced lugs on said wedge block, a screw threaded rod secured to said bar and extending loosely through said lugs, a pinion threaded on said rod between said lugs, and means for rotating said pinion to adjust the wedge block along the bar.

131. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism comprising a lengthwise movable bar for determining the position of the toe gripper and a wedge block on said bar for determining the spacing of the side grippers, spaced lugs

on said wedge block, a screw threaded rod secured to said bar and extending loosely through said lugs, a pinion threaded on said rod between said lugs, and means comprising an operating pinion for turning said threaded pinion to adjust the wedge block along the bar, said operating pinion being elongated to maintain operative connection with the threaded pinion in all positions of the spreading mechanism.

132. In a machine of the class described, the combination with grippers for engaging an upper at the toe and at opposite sides of a last, of gripper spreading mechanism comprising a lengthwise movable bar for determining the position of the toe gripper and a wedge block on said bar for determining the spacing of the side grippers, spaced lugs on said wedge block, a screw threaded rod secured to said bar and extending loosely through said lugs, a pinion threaded on said rod between said lugs, and means for rotating said pinion to adjust the wedge block comprising a hand wheel at one side of the machine and gearing connecting said hand wheel to said pinion.

133. In a machine of the class described having upper pulling means and end lasting wipers constructed and arranged to permit the wipers to be positioned manually in toe embracing relation to a shoe and to permit the toe portion of the upper to be released from the upper pulling means while the wipers are thus manually positioned and prior to their overwiping movement, the combination with the upper pulling means and the wipers, of means for adjustably limiting the initial spread of the wipers to permit them to be positioned manually in effective holding relation to the upper at the sides of the toe as well as at the end of the toe in their operation upon shoes of different widths.

134. In a machine of the class described, the combination with upper pulling means of power operated end lasting wipers mounted to be positioned manually in toe embracing relation to a shoe prior to their overwiping movement, and means carried by said wipers for adjustably limiting their initial spread for shoes of different widths.

135. In a machine of the class described, the combination with upper pulling means, of power operated end lasting wipers mounted to be positioned manually in toe embracing relation to a shoe prior to their overwiping movement, spring means tending to maintain said wipers in open position, and means for adjustably varying the limit of opening movement of said wipers.

136. In a machine of the class described, the combination with end lasting wipers and spring means for opening said wipers, of means for adustably limiting the opening movement of said wipers.

137. In a machine of the class described, the combination with end lasting wipers and spring means for opening said wipers, of means comprising adjustable eccentrics for variably limiting the opening movement of the wipers.

138. In a machine of the class described, the combination with end lasting wipers, of studs carried by said wipers and provided with eccentric portions adjustable through turning movement of said studs to vary the limit of opening movement of the wipers.

139. In a machine of the class described, the combination with a wiper support and end lasting wipers mounted on said support for opening and closing movements, of spring means for opening said wipers, and stops carried by said wipers and arranged to engage the wiper support to limit the opening movement of the wipers, said stops being adjustable to vary said limit of movement.

140. In a machine of the class described, the combination with a toe gripper, side grippers and end lasting wipers constructed and arranged to permit the wipers to be positioned manually in toe embracing relation to a shoe and to permit the toe gripper to be released from the upper prior to the overwiping operation of the wipers, of means constructed to engage the bottom portion of the shoe at the heel end to prevent the shoe from rocking about its connection with the side grippers in response to the pressure of the wipers.

141. In a machine of the class described having toe and side grippers and end lasting wipers constructed and arranged to permit the wipers to be positioned manually in toe embracing relation to a shoe and to permit the toe gripper to be released from the upper prior to the overwiping operation of the wipers, the combination with the grippers and the wipers, of a heel rest having means constructed to project over the bottom of the shoe to prevent the shoe from rocking about its connection with the side grippers in response to the pressure of the wipers.

142. In a machine of the class described having toe and side grippers and end lasting wipers constructed and arranged to permit the wipers to be positioned in toe embracing relation to the shoe while the upper is released from the top gripper and held by the side grippers, the combination with the grippers and the wipers, of means for engaging the bottom of the shoe at the heel end to restrain the shoe from rocking movement in response to the pressure of the wipers.

