Sept. 9, 1952 T. A. KESTELL 2,609,552

MACHINE FOR SHAPING UPPERS OVER LASTS

Filed March 17, 1949 4 Sheets-Sheet 1

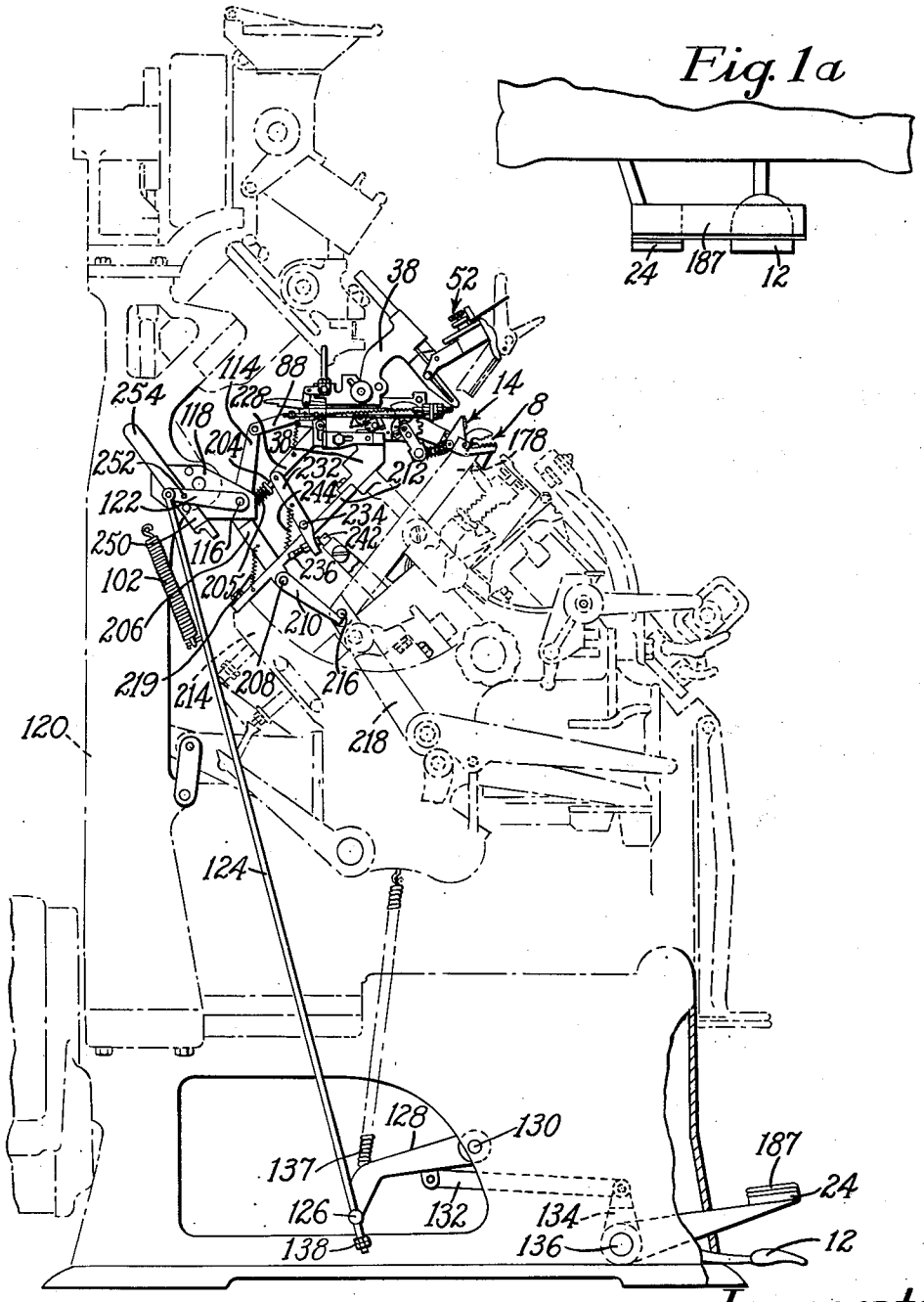


Fig. 1

Fig. 1a

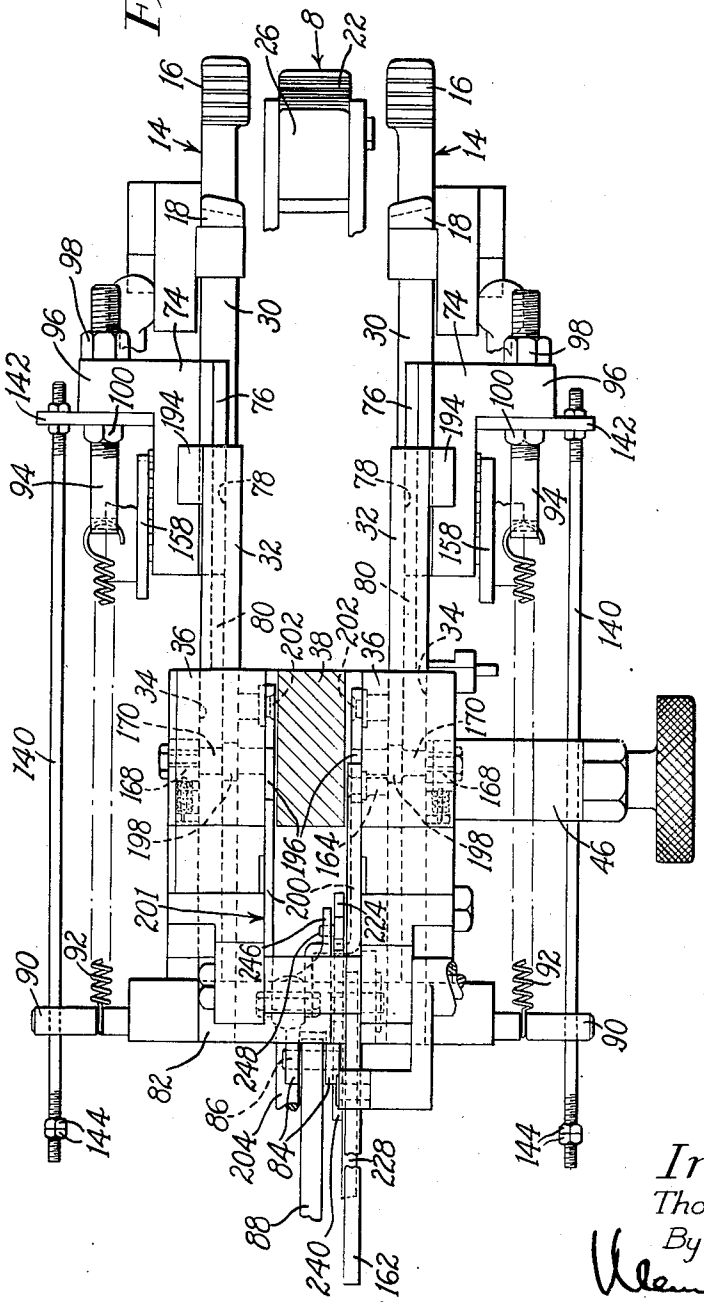
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Sept. 9, 1952 T. A. KESTELL 2,609,552

MACHINE FOR SHAPING UPPERS OVER LASTS

Filed March 17, 1949 4 Sheets-Sheet 2

Fig. 2



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Sept. 9, 1952 T. A. KESTELL 2,609,552

