

July 13, 1926.

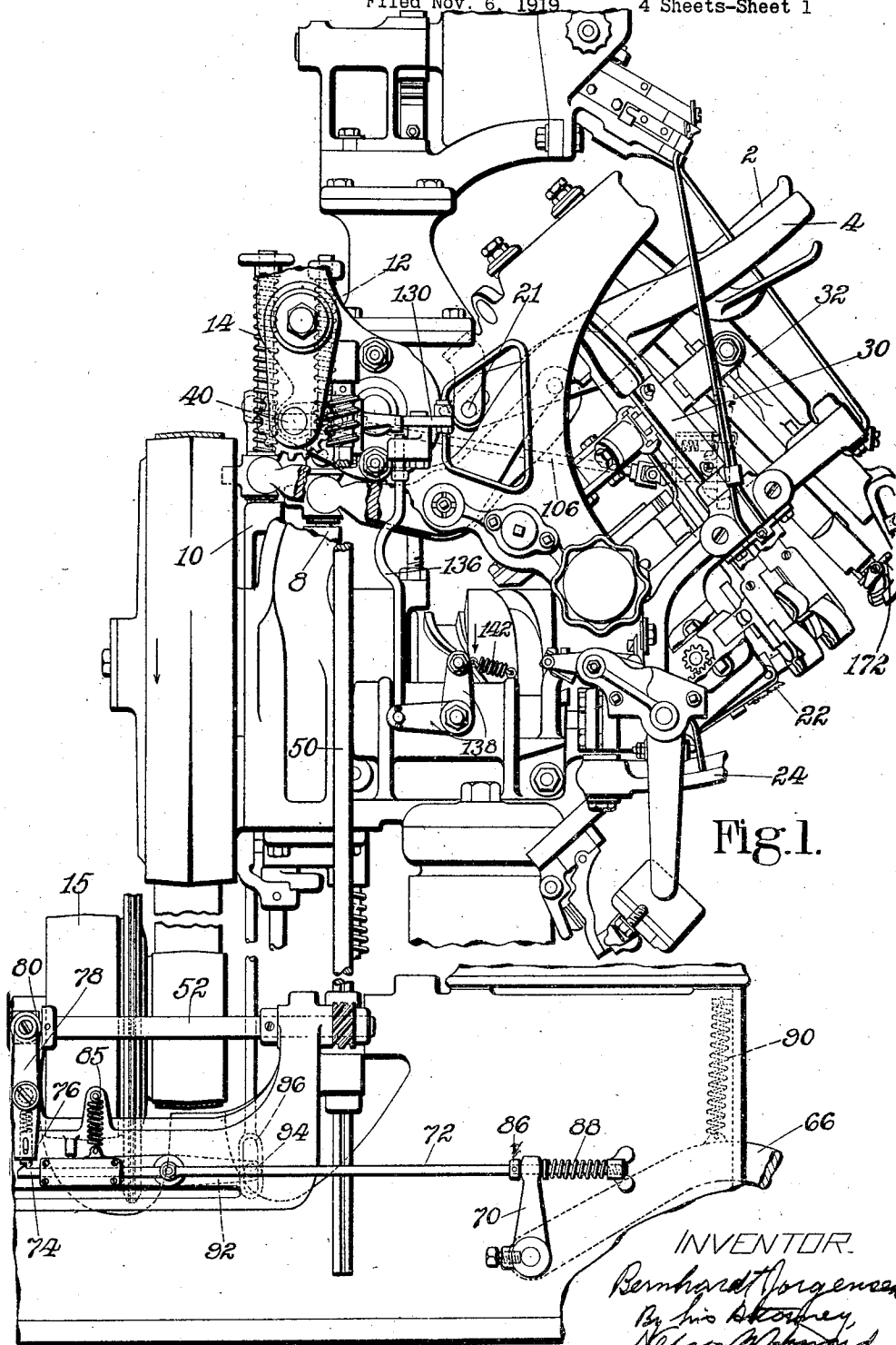
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B. JORGENSEN

UPPER PULLING MACHINE

Filed Nov. 6, 1919

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

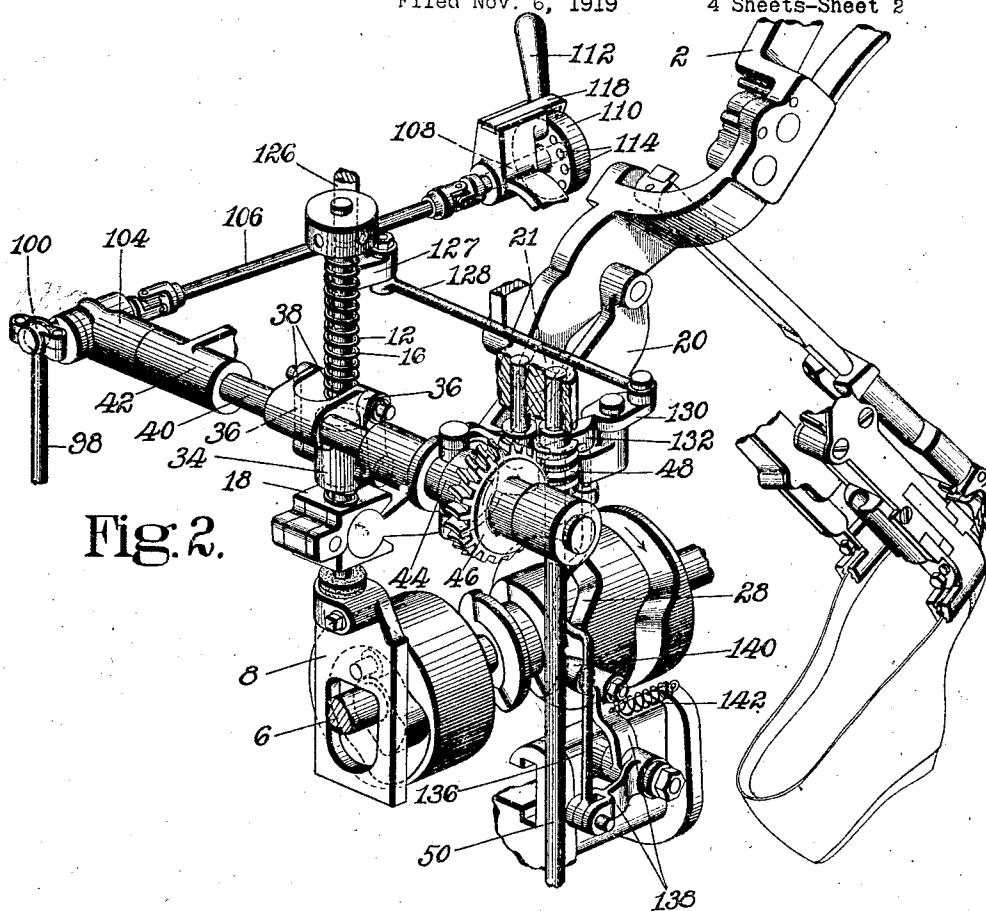


Fig. 2.

