

A. BATES.
 PULLING-OVER MACHINE.
 APPLICATION FILED OCT. 21, 1911

1,069,218.

Patented Aug. 5, 1913.

2 SHEETS—SHEET 1.

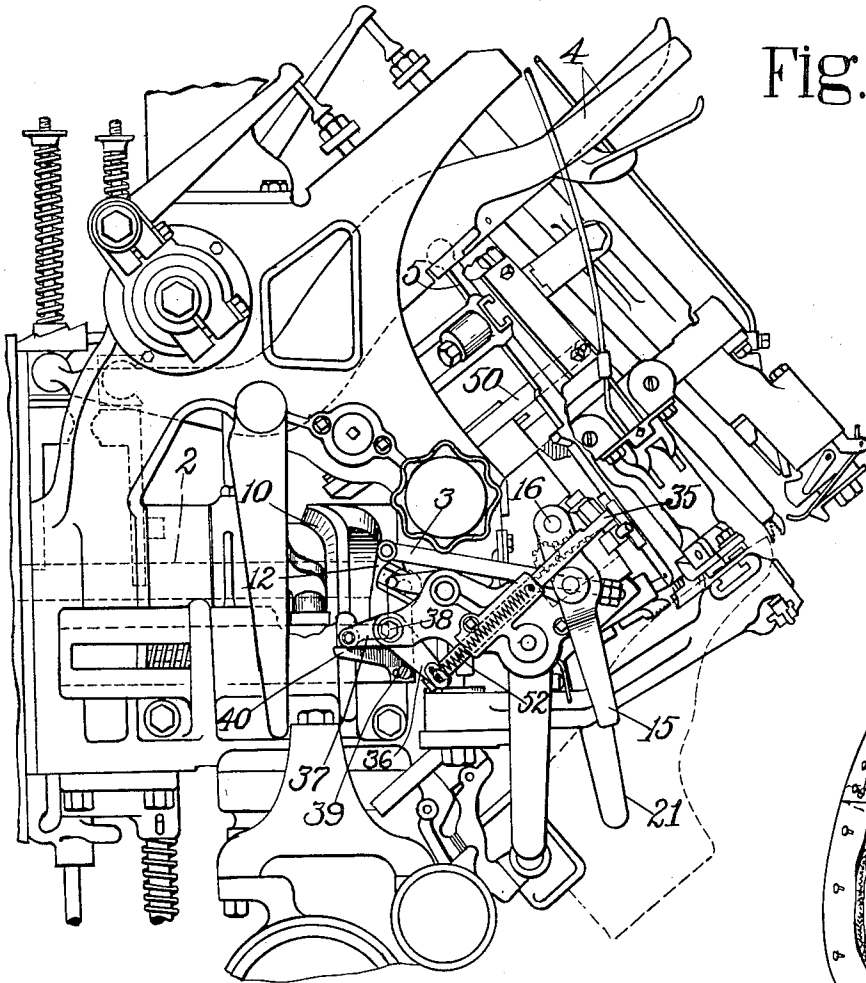


Fig. 1.

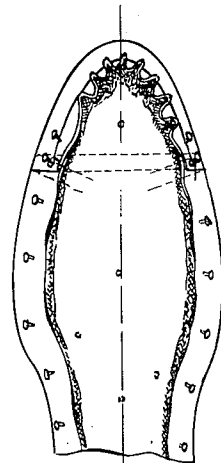


Fig. 6.

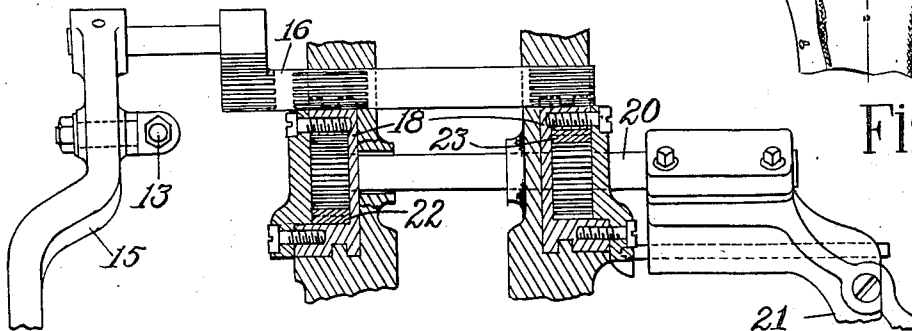


Fig. 2.

WITNESSES.

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2 SHEETS-SHEET 2.