MACHINE FOR SHAPING UPPERS OVER LASTS

Filed March 17, 1949 4 Sheets-Sheet 3

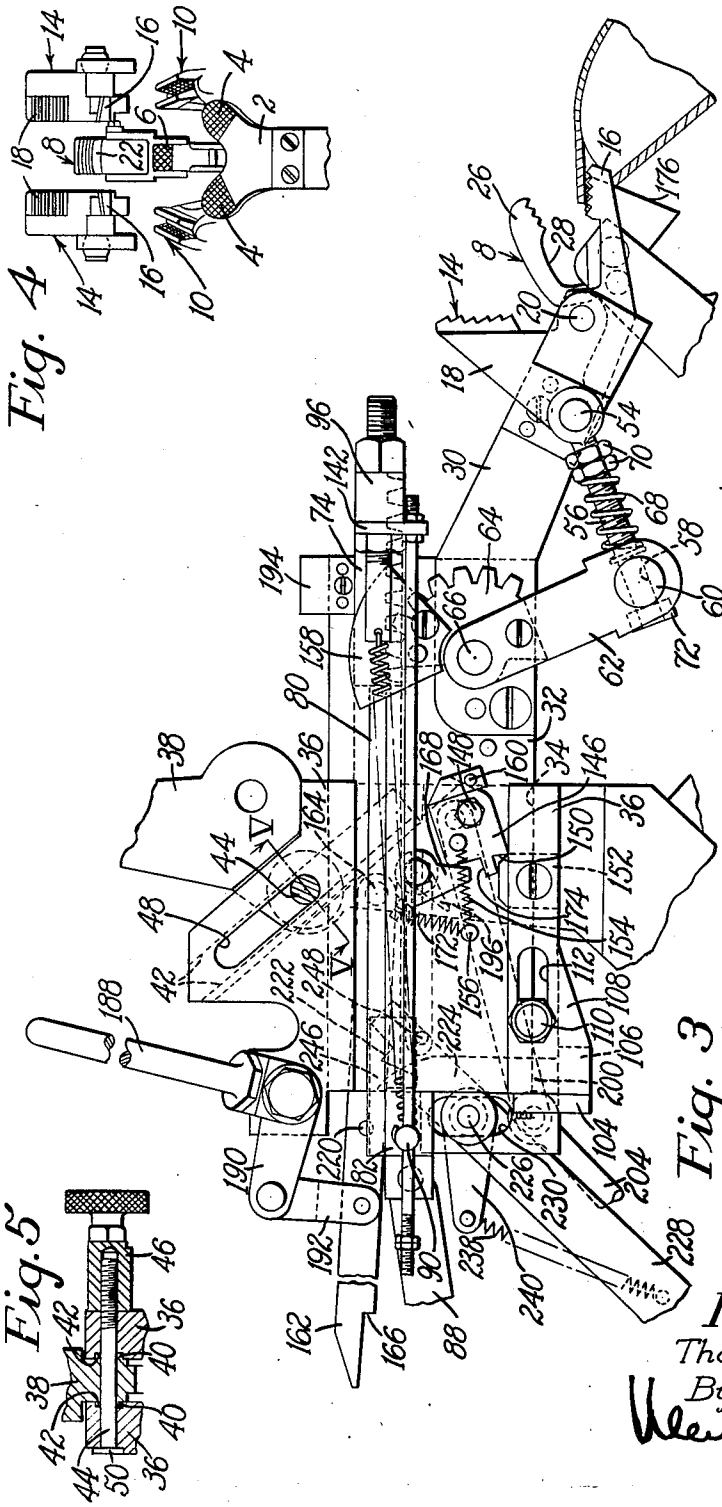


Fig. 3

Fig. 4

Fig. 5

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Sept. 9, 1952 T. A. KESTELL 2,609,552

MACHINE FOR SHAPING UPPERS OVER LASTS

Filed March 17, 1949 4 Sheets-Sheet 4

Fig. 6

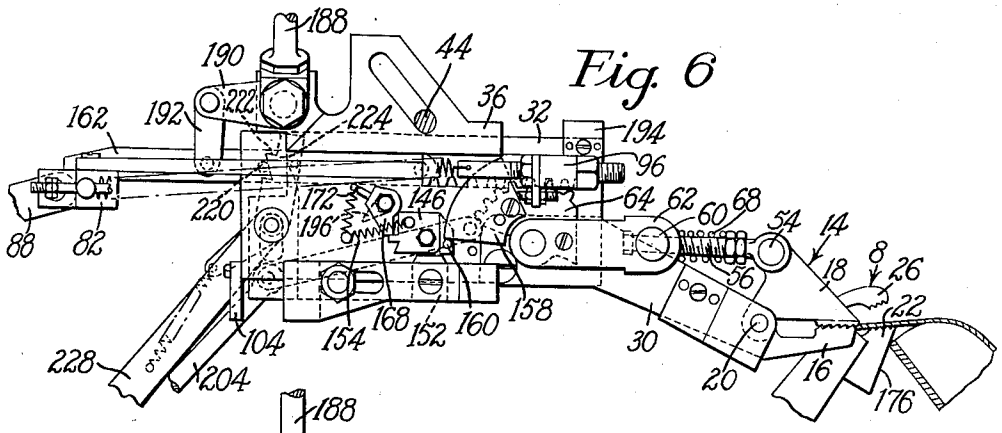


Fig. 7

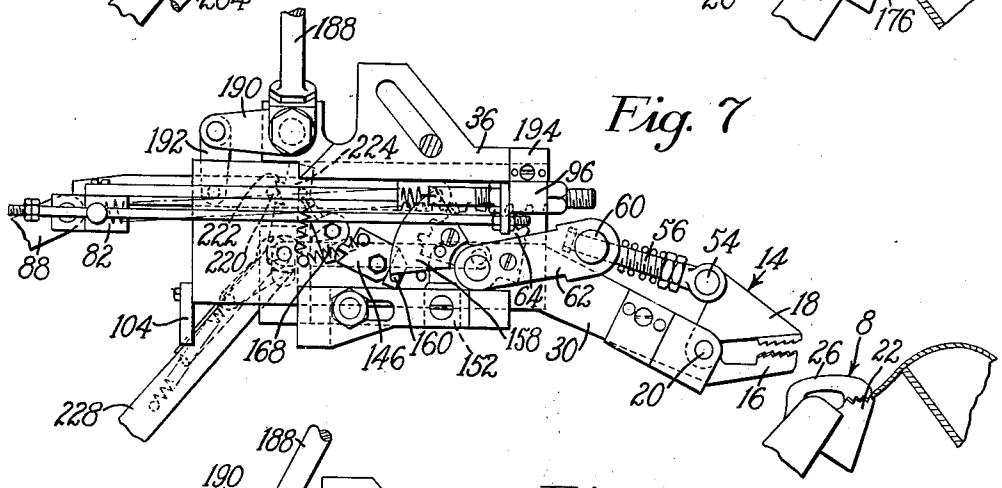


Fig. 8

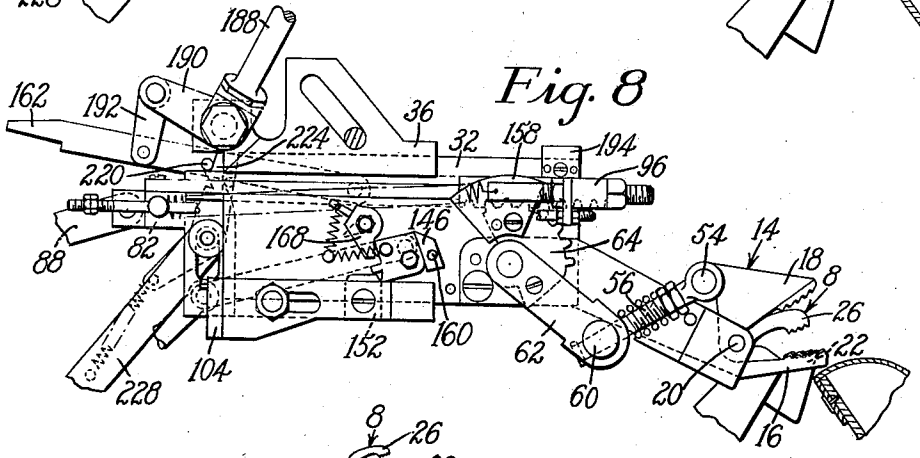
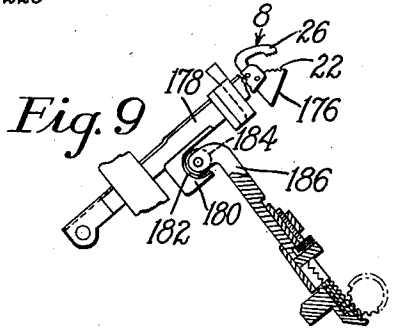


Fig. 9



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Patented Sept. 9, 1952 2,609,552

UNITED STATES PATENT OFFICE

2,609,552

MACHINE FOR SHAPING UPPERS OVER LASTS

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Application March 17, 1949, Serial No. 81,917
In Great Britain April 9, 1948

26 Claims. (Cl. 12—10.4)

1

This invention relates to machines for use in the manufacture of shoes for shaping uppers over lasts, and more particularly to machines having means for gripping the marginal portion of an upper on a last and for pulling the upper. Among its objects, the invention has especially in view the provision of certain improvements in machines known as pulling-over machines, which are commonly provided with grippers for gripping the marginal portion of the upper respectively at the end of the toe and the sides of the forepart and for pulling the upper over the last and also with means for thereafter driving fastenings to fasten the upper in pulled-over condition. The invention is herein shown as applied to a pulling-over machine of the type exemplified by the disclosure of United States Letters Patent No. 1,962,260, granted on June 12, 1934, on an application of W. T. B. Roberts, in which the shoe occupies an inclined position with its bottom facing downwardly and rearwardly, but the invention is not limited to an organization in which the shoe is positioned in that particular manner.