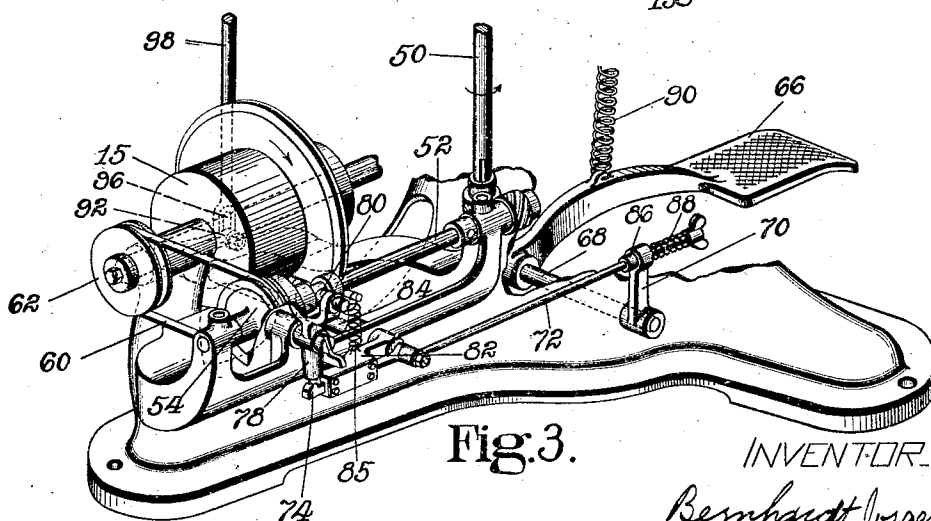


Fig. 3.

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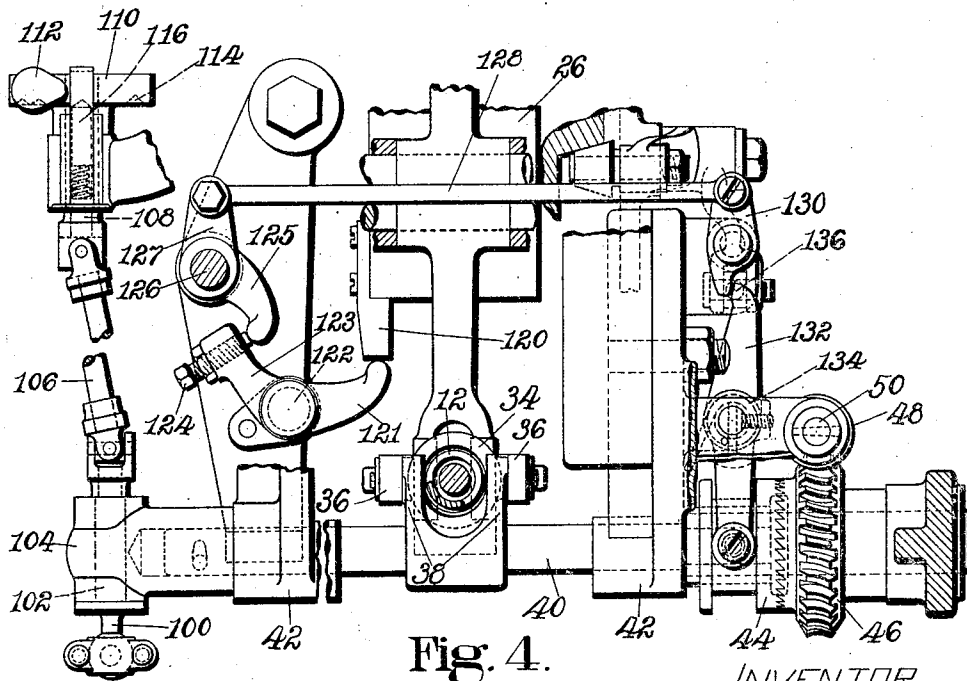
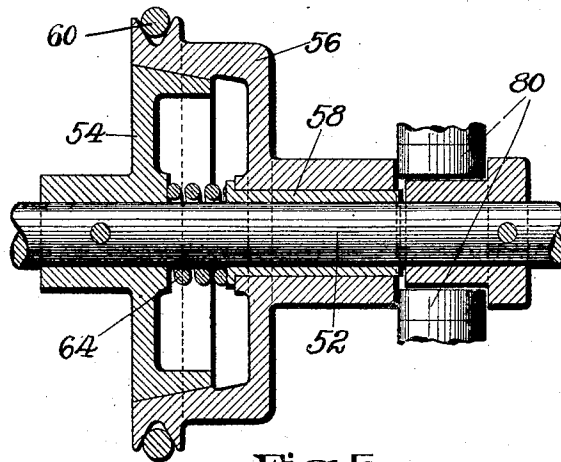
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UPPER PULLING MACHINE