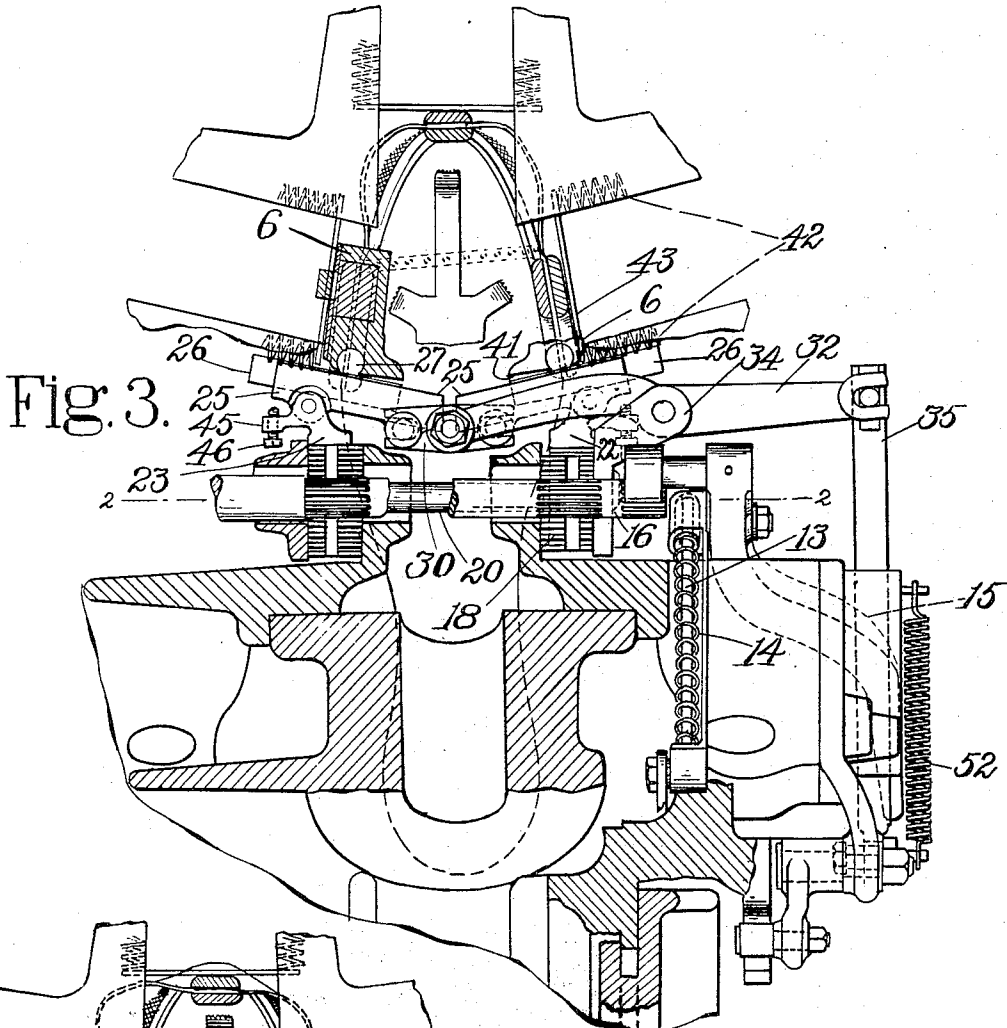


Fig. 3.

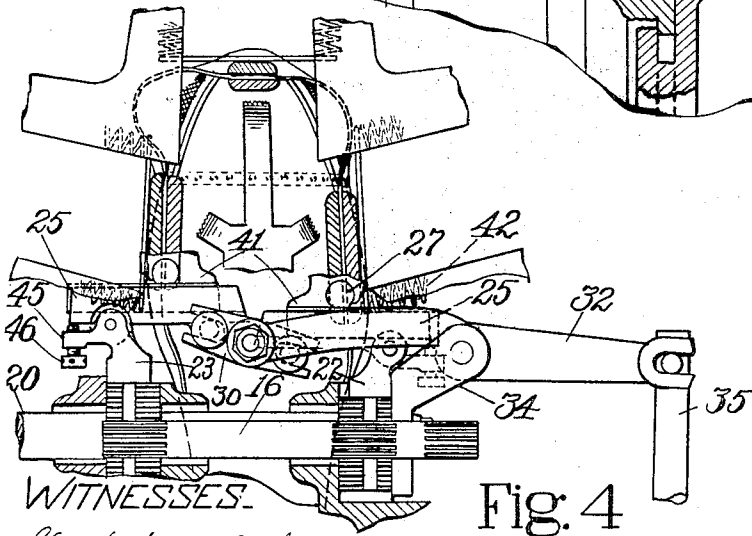
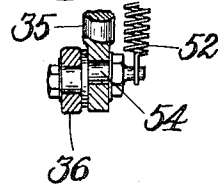


Fig. 4

Fig. 5.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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PULLING-OVER MACHINE.