Before presenting a shoe to a pulling-over machine it is a common practice, in the interest of good shoemaking, to apply a preliminary pull to the toe end of the upper and thereby to tighten the upper lengthwise of the last preparatory to the pull to be applied thereto by the toe gripper in the course of a cycle of power operations of the machine. For this purpose it is customary to use either hand pincers or bench pincers such as shown in United States Letters Patent No. 1,139,613, granted on May 18, 1915, on an application of P. J. Wentworth. The preliminary pull thus applied serves, among other advantages, to bring the margin of the toe end of the upper into a better position relatively to the last to be readily inserted between the jaws of the toe gripper when the shoe is presented to the machine, especially if the upper is cut comparatively short. Having thus pulled the upper, the operator holds it in place on the forepart of the last, as best he can, with his fingers while presenting the shoe to the machine and inserting the margin of the upper between the jaws of the several grippers.

It will be evident that preparation of the upper in the manner above described requires a substantial amount of time and that considerable care and skill also are required thus to prepare it and to hold it in proper position on the last while presenting the shoe to the machine. The present invention accordingly provides means associated with the toe gripper for gripping the toe end of the upper after the shoe has been presented in

2

position for the pulling-over operation and for applying a preliminary pull to the upper before it is gripped by the toe gripper, thus eliminating the need for such preparation of the upper as has been customary heretofore. In the construction herein shown the preliminary pull is thus applied by additional toe grippers positioned respectively at opposite sides of the main toe gripper and having jaws so arranged as to receive the margin of the toe end of the upper between them without the necessity for any special care on the operator's part in presenting the shoe, the additional grippers being closed and operated to pull the upper by a treadle prior to the starting of the cycle of operations of the machine. The additional grippers are moved in a direction more nearly lengthwise of the last than the main toe gripper and serve to present the margin of the upper between the jaws of the main toe gripper in proper position to be gripped by the latter after the starting of the machine, the additional grippers releasing the upper automatically after it has thus been gripped. Conveniently, as further herein illustrated, the starting of the machine is effected by further movement of the above-mentioned treadle.

The invention further provides novel gripper-operating and controlling means, herein shown as associated with the additional toe grippers but not thus limited in its applicability. In the construction shown each of these grippers is first closed on the upper through gripper-closing mechanism and is thereafter operated to pull the upper by continued force applied to this mechanism in the gripper-closing direction, a device being provided for locking it positively against upper-pulling movement until it has thus been closed and for then automatically releasing it. The gripper-closing mechanism includes a toggle which is straightened to close the gripper and is thereafter broken by further movement in the same direction to cause the gripper to release the upper, the straightening of the toggle being limited by a stop which thereafter releases it to permit such further movement thereof. As further herein illustrated, the closing of the gripper by the straightening of the toggle and its movement thereafter to pull the upper are effected through a spring associated with which is positive means arranged to supplement the force of the spring near the end of the gripper-closing operation to insure the full straightening of the toggle.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more

particularly described with reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings,

Fig. 1 is a view in left-hand side elevation of the machine to which the invention is herein shown as applied, portions of the structure provided for purposes of the invention being shown in full lines and the greater portion of the rest of the machine in broken lines, with parts omitted;

Fig. 1*a* is a plan view of certain treadles shown in Fig. 1;

Fig. 2 is mainly a plan view, on an enlarged scale, of the additional toe grippers and of parts associated therewith;

Fig. 3 is a view in left-hand side elevation of the structure shown in Fig. 2, illustrating the position of the toe end of a shoe when the shoe is presented to the machine;

Fig. 4 is a front view of a portion of the machine, showing the main toe gripper, the side grippers, the additional toe grippers and a shoe rest with which the machine is provided;

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

Figs. 6, 7 and 8 are views similar to Fig. 3, on a smaller scale, showing the positions of the parts at different times in the operation of the machine; and

Fig. 9 is a view in left-hand side elevation of the main toe gripper and of controlling mechanism associated therewith, parts of this mechanism being broken away.

In view of the disclosures in the previously mentioned Letters Patent No. 1,962,260, and in others, of characteristic features of machines of the type to which the invention is shown as applied, including especially the disclosure in United States Letters Patent No. 1,029,387, granted June 11, 1912 on an application of R. F. McFeely, the machine herein shown will be described in detail only in so far as is necessary for an understanding of the invention. A machine of this type includes a shoe rest **2** (Fig. 4) which, when the machine is organized as shown in Letters Patent No. 1,962,260, is so arranged that the shoe occupies an inclined position in the machine with its bottom facing downwardly and toward the rear of the machine, the shoe rest including two presser feet **4** which engage the insole at the opposite sides of the forepart and another presser foot **6** which engages it near the end of the toe. The upper of the shoe so positioned is pulled over the last by a toe gripper **8** which grips and pulls it at the end of the toe and by opposite side grippers **10** which grip and pull it at the opposite sides of the forepart, respectively. The several grippers thus pull the upper in downwardly and rearwardly inclined directions in the first stage of a cycle of power operations of the machine initiated by depression of a starting treadle **12** (Fig. 1), after which the machine comes automatically to a stop with the upper held under tension to permit the operator to inspect the work and to make any necessary adjustments. Thereafter the operator again depresses the treadle **12** to initiate the second stage of the cycle of operations during which the margin of the upper is wiped inwardly over the insole and tacks are driven to fasten it in pulled-over position, the grippers releasing the upper. Near the end of this stage of the cycle the parts of the machine are returned to their starting positions.

For purposes of this invention the machine is provided with a pair of additional toe grippers **14** located respectively at opposite sides of the main toe gripper **8** (Figs. 2 and 4). Each of these additional grippers comprises a relatively fixed lower jaw **16** extending in a generally horizontal plane and an upper jaw **18** pivotally mounted on a pin **20** on the lower jaw for swinging movements toward and from the latter. As shown in Fig. 4, the upper-engaging face of each lower jaw, which is serrated, is arranged to extend in a somewhat downwardly inclined direction widthwise of the shoe away from the main toe gripper. The additional toe grippers are preferably so adjusted, in a manner hereinafter described, that their lower jaws **16** are positioned at substantially the same level as the forwardly extending upper-engaging portion of a lower jaw **22** of the main toe gripper **8** when this gripper is properly adjusted lengthwise of the shoe by means with which machines of the type herein shown are provided. The additional toe grippers **14** are supported as hereinafter described for forward and rearward movements in horizontal directions and are preferably so positioned initially, by adjustable means also hereinafter described, that the upper-engaging faces of their lower jaws **16** extend forwardly somewhat beyond the foremost portion of the lower jaw **22** of the main toe gripper **8**, as shown in Fig. 2, thereby facilitating the positioning of the marginal portion of the toe end of an upper loosely assembled on a last on the jaws **16** even though the upper materials are somewhat scantily cut. It will be understood that the limit of the forward movements of the additional grippers will be adjustably varied in accordance with the scantiness of the upper materials.