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4 Sheets-Sheet 3



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UPPER PULLING MACHINE

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4 Sheets-Sheet 4

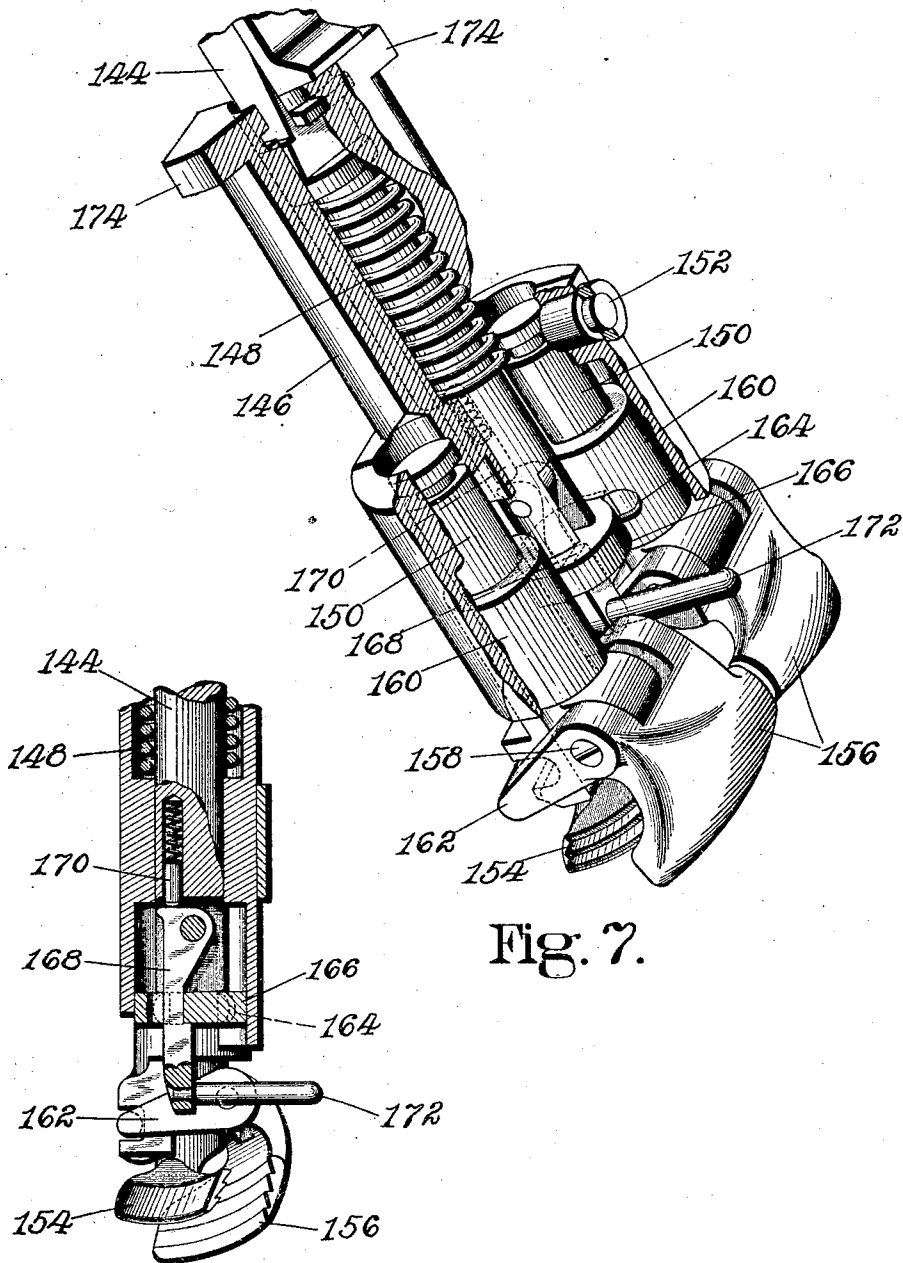


Fig. 7.

Fig. 6

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UNITED STATES PATENT OFFICE.

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UPPER-PULLING MACHINE.

Application filed November 6, 1919. Serial No. 336,017.

This invention relates to machines for use in the manufacture of boots and shoes for pulling uppers over lasts. The invention is herein illustrated in its application to a well-known type of pulling-over machine characteristic features of which are shown and described in United States Letters Patent No. 1,029,387 granted on June 11, 1912 upon an application of R. F. McFeely, but it will be understood that the invention is many of its aspects is not limited to machines of that particular type.

The invention has particularly in view certain improvements in upper pulling machines designed to insure more uniform and satisfactory results in the pulling of different uppers with an expenditure of less time and effort on the part of the operator than heretofore. To this end, a feature of the invention consists in a novel construction whereby the pulling of the upper is automatically controlled in such manner as to insure that the uppers of different shoes of the same size and style shall be pulled to substantially the same extent. In the application of such controlling means to the pulling of the upper at the toe of the shoe, as in the construction herein shown, the invention aims to insure uniformity in the length of tip on all shoes of a given size and style as well as substantial uniformity in the degree of tension to which the different uppers are subjected in the lengthwise pull. In the illustrative machine the controlling means is associated with mechanism whereby the upper is pulled in successive stages as distinguished from a continuous uninterrupted pull of the required extent. An advantage of this arrangement is that there is less danger of over-straining the upper than is involved in a continuous pull, and as applied to the pulling of the upper at the toe the provision for applying in the first instance a tension less than the required final tension lessens the danger of lengthwise displacement of the last, of bowing the tip, or of "bridging" the upper back of the toe. It will be understood, however, that the invention involves numerous advantages which are not dependent upon the provision of means for pulling the upper in successive stages nor restricted to the pulling of the upper at the toe of the shoe, and that it

many of its novel and useful aspects the invention is not limited to the particular construction herein illustrated.

A further feature of the invention consists in a novel construction and arrangement affording provision for automatic release of an upper by the pulling means. This feature is illustrated in a combination including a toe gripper provided with a plurality of pairs of gripper jaws mounted for relative angular adjustment in the upper-pulling operation in conformity to the contour of the shoe and having means movable in response to pressure of the associated overlying and fastening means to cause the jaws to open and release the upper after the measured pull has been effected.

The above and other features of the invention, including novel mechanism for imparting operative movement to a gripper and for holding it against retractive movement, together with certain details of construction and combinations of parts, will now be described with reference to the accompanying drawings and pointed out in the claims.

In the drawings:—

Fig. 1 is a view in side elevation of a pulling-over machine in which the invention is embodied, parts of the structure being broken away for the purpose of clearness in the illustration;

Fig. 2 shows in perspective a portion of the operating means for the toe gripper with the parts positioned as they appear at that point in the cycle where the upper is held under tension prior to the supplemental up-draw movement of the gripper;

Fig. 3 is a perspective view of a portion of the driving and controlling means associated with the mechanism shown in Fig. 2;

Fig. 4 is a plan view of a portion of the mechanism shown in Fig. 2, illustrating the relation of such mechanism to other parts of the structure;

Fig. 5 is a vertical section through a portion of the driving mechanism shown in Fig. 3;

Fig. 6 is a vertical section through the toe gripper, and

Fig. 7 is a perspective view of the toe gripper, with parts broken away to show the interior construction.

As shown and described in detail in said prior McFeely patent, machines of the illustrative type comprise in their organization grippers for engaging the upper at the toe end and at opposite sides of the last, the toe gripper herein shown being connected to an updraw lever 2 and the side grippers to updraw levers 4. Movement is imparted to the levers 2 and 4 by canis on a cam shaft 6 through connections comprising cam slides 8 and 10 and springs 12 and 14, the cam shaft being driven intermittently under clutch control from a constantly driven pulley 15 on a shaft mounted in bearings on the base of the machine. As shown in Fig. 2, the operating connections for the toe gripper, similarly to the connections to each of the side grippers, comprise a rod 16 which is fast on the slide 8 and extends upward loosely through a block 18 upon which the lower end of the spring 12 bears to transmit movement yieldingly to the gripper lever when the operating slide is depressed. In the construction shown the toe gripper lever, as in the construction illustrated in United States Letters Patent No. 1,280,613, granted on October 1, 1918 upon an application of Orrell Ashton, comprises two pivotally mounted sections of which the rear section 20 at its rear end has a swivel connection with the block 18 and is operatively connected at its opposite end to the front section 2 which carries the gripper and is fulcrumed on a fixed stud 21. In machines of the illustrative type the several grippers are operated through the above described connections by a partial rotation of the cam shaft 6 and then hold the upper under tension with the machine at rest to permit inspection of the work and any necessary adjustments as for straightening the tip or for varying the tension of the upper at one or more points. During the upper pulling operation the last is held against the strain of the upper by means of a sole rest 22 in engagement with which the work is initially positioned.