143. In a machine of the class described, the combination with upper pulling means and toe lasting means, of a heel rest constructed to embrace the heel end portion of the shoe, said heel rest having means constructed and arranged to project over the

bottom of the shoe to restrain the shoe from rocking movement.

144. In a machine of the class described, the combination with a sole rest for engaging the bottom of a shoe at the forepart, toe lasting wipers, and side grippers constructed to engage and hold locally portions of the upper at opposite sides of the sole rest and at a distance from the toe end face of the shoe while the wipers are positioned in toe embracing relation to the shoe, of a heel rest having means for engaging the bottom of the shoe to restrain the shoe from rocking movement.

145. In an upper pulling machine, the combination with upper pulling means, of upper fastening mechanism dependent for its operation upon the tensioning of an upper by the upper pulling means.

146. In an upper pulling machine, the combination with upper pulling means, of upper fastening means, and controlling mechanism dependent upon the absence of upper tensioning stress at a time in the cycle when such stress would normally exist for preventing the operation of said upper fastening means.

147. In an upper pulling machine, the combination with upper pulling means, of fastener driving means, and mechanism under control of said upper pulling means for restraining said fastener driving means from operative movement only in the absence of upper tensioning stress at a time in the cycle when such stress would normally exist.

148. In a machine of the class described, the combination with means for pulling an upper over a last in one stage of the cycle, and means for fastening the upper in a subsequent stage of the cycle, of controlling mechanism dependent upon the absence of upper tensioning stress at the beginning of said subsequent stage of the cycle for preventing the operation of said upper fastening means.

149. In a machine of the class described, the combination with toe and side grippers and a sole rest relatively movable to pull an upper over a last, and means for fastening the upper, of controlling mechanism arranged to be rendered automatically operative in the absence of work from the machine to prevent discharge of fasteners by said upper fastening means.

150. In a machine of the class described, the combination with toe and side grippers and a sole rest relatively movable to pull an upper over a last in one stage of the cycle, and means for driving fasteners to fasten the upper in a subsequent stage of the cycle, of controlling mechanism automatically operative in the absence of upper tensioning stress in said subsequent stage of the cycle to prevent operative movement of said fastener driving means.

151. In a machine of the class described, the combination with upper pulling means comprising grippers for engaging the upper at the toe and at opposite sides of the last, and means for fastening the upper, of mechanism under control of said upper pulling means for preventing operative movement of the upper fastening means in the event of premature release of the upper by the grippers.

152. In a machine of the class described, the combination with toe and side grippers, means for operating said grippers to pull an upper over a last, and means for fastening the upper, of mechanism for preventing the operation of said fastening means comprising parts arranged to be connected automatically to render said mechanism operative upon premature release of the upper from a gripper.

153. In a machine of the class described, the combination with means for pulling an upper over a last and means for fastening the upper, of a device controlled by said upper pulling means for preventing automatically the normal operation of said fastening means except under normal upper pulling conditions.

154. In a machine of the class described, the combination with yieldingly operated means for pulling an upper over a last and means for fastening the upper, of a device dependent upon movement of said upper pulling means beyond its normal range of upper pulling movement for preventing the normal operation of said fastening means during the completion of the cycle of operations of the machine.

155. In a machine of the class described, the combination with upper pulling means comprising a yieldingly operated updraw lever, and means for fastening the upper, of mechanism controlled by said updraw lever and dependent upon movement of the lever beyond its normal range of upper pulling movement for preventing the operation of said fastening means during the completion of the cycle of operations of the machine.

156. In a machine of the class described, the combination with upper pulling means comprising a yieldingly operated updraw lever, and means for fastening the upper, of a clutch device comprising parts arranged to be operatively related by a movement of said lever beyond its normal range of upper pulling movement, and mechanism automatically operative through the parts of said clutch device when thus related to prevent the operation of the upper fastening means during the completion of the cycle of operations of the machine.

157. In a machine of the class described, the combination with opposite side grippers, gripper levers, and operating means for moving the levers to pull an upper, of supplemental gripper operating means comprising a movable operating member, a lever pivoted on said member and having oppositely extending arms, and links connecting said arms respectively to the different gripper levers to permit said levers to assume different positions in the upper pulling operation.

In testimony whereof I have signed my name to this specification.

BERNHARDT JORGENSEN.