To outline briefly the purpose and the manner of operation of the additional toe grippers, it may be stated at this point that after the operator has presented a last with an upper loosely assembled thereon to the machine with the marginal portion of the toe end of the upper materials overlying the lower jaws **16** of the additional grippers, he causes these grippers to grip the upper and to move rearwardly to apply a yielding pull to the upper in a direction generally lengthwise of the last by depression of a treadle **24** (Fig. 1). In this operation the additional grippers present the marginal portion of the upper in position to be properly gripped by the lower jaw **22** and an upper jaw **26** of the main toe gripper **8**. The additional grippers hold the upper until it is gripped by the main toe gripper substantially at the beginning of the cycle of operations of the machine, whereupon they are automatically opened and are quickly moved farther rearwardly to positions where they do not interfere with the normal upper-pulling action of the main toe gripper or with the operations of other instrumentalities of the machine.

To facilitate the positioning of the marginal portion of the upper materials between the open jaws of the main toe gripper by the additional toe grippers in the manner above described, the jaws of the main toe gripper are different in shape from those of the corresponding gripper shown in Letters Patent No. 1,962,260. That is, they are so shaped that the upper-gripping faces of the jaws when the gripper is closed extend in substantially horizontal directions forwardly and rearwardly of the machine. These faces, moreover, are somewhat curved widthwise of the machine in downwardly inclined directions toward the additional grippers the upper-gripping faces of the lower jaws of which are inclined widthwise of the machine as hereinabove described. It will be evident that this curvature of the jaws of the main toe gripper and the incli-

nations of the upper-gripping faces of the lower jaws of the additional grippers, in view of the natural curvature of the marginal portion of the toe end of the upper as it lies loosely on the last when the work is presented to the machine, facilitates the presentation of the upper to the grippers by the operator. A portion of the upper jaw 26 of the main toe gripper at the rear of its serrated upper-engaging face is hollowed out, as shown at 28 (Fig. 3), to insure that in any event the margin of the upper materials pulled between the jaws of the main toe gripper by the additional grippers will not tend to interfere with the proper closing of the main toe gripper. The serrated upper-engaging faces of the jaws of the additional grippers may extend, for example, about half an inch lengthwise of the upper, and the rear edges of these faces when the grippers are closed may be spaced about half an inch forwardly of the pivot pins 20. Insurance is thus afforded that these grippers will properly grip, not only the outer layer of the upper materials, but also any inner layer which may terminate somewhat short of the edge of the outer layer.

The lower jaws 16 of the additional toe grippers are rigidly secured to front end portions of arms 30 which project forwardly and somewhat downwardly from slides 32 to which they are rigidly connected, each arm and slide serving as a gripper carrier. The slides 32 are mounted for sliding movements in forward and rearward directions along guideways 34 formed in brackets 36 which are spaced from each other widthwise of the machine as shown in Fig. 2. The spacing of these brackets is such that the additional toe grippers 14 are about an inch and a half apart with the main toe gripper 8 between them. The two brackets 36 are suitably bolted together in the above-mentioned spaced relation and are positioned respectively at opposite sides of a central bracket 38 which is secured to a portion of the frame of the machine. This central bracket has an upwardly extending portion provided near its upper end with ribs 40 (Fig. 5), one on each side thereof, which lie in parallel inclined guideways 42 in the brackets 36. These brackets are adjustably secured to the bracket 38 by a bolt 44 and a nut 46 (Fig. 5), the bolt extending through inclined slots 48 (Fig. 3) in the brackets 36 and through a bore in the bracket 38. The bolt 44 has a head 50 provided with a flattened portion which engages a surface on the right-hand bracket 36 to prevent the bolt from turning. The guideways 42 in the brackets 36 and the ribs 40 on the bracket 38 are so inclined that the brackets 36 may be adjusted relatively to the bracket 38 in forwardly and rearwardly inclined directions each at an angle of approximately 45° to the horizontal. By such adjustment the lower jaws 16 of the additional toe grippers are caused to move in paths substantially parallel to the inclination of the shoe rest 2 and also approximately parallel to the path of adjusting movement of the main toe gripper in directions lengthwise of the shoe for shoes of different lengths. Accordingly, the additional toe grippers may be readily adjusted to occupy similar initial positions relatively to the main toe gripper in its different adjusted positions, the adjustment of the additional grippers being effected by loosening the nut 46, moving the brackets 36 along the ribs 40 and thereafter tightening the nut. An upwardly and forwardly extending portion of the bracket 38 (Fig. 1) supports at its front end a tip-line gaging device 52 with which a pulling-over machine of the type shown is usually provided.

The movable upper jaws 18 of the additional toe grippers, which are pivotally mounted on the pins 20 as hereinbefore described, are arranged to extend upwardly in their fully open positions with their serrated upper-engaging faces substantially vertical. This enables the operator readily to position the marginal portion of the upper in proper relation to the lower jaws in presenting the work to the machine. For swinging the upper jaws toward the lower jaws to grip the upper, there are pivotally connected to the upper jaws, by means of studs 54, front end portions of rod-like links 56. When the upper jaws 18 are in fully open positions the links 56 extend downwardly and rearwardly, as shown in Fig. 3, the rear end portions of the links being slidably mounted in bores 58 drilled diametrically through transverse pivot pins 60 which are rotatably mounted in alined bearings in bifurcated end portions of links 62. The other ends of the links 62 are secured to gear segments 64 pivotally mounted for swinging movements on transverse pins 66 secured to the arms 30. Springs 68 surrounding the links 56 are mounted between the pins 60 and nuts 70 threaded on the links. Collars 72 fast on the rear ends of the links 56 prevent these links from moving forwardly out of the bores 58 in the pins 60 under the action of the springs 68. The links 56 and 62 constitute jaw-controlling toggles for closing and opening the additional toe grippers, the toggles being broken downwardly, as shown in Fig. 3, when the jaws 18 are in their initial open positions. When the toggles are straightened to the positions shown in Fig. 6 the jaws 18 are swung about the pins 20 toward the jaws 16, the springs 68 being compressed to an extent depending upon the thickness of the upper materials between the upper and lower jaws.

The gear segments 64 are in mesh with teeth cut in the lower faces of small rack members 74 having T-shaped ribs 76 (Fig. 2) slidingly mounted in correspondingly shaped guideways 78 formed in the outer sides of upper portions of the slides 32. These guideways extend forwardly and rearwardly in parallel relation to the paths of movement of the slides 32. Mounted in these guideways, at the rear of the rack members or bars 74, are slide bars 80. These slide bars extend, when in their most forward positions, rearwardly beyond the slides 32 and the brackets 36 and are rigidly connected together at their rear ends by a transversely extending crossbar 82. This crossbar has centrally disposed thereon rearwardly extending lugs 84 to which is pivotally connected by means of a pin 86 a rearwardly extending link 88 operated as hereinafter described. The crossbar 82 has end portions projecting widthwise of the machine somewhat beyond the slide bars 80 and provided with pins 90 which serve to anchor the rear ends of tension springs 92, the front ends of these springs being anchored to the rack members 74 by means of threaded rods 94 extending rearwardly from outturned lugs 96 on the front ends of the rack members. The threaded rods 94 extend freely through bores in the lugs 96 and have nuts 98 thereon by means of which the tension of the springs 92 can be varied, locknuts 100 being provided at the rear of the lugs for holding the rods in adjusted positions. When the parts are in their initial positions, as shown in Figs. 2 and 3, the rack members 74 are held by the springs 92 with their

rear end faces in abutting relation to the front end faces of the slide bars 80, the slide bars being positioned at this time as determined by engagement of the crossbar 82 with the rear ends of the slides 32. A spring 102 (Fig. 1) connected to the above-mentioned link 88 by means hereinafter described tends to move the slide bars 80 in forward directions and, through engagement of the crossbar 82 with the rear ends of the slides 32, also to move these slides in forward directions. Such forward movements of the slides 32 are limited by engagement of stop plates 104 (Fig. 3) extending downwardly from the rear ends of the slides with a crossbar 106 which extends widthwise of the machine just below the lower edges of the brackets 36 and is secured at its opposite ends to forwardly extending plates 108 adjustably secured to the brackets 36 by bolts 110 extending into the brackets through slots 112 in the plates. Accordingly, by adjustment of the plates 108 relatively to the brackets 36 the initial positions of the additional toe grippers with respect to forward and rearward movements may be variably determined without varying the height at which they are positioned in the machine. It will be understood that this adjustment is effected with reference to the scantiness or fullness of the uppers of the shoes on which the machine is to operate.