Upon a subsequent starting of the machine, shoe supporting and clamping devices are moved inwardly at the opposite sides of the shoe to hold and support it for the overlaying and fastening operations. These devices are not shown herein in detail but comprise side arms 24 which receive their operative swinging movement from a slide 26 (Fig. 4) operated by a cam 28 on the cam shaft 6. Immediately following the movement of the clamping devices to operative position the grippers are moved inwardly to overdraw the upper accompanied by inward movement of the overlaying and fastening devices which are carried by side arms 30 and by a front arm 32. As in many well-known machines of the type illustrated the overlaying means on the front arm

may comprise end embracing wipers for wiping the toe portion of the upper into lasted position. As soon as the overlaying and fastening devices have arrived in position to assume control of the upper the several grippers are tripped to cause them to release the upper, and upon the completion of the inward movement of the arms 30 and 32 the upper is secured by the fastening devices which may, for example, drive a plurality of tacks round the end and along the sides of the forepart. The parts of the machine are then returned to their starting positions and the shoe is released. In such return of the parts the gripper operating slides 8 and 10 engage under the blocks at the rear ends of the gripper levers to swing the levers back to their starting positions and thus to position the grippers with their jaws in open relation to receive the upper of another shoe.

For the purposes of this invention the machine is provided with power operated means under manual control for imparting to the toe gripper positively a supplemental pulling movement during the pause in the operation of the machine following the initial upper pulling movement of the grippers. To this end, a sleeve 34 is provided which loosely encircles the updraw spring 12 on the gripper operating rod 16 and is arranged for operative engagement with the upper face of the block 18 on the rear end of the lever section 20. This sleeve is connected by a pair of links 36 to crank arms 38 which are fast on a rock shaft 40 mounted in bearings 42 on the frame of the machine for imparting operative movement to the arms 38 at the required time. The shaft 40 is connected through a clutch hub 44, the purpose and function of which will be hereinafter more fully described, to a worm gear 46 which is loosely mounted on the shaft. In engagement with the gear 46 is a worm 48 on a vertical shaft 50 which is connected in turn by spiral gearing to a horizontal shaft 52 mounted in bearings on the base of the machine. The shaft 52 carries a clutch comprising a member 54 which is fast on the shaft and a member 56 mounted to turn freely on a bushing 58 on the shaft and connected by means of a belt 60 to a pulley 62 which is rigidly connected to the constantly driven pulley 15. A spring 64 between the member 54 and the bushing 58 tends to hold the member 56 out of engagement with the member 54 to permit it to turn idly without imparting movement to the shaft 52.

For moving the clutch member 56 into clutching engagement with the member 54 at the required time the machine is provided with a treadle 66 which is fast on a rock shaft 68, this shaft having an upwardly extending arm 70 through which extends a rod 72. At its rear end the rod 72 is pivotally

connected to a latch 74 which is arranged to engage a spring held pin 76 mounted in the lower end of a lever 78 which at its upper end is forked and provided with a pair of rolls 80 for engagement with the end of the hub of the clutch member 56. The latch 74 is slidably mounted in a holder 82 which is fast on a rock shaft 84 and is swung downwardly at the required time against the tension of a spring 85, as will be hereinafter explained, to carry the latch out of engagement with the pin 76 and permit the spring 64 to act to disconnect the clutch member 56 from the member 54. The connection between the arm 70 and the rod 72 comprises a collar 86 which is fast on the rod and engages the arm on one side and a spring 88 in engagement with the arm on its opposite side. The treadle 66 is normally upheld by a spring 90, causing the arm 70 to act through the collar 86 to position the latch 74 at its rearward limit of movement, as shown in Fig. 1. When the treadle is depressed the arm 70 acts through the spring 88 to move the rod 72 and the latch 74 forwardly and thus to swing the lever 78 in a direction to force the clutch member 56 into engagement with the member 54 and cause operative movement to be imparted to the shaft 52 and its connected mechanism, the clutch members thus being held yieldingly in engagement with each other through the spring 88 the tension of which, upon its compression, is sufficient to overcome the tension of the spring 64. The clutch members are thus held by the operator in operative relation to each other until such time as the latch 74 is swung downwardly to release the lever 78, as will now be explained.

Fast on one end of the rock shaft 84 is an arm 92 which carries a pin 94 engaging in a vertical slot 96 in the lower end of a rod 98 which at its upper end is connected to a pin 100 eccentrically mounted on the end of a short shaft 102 which extends transversely through a sleeve member 104 fast on the end of the rock shaft 40. When the shaft 40 is turned by the connections including the clutch 54, 56 to move the member 34 downwardly and thus impart additional pulling movement to the toe gripper, the rod 98 is raised and by its upward movement, as soon as the lost motion in the connection 94, 96 is exhausted, operates the arm 92 to turn the shaft 84 in a direction to swing the holder 82 downwardly and thus depress the latch 74 and cause it to release the clutch lever 78. The supplemental gripper operating means is thus rendered effective at the required time to disconnect the operating member 34 from the source of power and to terminate the movement of the gripper. It will be understood that when the treadle is released the latch 74 is moved rearwardly into position for re-engagement with the pin

76 when the holder 82 is permitted to return to its normal position under the influence of the spring 85.

The limit of pulling movement of the toe gripper effected by the supplemental operating means, and in consequence the total extent of pulling movement of the gripper, is predetermined by vertical adjustment of the rod 98 to vary the extent of lost motion between the rod and the pin 94 before the rod becomes effective to trip the clutch lever 78. To this end, the transverse shaft 102 which carries the eccentric pin 100 is connected by a universal joint to one end of a rod 106 which at its opposite end has a universal connection to a short shaft 108 mounted in the frame of the machine. On the front end of the shaft 108 is a disk 110 provided with a handle 112 whereby turning movement may be imparted through the described connections to the shaft 102 for adjusting the eccentric pin and raising or lowering the rod 98. On its rear face the disk 102 is provided with a plurality of depressions 114 arranged to co-operate with a spring held plunger 116 to retain the disk and its connected mechanism in adjusted position. On its front face the disk 110 may be provided with a series of marks arranged to register with a pointer 118 to indicate different positions of adjustment of the mechanism. Such marks may be of any desired character, and conveniently may comprise numerals indicating different lengths of tip. If it is desired to increase the extent of the pulling movement, the handle 112 is turned in the direction to depress the rod 98 and thereby increase the extent of lost motion between the rod and the pin 94 before the mechanism becomes effective to disconnect the clutch, while on the other hand if it is desired to decrease the extent of the pull the handle is moved in a direction to elevate the rod and thus decrease the extent of the lost motion.

While ordinarily the updraw spring 12 may be depended upon to hold the toe gripper at its limit of pulling movement, the construction herein shown affords additional insurance against retractive movement of the gripper by holding the gripper lever positively for a substantial length of time during which the upper tends to set in its strained condition, thereby decreasing its tendency to react. For this purpose the operating connections for the member 34, comprising the worm gearing above described, are so constructed and arranged as to be practically immovable in response to the pull of the upper, as will be evident by reference to the drawings showing the manner in which the different gears are related. In order to permit the subsequent return of the gripper to its starting position, the clutch member 44 is utilized to disconnect

the rock shaft 40 from the worm gear 46. The means for moving the member 44 to disconnect it from the gear may conveniently comprise, as herein shown, connections arranged to be operated by the movement of the slide 26 whereby the side clamp arms 24 are swung into operative relation to the shoe, this operation, as hereinbefore explained, taking place at the beginning of the period of the cycle following the pause during which the upper is pulled supplementary at the toe. For this purpose the slide 26 is provided with an extension 120 for engagement with an arm 121 which is mounted to swing on a stud 122 and connected to an arm 123 provided with an adjustable contact screw 124. The screw 124 engages an arm 125 fast on a shaft 126 upon which is a second arm 127 connected by a rod 128 to a lever 130 mounted at the opposite side of the machine and arranged for operative engagement with one arm of a lever 132 the opposite arm of which is connected to the clutch member 44. Movement of the slide 26 in the direction to swing the clamp arms toward the shoe thus serves through the described connections to swing the lever 132 against the tension of a coil spring 134 to move the clutch member 44 out of engagement with the clutch teeth on the gear 46. The operating member 34 is thus released to permit it to be moved upwardly by the block 18 when the latter is raised by the upward return movement of the cam slide 8.

Since in machines of the illustrative type the return movement of the slide 26 takes place before the gripper operating slides have been moved upwardly to their final starting position, it is necessary to provide additional means for preventing re-engagement of the clutch member 44 with the gear 46 until after the return of the gripper operating slides has been effected. For this purpose the machine is provided with a vertically slidable rod 136 the upper end of which is arranged to engage the front end of the lever arm 132 to hold this arm with the clutch member 44 in its inoperative position after the slide 26 has been returned. For controlling the operation of the rod 136 it is connected to a bell-crank lever 138 which carries a roll 140 in engagement with a cam on the cam shaft 6 against which the roll is normally held by the action of a spring 142. Conveniently this cam may be the same cam 28 by which operative movement is imparted to the slide 26. Normally, as shown in Fig. 1, the rod 136 is positioned below the arm 132, but during the first period of the cycle of the machine the cam 28 releases the bell-crank to permit the spring 142 to operate to force the rod upwardly against the lower face of the arm 132, and when the arm receives subsequently

its movement to disconnect the member 44 from the gear 46 the rod 136 snaps up behind the arm 132 to hold it in disconnecting position. The rod 136 remains effective to prevent the return of the member 44 until the bell-crank 138 is operated to move the rod downwardly and release the arm 132, which does not take place until after the gripper operating slides 8 and 10 have arrived at their upward limit of movement. Upon the release of the arm 132 the spring 134 becomes effective to move the clutch member 44 back into clutching engagement with the gear 46 to connect the member 34 to the operating means whereby the supplemental movement of the toe gripper may be effected in the operation of the machine on the next shoe.

The toe gripper, as shown in detail in Figs. 6 and 7, embodies in its general organization many of the features illustrated in Patent No. 1,137,566 granted on April 27, 1915 upon an application of Orrell Ashton. It comprises a bar 144 connected at its upper end to the front section 2 of the up-draw lever and having a cylindrical lower end portion upon which is rotatably mounted a gripper casing 146. Within the casing and encircling the cylindrical portion of the bar is a spring 148 which bears at its lower end upon the casing and at its upper end upon a shoulder on the bar. Rotatably mounted within recesses in the casing are jaw holders comprising stems 150, these stems being fixed against lengthwise movement by means of pins 152. On the lower end of each of the stems 150 is formed a gripper jaw 154 which for purposes of distinction may be termed a fixed jaw, this jaw being arranged to co-operate with an outer jaw 156 pivoted at 158 on the lower end portion of the stem. Slidingly mounted on the stems 150 are sleeves 160 provided with downwardly extending notched projections connected to arms 162 which are fixed on the pivoted jaws 156. The sleeves 160 are provided on their inner sides with slots 164 to receive diametrically opposite lugs on a disk 166. As the parts are thus constructed, the pivoted jaws are closed and opened by movements of the sleeves 160 along the stems 150 through the action of the disk 166. By the turning of the stems 150, moreover, the jaws are permitted to adjust themselves in the upper-pulling operation to the curvature of the shoe round the toe.

For purposes of this invention the gripper bar 144 carries at its lower end a pivoted latch 168 which is arranged to project downwardly through an opening in the disk 166 and to hook over the lower face of the disk, as shown in Fig. 6, the latch being normally held in operative position by means of a spring plunger 170 in the gripper bar. At its lower end the latch 168 is provided

with a pin 172 projecting forwardly in front of the gripper. It will be understood that when the parts are in starting position ears 174 on the casing 146 are in engagement with a fixed part of the machine which limits downward movement of the casing and that the spring 148 is under compression, the lower end of the gripper bar 144 abutting against the disk 166 and holding the sleeves 160 in their lowermost position to maintain the pivoted jaws 156 in open relation to the fixed jaws. As the gripper bar is moved upwardly by the updraw lever the spring 148 at first continues to hold the gripper casing stationary, and the gripper bar through the latch 168 and the disk 166 moves the sleeves 160 upwardly along the stems 150 to close the pivoted jaws upon the upper. As soon as resistance to the closing of the jaws becomes sufficient to overcome the tension of the spring 148 the casing 146 begins to move upwardly with the gripper bar and the gripper jaws are thus operated to pull the upper. Subsequently, in the overdrawing movement of the toe gripper, a portion of the overlaying and fastening mechanism carried by the inwardly swinging front arm 32 engages the outer end of the pin 172 and forces the latch 168 backwardly to disengage it from the disk 166. This serves to disconnect the gripper bar from the sleeves 160 and thereby to release the jaws and permit them to open. In the return of the parts to starting position the ears 174 on the gripper casing are moved into engagement with the frame, and by continued downward movement of the gripper bar against the tension of the spring 148 the latch 168 is moved again into operative relation to the disk 166, as shown in Fig. 6, the lower end of the bar abutting against the disk to hold the pivoted gripper jaws fully open.