The above-mentioned link 88 connected to the crossbar 82 is pivotally connected at its rear end (Fig. 1) to the upper end of an arm 114 which is fast on a transverse shaft 116 rotatably mounted in brackets 118, the brackets being secured, one at each side of the machine, to a column 120 forming part of the frame of the machine. Also fast on the shaft 116 is an arm 122 pivotally connected to the upper end of a downwardly and forwardly extending rod 124 the lower end portion of which is slidingly mounted in a transverse bore formed in a stud 126 rotatably supported on the rear end of an arm 128. This arm is pivotally mounted on a rod 130 on the frame and is connected by a link 132 to an upwardly extending arm 134 fast on a shaft 136, this shaft having also fast thereon the previously mentioned treadle 24. Depression of this treadle, therefore, swings the arm 128 in a downward direction against the resistance of a return spring 137, and by the engagement of the stud 126 on the arm with a nut 138 on the lower end of the rod 124 the rod is moved downwardly against resistance of the spring 102 to impart rearward movement to the crossbar 82 and the slide bars 80. As the crossbar 82 is thus moved rearwardly it acts through the springs 92 to move the rack members 74 also in that direction and, through the action of these rack members on the gear segments 64, to straighten the toggles formed by the links 56 and 62 and thereby to swing the jaws 18 of the additional grippers toward the jaws 16 to grip the marginal portion of the upper.

To avoid the necessity of using unduly strong springs 92 through which to close the additional grippers, there is provided means for transmitting force positively from the crossbar 82 to the rack members 74 near the end of the gripper-closing operation, thus insuring that the toggles formed by the links 56 and 62 will be fully straightened. This means comprises forwardly and rearwardly extending rods 140 secured at their front ends to outwardly extending lugs 142 on the rack members 74, the rear end portions of these rods extending freely through bores in the pins 90 on the crossbar 82. Threaded on the rear ends of these rods are nuts 144 which initially are spaced substantial distances rearwardly from the pins 90. Accordingly, when the crossbar is moved rearwardly it acts first through the springs 92 in the manner above described until the toggles 56, 62 have been nearly straightened, after which the engagement of the pins 90 with the nuts 144 causes the crossbar to act positively through the rods 140 fully to straighten the toggles.

During the above-described closing of the additional grippers by the rearward movement of the crossbar 82 movements of the slides 32 in rearward directions by the force applied through the springs 92 are positively prevented. For this purpose two latch members 146, one on each of the slides 32, are pivotally mounted on shouldered studs 148 on the slides. These latch members have stop faces 150 arranged to engage stop faces formed on small blocks 152 secured to the plates 108. Tension springs 154 connected to the latch members and to pins 156 on the slides 32 hold the latch members normally in the positions illustrated in Fig. 3 to prevent rearward movements of the slides. It will be evident that since the blocks 152 are secured to the plates 108 which are adjustable to vary the limits of forward movement of the slides 32, they are in positions to cooperate properly with the latch members 146 regardless of such adjustments. For swinging the latch members 146 about the studs 148 to release the slides 32 for rearward movement, there are fast on the gear segments 64 segment-like plates 158 arranged to engage pins 160 on the latch members and to swing these members as the above-described jaw-closing toggles arrive in their straightened positions. Upon such release of the slides 32 they are moved rearwardly by the already tensioned springs 92 to cause the additional grippers to pull the upper and to position its margin between the jaws of the main toe gripper 8, the rearward movements of the additional grippers ceasing when the resistance offered by the upper materials balances the force of the springs 92. It will be evident that since each of the additional grippers is thus operated through the separate spring 92 associated therewith, the grippers may be moved different distances depending upon the resistance of the different portions of the upper materials on which they act. To hold the crossbar 82 in its rearmost position after the pull on the upper, even though the operator releases the treadle 24, there is provided a latch 162 pivotally mounted on one of the brackets 36 for swinging movements about a stud 164. This latch has in its rear end portion a recess providing a shoulder 166 for holding engagement with the crossbar.

In order to prevent the toggles 56, 62 from being broken upwardly beyond their straightened positions in the closing of the gripper jaws 18 on the upper, mechanisms are provided which act through the latches 146, the pins 160 and the segment plates 158 to limit the turning movements of the gear segments 64 at this time. These mechanisms include pawls 168 secured on the outer ends of studs 170 (Fig. 2) which are rotatable in bores extending transversely of the slides 32. Springs 172 (Fig. 3) connected to these pawls and to the pins 156 hold the pawls normally against the latches 146 in such positions that the pawls will engage stop faces 174 on the latches and thus limit the movements of the latches when they are operated by the segment plates 158 to release the slides 32 (see Fig. 6).

In this manner turning of the gear sectors 64 is stopped when the toggles arrive in their fully straightened positions.

To position the last lengthwise when the work is presented to the machine the lower jaw 22 of the main toe gripper 8 has an abutment face 176 thereon for engagement with the toe end of the last or of the insole. To prevent the last from moving lengthwise in a rearward direction during the pulling of the upper by the additional toe grippers, the usual downwardly and rearwardly extending bar 178 (Fig. 9) of the main toe gripper has thereon a member 180 provided with a recess 182 to receive a roll 184 mounted on a gripper-controlling arm 186. When the gripper bar is in its uppermost position, as it is when the additional grippers pull the upper, the roll 184 is within the recess 182 and the arm 186 prevents any rearward swinging movement of the main toe gripper. When the bar 178 is moved downwardly to close the gripper on the upper and to pull the upper at the beginning of the cycle of operations of the machine the member 180 is carried downwardly beyond the roll 184. The arm 186 corresponds otherwise in purpose and function to the gripper-controlling arm 348 shown in the previously mentioned Letters Patent No. 1,029,387. It will therefore be understood that it is through movements of this arm that the main toe gripper is adjusted in directions lengthwise of the last and is controlled with respect to forward and rearward swinging movements in the course of the operation of the machine.

After the additional toe grippers have been operated by the treadle 24 to apply their pull to the upper, the operator, if he is satisfied with the pulling of the upper by these grippers, depresses the treadle 12 to start the power operation of the machine. Conveniently the treadle 24 has thereon a bar 187 (Fig. 1a) extending over the treadle 12, so that the depression of the latter may be effected by further movement of the treadle 24. If the operator is not satisfied with the manner in which the upper has been gripped and pulled by the additional grippers, he may, before starting the cycle of operations, cause these grippers to release the upper and to return to their initial positions. For this purpose there is provided a hand lever 188 mounted for swinging movements on one of the brackets 36 and arranged to act through an arm 190 and a link 192 to lift the latch 162 and thus to release the crossbar 82. It will be understood that when the crossbar is thus released the parts are returned to their initial positions by the springs 92 and 102.