In the operation of the machine, briefly summarized, the operator first adjusts the controlling means, by manipulation of the handle 112, in accordance with the length of tip required for the size and style of shoe upon which the machine is to operate, as indicated by the graduations on the disk 110. He then presents a shoe to the machine in the customary manner and depresses the starting treadle (not herein shown) to cause the machine to pull the upper and to come to rest with the upper held under tension. In this operation the upper is pulled yieldingly at the toe and at the opposite sides through the updraw springs 12 and 14, the side grippers thus receiving substantially the extent of movement required to stretch the upper transversely and draw it over the top of the last back of the toe. The toe gripper, on the other hand, receives only a portion of the extent of movement required to stretch the

upper lengthwise and position the top seam at the correct distance from the end face of the last. By reference to Fig. 2 it will be seen that in this operation of the toe gripper the block 18 is pulled downwardly away from the sleeve member 34 which is held in place by its connection to the gear 46. While the upper is thus held under tension the operator depresses the treadle 66 to connect the supplemental upper pulling means to the source of power and holds the treadle depressed until such time as this mechanism is disconnected from the source of power by the automatic controlling means provided. In this supplemental upper pulling operation the sleeve 34 is moved downwardly into engagement with the block 18, and continuing its movement to the limit predetermined by the adjustment of the controlling means completes positively the prescribed movement of the toe gripper. By the action of the gearing connections the toe gripper is then held positively against retractive movement in response to the pull of the upper. Upon the subsequent starting of the machine the shoe supporting and clamping device 24 are moved into operative relation to the shoe, the sleeve member 34 is disconnected from its operating gearing by movement of the clutch member 44, and in the same period of the cycle the upper is drawn inwardly over the bottom of the last by the grippers and is overlaid and fastened by the devices carried by the arms 30 and 32. In the course of this operation the side grippers are tripped in the usual manner to cause them to release the upper, and the toe gripper is tripped by the means hereinbefore described. In the return of the parts to starting position, the sleeve member 34 is moved upwardly by the block 18, and the rock shaft 40 is then connected again to the gear 46 by the return movement of the clutch member 44.

The machine having been adjusted to effect the required extent of pulling movement of the toe gripper for a given size and style of shoe, assurance is afforded that all shoes of that size and style will be pulled uniformly and in such manner as to produce tips of the required length, and it is only necessary to change the adjustment of the controlling means when the machine is to be used on shoes of a different size or style.

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 means for gripping an upper on a last, of power driven mechanism for effecting relative movement of said gripping means and the last to pull the upper, means automatically operative to disconnect said mechanism from the source of power as soon as it arrives at a predetermined

limit of movement, and means enabling the operator to vary said limit of movement.

2. In a machine of the class described, the combination with means for gripping an upper on a last, of power driven mechanism for effecting relative movement of said gripping means and the last to pull the upper, automatically operative controlling means for disconnecting said mechanism from the source of power to terminate said relative upper pulling movement, and adjusting means for varying the time of operation of said controlling means.

3. In a machine of the class described, the combination with means for gripping an upper on a last, of power driven mechanism for positively effecting relative movement of said gripping means and the last to pull the upper, and automatically operative controlling means for determining the limit of said relative movement, said controlling means being adjustable to vary the limit of said movement.

4. In a machine of the class described, the combination with upper gripping means, of power driven mechanism for operating said gripping means to pull an upper, and adjustable means automatically operative to disconnect said gripping means from the source of power as soon as the gripping means arrives at a limit of movement initially predetermined by the adjustment.

5. In a machine of the class described, the combination with upper gripping means, of power driven mechanism for operating said gripping means to pull an upper, and controlling means arranged to be operated by said power driven mechanism to terminate the movement of said mechanism as soon as the gripping means arrives at a definite limit of movement, said controlling means being adjustable to vary said limit of movement.

6. In a machine of the class described, the combination with upper gripping means, of power driven mechanism including a clutch for imparting operative movement to said gripping means to pull an upper, clutch actuating means automatically operative to terminate the movement of the gripping means at a definite point, and mechanism for adjusting said clutch actuating means to vary the limit of movement of the gripping means.

7. In a machine of the class described, the combination with upper gripping means, of power driven mechanism for imparting a positive movement to said gripping means to pull an upper, and adjustable controlling means automatically operative in response to the movement of said mechanism to disconnect said mechanism from the source of power as soon as the gripping means arrives at a limit of movement variably predetermined by the operator.

8. In a machine of the class described,

the combination with upper gripping means, of power driven mechanism for imparting positively to said gripping means an upper pulling movement, automatically operative controlling means for determining the limit of the movement of said mechanism, and means for adjusting said controlling means to vary the limit of said movement.

9. In a machine of the class described, the combination with a gripper, of power driven mechanism for imparting operative movement to said gripper to pull an upper and for then holding the gripper positively against retractive movement, controlling means automatically operative to limit the movement of said gripper, and means enabling the operator to predetermine the limit of said movement.

10. In a machine of the class described, the combination with a gripper, of power driven mechanism for imparting upper pulling movement to said gripper comprising power transmitting connections automatically operative to hold the gripper positively against retractive movement in response to the pull of the upper, and adjustable controlling means automatically operative to disconnect the gripper from the source of power at a point in its movement initially predetermined by the operator.

11. In a machine of the class described, the combination with means for gripping an upper on a last, of power driven mechanism for effecting relative movement of said gripping means and the last to pull the upper, and means for disconnecting said mechanism from the source of power, said mechanism comprising power transmitting connections constructed and arranged to act automatically to prevent relative retractive movement of said gripping means and the last in response to the pull of the upper after the mechanism has been thus disconnected.

12. In a machine of the class described, the combination with upper gripping means, of power driven mechanism for imparting upper pulling movement to said gripping means, said mechanism comprising gearing connections automatically operative to hold the gripping means positively against retractive movement in response to the pull of the upper when said means is disconnected from the source of power.

13. In a machine of the class described, the combination with a gripper, of power driven mechanism for imparting upper pulling movement to said gripper, said mechanism comprising gearing automatically operative to hold the gripper against retractive movement in response to the pull of the upper when said mechanism is disconnected from the source of power, and means for disconnecting the gripper from said gearing to permit the gripper to return to its starting position.

14. In a machine of the class described, the combination with a gripper, of power driven mechanism for imparting upper pulling movement to said gripper, said mechanism comprising a rock shaft and gearing connections for imparting operative movement to said shaft, said gearing connections being constructed and arranged to hold the gripper automatically against retractive movement when said mechanism is disconnected from the source of power, and clutch means for disconnecting the rock shaft from said gearing to permit the gripper to return to its starting position.

15. In a machine of the class described, the combination with means for gripping an upper at the toe end of a last, of power driven mechanism having a prescribed range of movement to pull the upper lengthwise positively through relative movement of said gripping means and the last, and controlling means automatically operative to disconnect said mechanism from the source of power to terminate the upper pulling operation, said controlling means being adjustable in accordance with the size and style of the shoe to vary the extent of said relative pulling movement.