After having pulled the upper and positioned it relatively to the main toe gripper, the additional toe grippers continue to hold it until the main toe gripper is closed thereon near the beginning of the cycle of operations. As soon as the main toe gripper has closed, the additional grippers are opened and are then moved quickly in a rearward direction by the springs 92 to out-of-the-way positions while the crossbar 82 is still held by the latch 162, the limits of such rearward movements of the additional grippers being determined by engagement of small plates 194 on the slides 32 with the front end faces of the brackets 36. For thus automatically causing the additional grippers to open and to move rearwardly the inner ends of the rotatable studs 170 have integrally formed thereon small fingers 196 of generally triangular shape which extend in downward and rearward directions. These fingers lie adjacent to the inner faces of the brackets 36, brackets being provided with forwardly and rearwardly extending slots through which the studs 170 extend and along which they move during the rearward movements of the slides 32. Midway between their opposite ends the studs have flanges 198 thereon which lie in counterbores in the slides 32 to present outward movements of the studs. The fingers 196 are arranged to be engaged at the proper time in the cycle of operations by upper edge faces of two parallel arms 200 of a substantially U-shaped trip lever 201, these arms extending forwardly and rearwardly below the fingers 196 and being pivotally mounted at their front ends on studs 202 projecting inwardly from the brackets 36. The inner side portions of these brackets are provided with forwardly and rearwardly extending recesses to provide clearance for the arms 200 and for the fingers 196. The U-shaped lever 201 is pivotally connected at its rear end to the upper end of a downwardly and rearwardly extending rod 204 yieldingly connected through a compression spring 205 to the rear end of an arm 206 (Fig. 1) fast on a shaft 208 which has also fast thereon an arm 210. The shaft 208 is journaled in a bracket 212 secured to the bracket 38 and extending downwardly and rearwardly therefrom, the lower end of the bracket 212 being secured to a member 214 which forms part of the frame. The front end portion of the arm 210 is arranged to be engaged by an abutment 216 extending outwardly from the rear end of the usual "updraw" lever 218 connected to the bar 178 (Fig. 9) of the main toe gripper 8. It will be understood that the rear end of this updraw lever swings downward in operating the gripper to pull the upper. The arrangement is such that as this lever swings downward sufficiently to cause the main toe gripper to close on the upper the abutment 216 imparts downward swinging movement to the arm 210 against the resistance of a return spring 219 connected to the arm 206 and, through the mechanism described, swings the arms 200 of the U-shaped trip lever 201 upwardly about the studs 202. The upper edges of the arms thereupon engage the fingers 196, regardless of the distance these fingers have been moved in rearward directions during the upper-pulling action of the additional toe grippers, and swing the fingers in the directions to withdraw the pawls 168 from engagement with the stop faces 174 on the latches 146. This permits the gear segments 64 to be swung still farther in counterclockwise directions with reference to Fig. 3 by the springs 92, thus causing the toggles 56, 62 to break in upward directions (Fig. 7) and partially to open the additional grippers 14. Upon such opening of these grippers they are immediately retracted by the springs 92 to the positions determined by engagement of the plates 194 with the brackets 36.

Near the end of the cycle of operations the latch 162 is swung upwardly, by means hereinafter described, to release the crossbar 82, whereupon the spring 102 (Fig. 1) by its action on the rod 124, the arms 122 and 114 and the link 88 imparts forward movement to the crossbar. As the crossbar is thus moved forwardly the slide bars 80, by their engagement with the rear ends of the rack members 74, tend to cause these members to swing the gear segments 64 in clockwise directions with reference to Fig. 7. By reason, however, of the resistance of the springs 68 to the downward movements of the

toggles 56, 62 from the positions shown in Fig. 7 the forward movement of the crossbar first causes the slides 32 and the parts carried thereby to be moved forwardly to the initial positions determined by engagement of the plates 104 with the crossbar 106. Thereafter the crossbar 82 is moved forward relatively to the slides 32, causing the toggles to be swung downwardly and thereby fully to open the additional toe grippers. As the gear segments 64 are thus turned reversely the plates 158 thereon are swung upwardly, thus permitting the springs 154 and 172 to return the latches 146 and the pawls 168 to their initial positions.

For swinging the latch 162 upwardly as above described the latch has extending laterally therefrom a small pin 220 (Fig. 3) arranged to be engaged by a shoulder 222 on a latch-releasing finger 224 located between the rear end portions of the brackets 36 and pivotally mounted on a pin 226 extending transversely from an upper end portion of a link 228. The pin 226 is guided for vertical sliding movements in slots 230 formed in the rear end portions of the brackets 36. The link 228 extends downwardly and rearwardly (Fig. 1) and is pivotally connected at its lower end to the upper end of a latch-releasing lever 232 which is pivotally mounted between its opposite ends on a pin 234 on the bracket 212. Mounted in the lower end of the lever 232 is a screw 236 adjustably secured to the lever by a locknut. A spring 238 (Fig. 3) connected to a rearwardly extending tail portion 240 of the finger 224 and to the link 228 tends to swing the finger in a counterclockwise direction with reference to Fig. 3 and, when the crossbar 82 is held by the latch 162 in its rearmost position, holds the finger in a substantially vertical position against the pin 220 (Fig. 6). Prior to the beginning of the cycle of operations of the machine, however, and during a portion of the cycle the finger is maintained at such a height that its shoulder 222 is above the level of the pin 220, as shown in Figs. 6 and 7. The finger is maintained at this height by engagement of a member 242 (Fig. 1) with the screw 236 on the lever 232. The member 242 is a portion of mechanism included in a machine of the type shown for swinging the wiping and tacking devices inwardly toward the shoe after the pulling of the upper, for releasing the tack drivers to cause them to drive the tacks and for later retracting the drivers and returning the devices to their initial positions. Such mechanism is identified as "spreader mechanism 120" in United States Letters Patent No. 2,305,535, granted on December 15, 1942 on an application of H. Lane, and the member 242 herein shown corresponds to one of the members 184 shown in said Letters Patent. In the second stage of the cycle of operations of the machine this member is moved in a forwardly and downwardly inclined direction, and near the end of the cycle it is moved reversely toward the rear of the machine and is also swung first upwardly and then downwardly. When the member is moved as above described in a forwardly and downwardly inclined direction it disengages the screw 236 and thereby releases the lever 232, whereupon a spring 244 connected to this lever swings its rear arm downwardly and thereby lowers the finger 224 to a position in which its shoulder 222 is under the pin 220. At this time the pin 226 (Fig. 3) is at the lower ends of the slots 230. When the member 242 is thereafter moved reversely toward the rear of the machine and is swung upwardly as above described near the end of the cycle it is carried to a position where it is again over the screw 236, and in its subsequent downward swinging movement it swings the lever 232 in the direction to impart upward movement to the finger 224, thus causing the finger to lift the latch 162 and thereby to release the crossbar 82 (Fig. 8). As the crossbar 82 approaches the limit of its forward movement after it has thus been released by the latch 162 a small plate 246 carried by the crossbar and extending forwardly therefrom between the brackets 36 strikes a pin 248 extending from the latch-releasing finger 224 and swings the finger forwardly to carry its shoulder 222 clear of the pin 220, thus permitting the latch 162 to be swung downwardly by gravity into engagement with the crossbar 82 ready to hold the crossbar when it is moved rearwardly in the operation of the machine on the next shoe, at which time the link 228 will not have been moved downwardly to lower the finger. The plate 246 is so arranged that regardless of the initial positions of the slides 32 and the crossbar 82, depending upon the position to which the crossbar 106 has been adjusted, the finger 224 is swung far enough forwardly by the plate to release the pin 220. When the crossbar 106 is positioned at or near the limit of its forward adjusting movement the plate 246, after swinging the finger 224 to the position in which it is shown in Fig. 3, rides over the top of the pin 248, as shown. When the crossbar 106 is positioned farther rearwardly, the movements of the slides 32 and the crossbar 82 may be arrested before the finger 224 has been swung far enough forwardly to permit the plate 246 to ride over the pin 248.

In pulling-over machines of the type shown in Letters Patent No. 1,962,260 it has been customary for the toe gripper to close and at least to begin the pulling of the upper prior to the closing and pulling action of the side grippers. Since in the machine herein shown the additional toe grippers apply a lengthwise pull to the upper prior to the closing of the main toe gripper, it has been found to be unnecessary for the main toe gripper to close and to begin its upper-pulling action prior to the closing and pulling actions of the side grippers. For this reason it is preferable to shape the cam which operates the side grippers in such manner that they grip and pull the upper at substantially the same time as the main toe gripper. The side-gripper-operating cam is, therefore, operative during a greater portion of the cycle than heretofore, and this has rendered less necessary, in operating on some kinds of upper materials, the use of a fluid check or dashpot such as shown in United States Letters Patent No. 2,007,973, granted on July 16, 1935, on an application of B. Jorgensen, for retarding the upper-pulling movements of the side grippers.