16. In a machine of the class described, the combination with a gripper for engaging an upper at the toe end of a last, of power driven mechanism for imparting upper pulling movement to said gripper, controlling means automatically operative to disconnect said mechanism from the source of power as soon as the gripper arrives at a definite limit of movement, and means for adjusting said controlling means to vary the limit of movement of the gripper in accordance with the size and style of the shoe.

17. In a machine of the class described, the combination with means for gripping an upper on a last, of mechanism for effecting relative movement of said gripping means and the last to pull the upper, additional power driven mechanism for effecting a supplemental relative pulling movement of said gripping means and the last, and adjustable means automatically operative to terminate the movement of said additional mechanism at a point initially predetermined by the adjustment.

18. In a machine of the class described, the combination with means for gripping an upper on a last, of mechanism for effecting relative movement of said gripping means and the last to pull the upper, additional power driven mechanism for effecting a supplemental relative pulling movement of said gripping means and the last, means automatically operative to disconnect said additional mechanism from the source of power at a predetermined point in its movement, and means enabling the operator to vary the point of such disconnection.

19. In a machine of the class described, the combination with means for gripping an upper on a last, of mechanism for effecting relative movement of said gripping means and the last to pull the upper, additional power driven mechanism including a clutch for imparting a supplemental pulling movement to said gripping means and adjustable clutch actuating means automatically operative to terminate the supplemental movement of the gripping means at a point in said movement initially predetermined by the operator.

20. In a machine of the class described, the combination with upper gripping means, of mechanism for operating said gripping means to pull an upper, additional power driven mechanism for imparting a supplemental pulling movement to said gripping means, and controlling means automatically operative to limit the movement of said additional mechanism, said controlling means being adjustable by the operator to predetermine the limit of said movement.

21. In a machine of the class described, the combination with upper gripping means, of a power shaft and connections to said gripping means for operating said means to pull an upper, additional power driven mechanism for imparting a supplemental upper pulling movement to said gripping means, and means operated by said additional mechanism for disconnecting said mechanism from the source of power at a point in its movement variably predetermined by the operator.

22. In a machine of the class described, the combination with upper gripping means, of mechanism for operating said gripping means to pull an upper, additional power driven mechanism including a clutch for imparting a supplemental upper pulling movement to said gripping means, clutch actuating means arranged to be operated by said additional mechanism to terminate the movement of the gripping means, and adjusting means for varying the time of actuation of said clutch.

23. In a machine of the class described, the combination with upper gripping means, of a power shaft and connections to said gripping means for operating said means to pull an upper, additional power driven mechanism including a clutch for imparting a supplemental upper pulling movement to said gripping means, treadle mechanism for controlling said clutch to initiate the supplemental movement of the gripping means independently of other operations of the machine, and means automatically operative to terminate the supplemental movement of the gripping means at a point where the upper is subjected to the desired tension.

24. In a machine of the class described,

the combination with upper gripping means, of mechanism for operating said gripping means to pull an upper, and additional power driven mechanism for imparting a supplemental upper pulling movement to said gripping means comprising power transmitting connections constructed and arranged to hold said gripping means automatically against retractive movement in response to the pull of the upper when said additional mechanism is disconnected from the source of power.

25. In a machine of the class described, the combination with a gripper and mechanism for operating it to pull an upper yieldingly over a last, of additional power driven mechanism for imparting a supplemental positive upper pulling movement to said gripper comprising gearing connections automatically operative to hold the gripper against retractive movement in response to the pull of the upper when said additional mechanism is disconnected from the source of power.

26. In a machine of the class described, the combination with a gripper, of an up-draw lever connected to said gripper, mechanism including a spring for imparting operative movement yieldingly to said lever, and additional mechanism comprising a sleeve encircling said spring and arranged to operate said lever positively to increase the tension of the upper.

27. In a machine of the class described, the combination with a gripper, of an up-draw lever connected to said gripper, mechanism for operating said lever yieldingly to pull the upper, and additional mechanism for imparting a supplemental movement to said gripper comprising a rock shaft extending transversely of the plane of movement of said lever and a member operated by said rock shaft and arranged to act on the rear end of said lever to impart movement positively to said lever.

28. In a machine of the class described, the combination with a gripper, of an up-draw lever connected to said gripper, mechanism for imparting operative movement to said lever, additional mechanism comprising a rock shaft for imparting a supplemental upper pulling movement to said lever, and means controlled by said rock shaft for terminating the supplemental movement of the gripper lever at a predetermined point.

29. In a machine of the class described, the combination with a gripper, of an up-draw lever connected to said gripper, mechanism for imparting operative movement to said lever to pull an upper, additional power driven mechanism comprising a rock shaft for imparting a supplemental pulling movement to said lever, a clutch through which power is transmitted to said rock shaft, clutch actuating means arranged to be op-

erated by said rock shaft to terminate the supplemental movement of the gripper lever, and means for adjustably varying the time of operation of said clutch actuating means to determine the limit of movement of the lever.

30. In a machine of the class described, the combination with a gripper, of operating mechanism for imparting a positive upper pulling movement to said gripper, said mechanism having a predetermined range of movement corresponding to the required total extent of upper pulling movement of the gripper and arranged to permit the gripper to receive a portion of its upper pulling movement before said mechanism is operated, and additional means for moving the gripper yieldingly to pull the upper prior to the operation of said mechanism.

31. In a machine of the class described, the combination with a toe gripper and side grippers for pulling an upper over a last, of mechanism for effecting relative movement of said grippers and the last to pull an upper, additional power driven mechanism for imparting subsequently to the toe gripper a supplemental upper pulling movement, and means automatically operative to disconnect said toe gripper from the source of power at a limit of the supplemental movement of said gripper initially predetermined by the operator.

32. In a machine of the class described, the combination with a toe gripper and side grippers for pulling an upper over a last, of means comprising a power shaft and connections to said grippers for operating them to pull the upper, additional power driven mechanism for imparting at the will of the operator a supplemental upper pulling movement to the toe gripper, and means automatically operative to terminate the supplemental movement of the toe gripper at a point where the upper is subjected to the desired tension.

33. In a machine of the class described, the combination with a toe gripper and side grippers for pulling an upper over a last, of mechanism for effecting relative movement of said grippers and the last to pull the upper, additional power driven mechanism for imparting a supplemental upper pulling movement to the toe gripper, means automatically operative to limit said supplemental movement of the toe gripper, and means enabling the operator to adjust said limit of movement in accordance with the size and style of the shoe.

34. In a machine of the class described, the combination with a toe gripper and side grippers for pulling an upper over a last, of mechanism for effecting relative movement of said grippers and the last to pull the upper, additional power driven mechanism for imparting to the toe gripper at

the will of the operator a supplemental upper pulling movement, means automatically operative to disconnect the toe gripper from the source of power at a definite point, and means enabling the operator to vary the time of operation of said disconnecting means in accordance with the size and style of the shoe.

35. In a machine of the class described, the combination with a toe gripper and side grippers for pulling an upper over a last, of means for effecting relative movement of said grippers and the last to pull the upper, power driven mechanism including a clutch for imparting at the will of the operator a supplemental upper pulling movement to the toe gripper, clutch actuating means automatically operative to terminate the supplemental movement of the toe gripper, and means for adjusting the time of operation of said clutch actuating means in accordance with the size and style of the shoe.

36. In a machine of the class described, the combination with means for overlaying and fastening the margin of an upper at the toe end of a last, of means for pulling the upper at the toe and for holding it for the operation of said overlaying and fastening means, said pulling means comprising a gripper having a plurality of pairs of jaws mounted to turn respectively about different axes in the upper-pulling operation for adjustment to the curvature of the shoe round the toe, and operating means for said jaws including a latch arranged to be engaged and operated by said overlaying and fastening means to cause the different pairs of jaws to release the upper.

37. In a machine of the class described, the combination with means for overlaying and fastening the margin of an upper at the toe end of a last, of means for pulling the upper at the toe and for holding it for the operation of said overlaying and fastening means, said pulling means comprising a gripper having a plurality of pairs of jaws mounted to turn respectively about different axes in the upper-pulling operation for adjustment to the curvature of the shoe round the toe, a gripper bar, and mechanism including a latch arranged to connect said bar to the different pairs of jaws in the different positions of adjustment of said jaws, said latch being movable in response to pressure of the overlaying and fastening means against it to disconnect the jaws from said bar and cause them to release the upper.

38. In a machine of the class described, the combination with means for overlaying and fastening the margin of an upper at the toe end of a last, of means for pulling the upper at the toe and for holding it for the operation of said overlaying and fastening means, said pulling means comprising a

plurality of pairs of gripper jaws, an operating member, a latch arranged to connect said member to the different pairs of jaws, and a member positioned substantially adjacent to said jaws and arranged to be engaged by said overlaying and fastening means to cause said latch to release the jaws from said operating member and permit them to open.

39. In a machine of the class described, the combination with means for overlaying and fastening the margin of an upper at the toe end of a last, of means for pulling the upper at the toe and for holding it for the operation of said overlaying and fastening means, said pulling means comprising a gripper having a plurality of pairs of jaws mounted to turn respectively about different axes for adjustment to the curvature of the shoe round the toe, a gripper bar, and latch mechanism arranged to connect said bar to the different pairs of jaws in the different positions of adjustment of the jaws and including a member arranged to project forwardly substantially adjacent to said jaws and to be engaged by said overlaying and fastening means to release the jaws from said bar and cause them to open.

40. In a machine of the class described, the combination with means for gripping an upper on a last, of an operating member, connections for effecting by movement of said operating member relative movement of said upper gripping means and the last to pull the upper, and a controlling device automatically operative at a predetermined time in the operation of the machine to disconnect said connections from the operating member to stop such relative pulling movement, said controlling device being adjustable to vary the time of its operation.

41. In a machine of the class described, the combination with means for gripping an upper on a last, of a power driven operating member, mechanism including a clutch for effecting by movement of said operating member a relative movement of said upper gripping means and the last to pull the upper, actuating means for said clutch automatically operative to stop said relative movement at a predetermined time in the operation of the machine, and a device enabling the operator to adjust said clutch actuating means to determine the limit of said relative movement.

42. In a machine of the class described, the combination with means for gripping an upper on a last, of operating mechanism including a clutch for effecting relative movement of said upper gripping means and the last to pull the upper, automatically controlled clutch actuating means for stopping said relative movement, a device for adjusting such clutch actuating means to vary the limit of said movement, and an indicator as-

sociated with said adjusting device to assist the operator in adjusting the device as required by the work.

43. In a machine of the class described, 5 the combination with means for gripping an upper on a last, of operating mechanism for effecting relative movement of said upper gripper means and the last to pull the upper comprising a power operated member 10 having an automatically controlled movement and another member positioned in the path of movement of said first member and arranged to be moved thereby to a limit determined by said first member, and means 15 for imparting to said other member a movement away from said first member for effecting a portion of the upper pulling operation prior to its operation by said first member.

44. In a machine of the class described, 20 the combination with means for gripping an upper on a last, of operating mechanism for effecting relative movement of said upper gripping means and the last to pull the upper comprising a member arranged to be 25 moved initially in pulling the upper a portion only of the extent required, and a positively operated member in the path of which said first member is thus movable, said positively operated member having an automati- 30 cally limited movement to pick up said first member and complete its movement to the limit thus determined.

45. In a machine of the class described, 35 the combination with means for gripping an upper on a last, of operating mechanism comprising clutch controlled power means for effecting relative movement of said gripping means and the last to pull the upper a portion only of the extent required, 40 additional power operated mechanism arranged to be started by the operator independently of said first named mechanism for thereafter effecting additional relative pulling movement of the upper gripping 45 means and the last, and automatic means for limiting said additional pulling movement at a point determined independently of the extent of the first pulling movement and as soon as the upper is subjected to the de- 50 sired degree of tension.

46. In a machine of the class described, 55 the combination with a gripper, of operating mechanism for imparting upper pulling movement to said gripper comprising a member movable with the gripper for initially pulling the upper, and a positively

operated member having an automatically limited movement for subsequently engaging said first member and moving it a variable distance depending upon the extent of 60 the initial movement of the gripper to complete the movement of the gripper to a limit determined independently of the extent of said initial movement.

47. In a machine of the class described, 65 the combination with a gripper, of operating mechanism for imparting upper pulling movement to said gripper comprising a positively operated member having a movement of predetermined extent corresponding to 70 the required extent of pulling movement of the gripper, a second member arranged to be engaged and operated by said first member to impart the upper pulling movement to the gripper, and means for imparting 75 to the gripper an initial movement a portion only of the distance required to pull the upper and for thereby moving said second member away from the first into position to be subsequently picked up and further 80 moved by operation of said first member.

48. In a machine of the class described, 85 the combination with means for gripping an upper on a last, of power means automatically controlled to effect relative movement of said upper gripping means and the last to pull the upper and to come to a stop with the upper held under tension, and addition- 90 al power means arranged to be started by the operator independently of said first means for effecting further relative movement of said upper gripping means and the last and automatically controlled to stop such relative movement as soon as the upper 95 is subjected to the desired tension.

49. In a machine of the class described, 100 the combination with means for gripping an upper on a last, of power operated means including a clutch for effecting relative movement of said upper gripping means and the last to pull the upper, additional power 105 operated means including a clutch and having an automatically limited movement for further pulling the upper and for stopping the pull as soon as the upper is subjected to the desired tension, and independent manually operated starting mechanisms for said different clutches.

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

BERNHARDT JORGENSEN.