While the manner in which the mechanism provided by the present invention is used and operated will be understood from the foregoing description, it will now be briefly summarized. The operator will, if necessary, adjust the main toe gripper 8 in a direction lengthwise of the shoe, in the manner customary in pulling-over machines of the type shown, in accordance with the size of the shoes on which the machine is to operate. He will also adjust the brackets 36 upwardly or downwardly in the inclined path determined by the ribs 40 on the bracket 38 to posi-

tion the lower jaws 16 of the additional toe grippers 14 at the proper height relatively to the jaws of the main toe gripper. He may then, if necessary, adjust the additional toe grippers forwardly or rearwardly by suitable adjustment in a forward or rearward direction of the crossbar 106 and the plates 103. The extent of this adjustment will depend upon the degree of scantiness with which the uppers of the shoes to be operated on are cut.

Having made the adjustments above described, the operator presents a last having an upper loosely assembled thereon to the machine, the last having on its bottom face an insole which is either loosely mounted thereon or temporarily secured thereto by one or more tacks and which is presented in engagement with the shoe rest 2. In thus presenting the shoe to the machine the operator positions the toe end of the last or the edge of the insole thereon against the abutment face 176 on the lower jaw 22 of the main toe gripper 8, as shown in Fig. 3, and positions the marginal portion of the toe end of the upper materials on the horizontal lower jaws 16 of the additional toe grippers 14 and over a portion of the lower jaw 22 of the main toe gripper.

Having thus presented the shoe to the machine, the operator depresses the treadle 24, thus causing the additional toe grippers to grip the margin of the upper and then to move rearwardly to apply a pull to the upper lengthwise of the last in the manner hereinbefore described, these grippers, in thus pulling the upper, presenting its margin in proper position between the jaws of the main toe gripper (Fig. 6). Since the additional grippers are spaced a substantial distance apart, they apply their pull over a substantial widthwise extent of the upper, as is considered desirable. The additional grippers, after thus pulling the upper, are held by the latch 162 against return movements while maintaining the upper under tension. If the operator is not satisfied with the manner in which the upper is thus pulled, he lifts the latch 162 by means of the hand lever 183 and thus causes the additional grippers to return to their initial positions and to release the upper preparatory to gripping and pulling it a second time. Otherwise the operator starts the cycle of operations of the machine by further depressing the treadle 24 to cause the bar 187 thereon to depress the starting treadle 12. It will be understood that as the treadle 24 is thus further depressed the tension of the springs 92 is somewhat further increased by rearward movement of the crossbar 82 beyond the position in which it is held by the latch 162.

Shortly after the starting of the cycle of operations the main toe gripper 8 and also the side grippers 10 are closed on the upper and are moved downward in rearwardly inclined directions to pull the upper. As the updraw lever 218 operates the bar 178 of the main toe gripper to close this gripper on the upper, the abutment 216 thereon operates the arm 210 and the parts connected thereto to swing the U-shaped lever 201 (Fig. 2) upwardly and thus to cause the pawls 168 to release the latches 146, whereupon the jaw-closing toggles 56, 62 of the additional toe grippers are broken in upward directions (Fig. 7) by the action of the springs 92 to cause these grippers to release the upper and to be moved farther rearwardly by the springs to out-of-the-way positions. The main toe gripper and the side grippers begin to pull the upper simultaneously, but in accordance with the usual

manner of operation of a machine of the type shown the main toe gripper moves more rapidly than the side grippers and in the course of the upper-pulling operation relieves the force of its pull somewhat and then increases the force of the pull while the side grippers are steadily increasing the force which they apply to the upper. After the pull the machine comes automatically to a stop as usual while the upper is held under tension to permit inspection of the upper and any necessary adjustment. Thereafter the operator starts the machine again to cause it to complete the cycle. In this stage of the cycle the wiping and tacking devices are swung inwardly toward the shoe to wipe the margin of the upper inwardly over the insole and the tack drivers are then operated to drive the upper-fastening tacks, these operations occurring in response to movement of the spreader mechanism of which the member 242 (Fig. 1) is a part. As hereinbefore explained, the forward movement of this member in a downwardly inclined direction releases the lever 232 and thus causes the latch-releasing finger 224 to be lowered from the position in which it is shown in Figs. 6 and 7 to a position in which its shoulder 222 is under the pin 220 on the latch 162. The spreader mechanism thereafter is operated to move the wiping and tacking devices outwardly to their initial positions and to retract the tack drivers, the member 242 reengaging the screw 236 on the lever 232 and by its downward swinging movement moving the finger 224 upwardly to lift the latch 162 (Fig. 8). This causes the additional toe grippers to be returned to their initial positions and opened in the manner hereinbefore described. Fig. 8 shows the positions of the parts when the additional toe grippers have been only partially opened, the crossbar 82 not having been moved forwardly far enough to cause the plate 246 (Fig. 3) thereon to swing the finger 224 from under the pin 220 to the final position in which it is shown in Fig. 3.

If it should be desired for any reason to operate the machine without the use of the additional toe grippers, these grippers may be moved rearwardly by the treadle 24 to out-of-the-way positions and held in such positions by the engagement of a latch 250 (Fig. 1) with a pin 252 on the arm 122, the latch having thereon a handle portion 254 by which it may be swung into position to engage the pin.

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

1. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper having upper-gripping faces arranged to extend generally widthwise of the last for gripping the toe end of the upper and for pulling the upper to tension it lengthwise of the last positioned by said shoe rest, additional upper-gripping means having upper-gripping faces also arranged to extend generally widthwise of the last for gripping the toe end of the upper, and mechanism for operating said additional upper-gripping means to pull the upper preliminarily lengthwise of the last so positioned before the upper is gripped by said toe gripper.

2. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper having upper-gripping faces arranged to extend generally widthwise of the last for gripping the toe end of the up-

per and for pulling the upper to tension it lengthwise of the last positioned by said shoe rest, additional upper-gripping means having upper-gripping faces also arranged to extend generally widthwise of the last for gripping the toe end of the upper, and mechanism for operating said additional upper-gripping means to apply a preliminary pull to the upper to tension it lengthwise of the last so positioned before the upper is gripped by said toe gripper, said additional upper-gripping means comprising upper-gripping jaws arranged to engage the upper in locations at opposite sides of the toe gripper.

3. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper for gripping the upper at the end of the toe and for pulling the upper to tension it lengthwise of the last positioned by said shoe rest, additional grippers arranged respectively at opposite sides of said toe gripper, and means for operating said additional grippers to grip the toe end of the upper and to apply a preliminary pull thereto to tension the upper lengthwise of the last before it is gripped by the toe gripper.

4. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper having upper-gripping faces arranged to extend generally widthwise of the last for gripping the toe end of the upper, said toe gripper being mounted for movement in a predetermined direction to pull the upper and thereby to tension it lengthwise of the last positioned by said shoe rest, additional upper-gripping means having upper-gripping faces also arranged to extend generally widthwise of the last for gripping the toe end of the upper, said additional upper-gripping means being mounted for upper-pulling movement in a direction different from that of the movement of the toe gripper and mechanism for thus moving said additional upper-gripping means to apply a preliminary pull to the upper to tension it lengthwise of the last positioned by said shoe rest before the upper is gripped by the toe gripper.

5. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon at such an inclination that the bottom of the last faces downwardly and rearwardly, a toe gripper having upper-gripping faces arranged to extend generally widthwise of the last for gripping the toe end of the upper, said toe gripper being mounted for movement in a downwardly and rearwardly inclined direction to pull the upper and thereby to tension it lengthwise of the last positioned by said shoe rest, and additional means having upper-gripping faces also arranged to extend generally widthwise of the last for gripping the toe end of the upper, said additional means comprising upper-gripping jaws arranged to engage the upper in locations at opposite sides of the toe gripper and mounted for movement rearwardly in a substantially horizontal direction for applying a preliminary pull to the upper to tension it lengthwise of the last before the upper is gripped by the toe gripper.

6. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon at such an inclination that the bottom of the last faces downwardly and rearwardly, a toe gripper arranged to grip the upper at the end of the toe and mounted for movement in a downwardly and rearwardly inclined direction to pull the upper and thereby to tension it

lengthwise of the last positioned by said shoe rest, additional grippers arranged respectively at opposite sides of said toe gripper for gripping the toe end of the upper, and means for moving said additional grippers rearwardly in a direction different from that of the movement of the toe gripper for applying a preliminary pull to the upper to tension it lengthwise of the last before it is gripped by the toe gripper.

7. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper for gripping the toe end of the upper and for pulling the upper to tension it lengthwise of the last positioned by said shoe rest in the course of a cycle of power operations of the machine, additional means for gripping the toe end of the upper, and mechanism for operating said additional upper-gripping means to tension the upper preliminarily lengthwise of the last and to position it relatively to said toe gripper prior to the starting of the cycle of operations.

8. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper for gripping the upper at the end of the toe and for pulling the upper to tension it lengthwise of the last positioned by said shoe rest in the course of a cycle of power operations of the machine, and additional grippers arranged respectively at opposite sides of said toe gripper and movable by the operator for gripping the toe end of the upper and for applying a preliminary pull thereto to tension the upper lengthwise of the last and to position it relatively to said toe gripper prior to the starting of the cycle of operations.

9. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper for gripping the toe end of the upper and for pulling the upper to tension it lengthwise of the last positioned by said shoe rest in the course of a cycle of power operations of the machine, additional upper-gripping means for applying a preliminary pull to the upper at its toe end prior to the starting of the cycle of operations to position it relatively to said toe gripper and for maintaining the pull thus applied until after the starting of the cycle, and mechanism for causing said additional upper-gripping means to release the upper at a predetermined time in the cycle after the gripping of the upper by the toe gripper.

10. In a machine for shaping uppers over lasts, a shoe rest for positioning a last with an upper thereon, a toe gripper for gripping the toe end of the upper and for pulling the upper to tension it lengthwise of the last positioned by said shoe rest in the course of a cycle of power operations of the machine, additional upper-gripping means movable by the operator prior to the starting of the cycle of operations for applying a preliminary pull to the upper at its toe end to position it relatively to said toe gripper, mechanism for locking said additional means to maintain the pull on the upper, and mechanism for causing said additional means to release the upper at a predetermined time in the cycle of operations after the gripping of the upper by the toe gripper.

11. In a machine for shaping uppers over lasts, a toe gripper having jaws for gripping the toe end of an upper on a last and for pulling the upper to tension it lengthwise of the last, additional upper-gripping means for also gripping the toe end of the upper, and mechanism for operating said additional upper-gripping means to

pull the upper preliminarily lengthwise of the last and to present it in proper position between the jaws of said toe gripper before they grip the upper.

12. In a machine for shaping uppers over lasts, a toe gripper having jaws for gripping the toe end of an upper on a last and for pulling the upper to tension it lengthwise of the last in the course of a cycle of power operations of the machine, additional upper-gripping means for also gripping the toe end of the upper and for pulling the upper preliminarily to tension it lengthwise of the last and to present it in proper position between the jaws of said toe gripper before they grip the upper, and means movable by the operator thus to operate said additional upper-gripping means prior to the starting of the cycle of operations.

13. In a machine for shaping uppers over lasts, a toe gripper for gripping the toe end of an upper on a last and for pulling the upper to tension it lengthwise of the last in the course of a cycle of power operations of the machine, additional upper-gripping means for gripping the toe end of the upper and for applying a preliminary pull thereto to tension the upper lengthwise of the last and to position it relatively to said toe gripper prior to the starting of the cycle of operations, and a treadle for thus operating said additional upper-gripping means and for thereafter by further movement starting the cycle of operations.

14. In a machine for shaping uppers over lasts, a toe gripper for gripping the toe end of an upper on a last and for pulling the upper to tension it lengthwise of the last in the course of a cycle of power operations of the machine, a treadle for starting the cycle of operations, additional upper-gripping means for gripping the toe end of the upper and for applying a preliminary pull thereto to tension the upper lengthwise of the last and to position it relatively to said toe gripper prior to the starting of the cycle of operations, and another treadle for thus operating said additional upper-gripping means and for thereafter by further movement operating said first-named treadle to start the cycle.

15. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, a gripper carrier supporting said gripper and movable to cause it to pull the upper, mechanism on said gripper carrier for closing the gripper on the upper, means for operating said mechanism thus to close the gripper and for thereafter moving the gripper carrier to pull the upper by continued force applied to said mechanism in the gripper-closing direction, a device for positively locking the gripper carrier against such movement until the gripper is substantially closed, and a member movable into engagement with said device to release the gripper carrier.

16. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, a gripper carrier supporting said gripper and movable to cause it to pull the upper, mechanism on said gripper carrier for closing the gripper on the upper, means for operating said mechanism thus to close the gripper and for thereafter moving the gripper carrier to pull the upper by continued force applied to said mechanism in the gripper-closing direction, a device for positively locking the gripper carrier against such movement during the closing of the gripper, and means movable by the gripper-closing mechanism to unlock the carrier when the gripper is substantially closed.

17. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, a gripper carrier supporting said gripper and movable to cause it to pull the upper, mechanism on said gripper carrier for closing the gripper on the upper, said mechanism including a rotatable gear member and a rack bar for operating said member, means for operating said rack bar to close the gripper and for thereafter moving the gripper carrier to pull the upper by continued force applied to the rack bar in the gripper-closing direction, and a device for locking the gripper carrier against such movement until the gripper is substantially closed and for then automatically releasing it to permit its movement.

18. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, a gripper carrier supporting said gripper and movable to cause it to pull the upper, mechanism on said gripper carrier for closing the gripper on the upper, said mechanism including a rotatable gear member and a rack bar for operating said member, means for operating said rack bar to close the gripper and for thereafter moving the gripper carrier to pull the upper by continued force applied to the rack bar in the gripper-closing direction, a latch for holding the gripper carrier against such movement during the closing of the gripper, and means on said rotatable gear member for operating said latch to release the carrier when the gripper is substantially closed.

19. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, a gripper carrier supporting said gripper and movable to cause it to pull the upper, mechanism on said gripper carrier for closing the gripper on the upper, means including a spring for operating said mechanism thus to close the gripper and for thereafter moving the gripper carrier to pull the upper by continued force applied to said mechanism in the gripper-closing direction, and a device for holding the gripper carrier against such movement by the spring during the closing of the gripper, said device being arranged to be operated by the gripper-closing mechanism to release the carrier when the gripper is substantially closed.

20. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last and for pulling the upper, a toggle arranged to be straightened to close the gripper on the upper, a spring yieldable to permit the full straightening of the toggle, and means for thus straightening the toggle and for thereafter breaking it by further movement thereof in the same direction to cause the gripper to release the upper after the pull.

21. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last and for pulling the upper, a toggle arranged to be straightened to close the gripper on the upper, means for thus straightening the toggle and for thereafter breaking it by further movement thereof in the same direction to cause the gripper to release the upper after the pull, and a device arranged to act as a stop to limit the straightening of the toggle and thereafter to release it to permit it thus to be broken.

22. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last and for pulling the upper, a toggle arranged to be straightened to close the gripper on the upper,

means including a spring for thus straightening the toggle and for thereafter breaking it by further movement thereof in the same direction to cause the gripper to release the upper after the pull, and a device for limiting the straightening of the toggle under the influence of the spring and for thereafter releasing it to cause it thus to be broken by the spring.

23. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, mechanism for closing said gripper on the upper, means including a spring for operating said mechanism yieldingly to close the gripper, and additional positive means arranged to supplement the force of said spring in operating said mechanism near the end of the gripper-closing operation.

24. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, mechanism for closing said gripper on the upper, a movable operating member, a spring for transmitting force yieldingly from said member to said mechanism for closing the gripper, and additional means for transmitting force positively from said member to the gripper-closing mechanism to supplement the action of said spring near the end of the gripper-closing operation.

25. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, mechanism for closing said gripper on the upper, a movable operating member, a spring for transmitting force yieldingly from said member to said mechanism for closing the gripper, and a rod arranged to be operated by said member only near the end of the gripper-closing operation to supplement the force applied by the spring to the gripper-closing mechanism.

26. In a machine for shaping uppers over lasts, a gripper for gripping an upper on a last, mechanism including a toggle arranged to be straightened to close said gripper on the upper, means including a spring for operating said mechanism yieldingly to close the gripper, and additional positive means arranged to supplement the force of said spring near the end of the gripper-closing operation to insure the full straightening of said toggle.

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