1,069,218.

Specification of Letters Patent.

Patented Aug. 5, 1913.

Application filed October 21, 1911. Serial No. 655,833.

To all whom it may concern:

Be it known that I, ARTHUR BATES, a subject of the King of England, residing at Leicestershire, England, have invented certain Improvements in Pulling-Over Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for working uppers over lasts and particularly to machines of the type of the pulling over machine shown in Letters Patent of the United States 663,777, Dec. 11, 1900. In the machine therein shown are toe and side grippers which are adjustable relatively for large and small shoes and the side grippers are guided in such adjustments obliquely inwardly and backwardly and vice versa, substantially perpendicular to the diverging side edges of the forepart of a conventional shape of last, said directions being controlled through sliding connections between the lower portions of the grippers and oblique guides. This direction of adjustment is advantageous for bringing the grippers into suitable relation to other parts of the machine to enable them to cooperate to the best advantage in working upon shoes of varying sizes. The tackers of that machine, which cooperate to fasten the upper pulled over by each gripper, are similarly guided obliquely in the frame of the machine. The said adjustment of the grippers is effected through the spreading means which at the end of each cycle restores the grippers to relative shoe receiving positions and during each cycle is retracted to permit the over-drawing movement of the grippers by which the upper is carried inwardly over the shoe bottom toward position to be fastened by the tackers. The overdrawing movement is effected by springs arranged in the frame at the outer side of each gripper where they are compressed when the grippers are spread and are able to react to force the grippers inwardly for overdrawing when the spreader is retracted. The direction of this overdrawing movement of the side grippers is controlled by the aforesaid guides through which direction of adjustment is controlled. Therefore the direction of overdrawing

movement of the side grippers is oblique to the median line of the machine and to the median line of the shoe which is being operated upon. The result of this is that the side grippers have, in their overdrawing movement, a component of backward displacement and, cooperating with the toe gripper, they tend to draw the entire forward portion of the shoe upper rearwardly as well as inwardly. It was considered at the time of the invention represented in that patent that the ideal direction for the overdraw movement was perpendicular to the edge of that portion of the last across which the gripper moved. Under conditions that now exist to some extent at least, it is preferable to overdraw at the sides in directions substantially perpendicular or normal to the median line of the last, or of the machine, instead of in directions perpendicular to the divergent side faces of the last. Among the advantages for the new direction of overdraw is the result that the end portions of the tip seam are carried squarely inwardly instead of running off toward the heel of the shoe more or less as they do when overdrawn obliquely.

With these conditions in view, provision is made in accordance with an important feature of this invention for overdrawing the upper by the side grippers of a pulling-over machine in a direction normal to the median line of the machine. It is, however, important to preserve the oblique initial relation of the side grippers to one another, parallel with the edges of the last, for seizing the upper because it would be less convenient to insert the upper between the gripper jaws if they did not extend in substantially the direction in which the upper extends along the side of the last. In accordance, therefore, with another very important feature of this invention provision is made for positioning the grippers with their jaws extending in diverging directions, as parallel with the side faces of the last, and for directing overdraw movement of the grippers in directions normal to the median line of the last.

In carrying out this invention according to the illustrated embodiment thereof the aforesaid guides which control the direction of overdrawing movement, and of

adjustment, of the side grippers are angularly movable so that after the grippers have seized the upper the guides can be moved to a position in which they will direct the over-
 5 drawing movement in lines normal to the median line of the last. The extent of this movement of the guides can be varied to obtain any desired direction of overdraw movement approximating the normal to the
 10 median line. Also as herein shown and in accordance with another feature of the invention the movement or adjustment of the said guides is accompanied by, and preferably is made to produce, a turning movement of
 15 the side grippers from their upper receiving positions parallel with the diverging sides of the last into positions parallel with the median line of the last. This adjustment, accompanied by turning of the grippers, is
 20 made to take place automatically and is followed by an automatic restoration of the grippers to their angular upper receiving positions, and this is another feature of the invention. This new movement is made to
 25 take place in time relation to other gripper movements, and occurs as herein shown near the end of the updrawing stroke of the gripper operating cam, although it is to be remembered that this cam movement is trans-
 30 mitted yieldingly so that in some instances the actual updrawing movement may have ceased before the turning movement will take place. Provision is made for adjustment by which the turning movement will
 35 occur earlier or later. The turning movement of the gripper while it holds the upper under strain has an advantageous effect in that it twists the upper and carries the portion held by the rear ends of the gripper
 40 jaws, and which extends about the last in the rear of the tip seam, farther inwardly over the last bottom than the portion which is adjacent to the tip seam and is held by the front ends of the jaws. This effects additional
 45 straining and overdrawing of the more stretchy portion of the shoe vamp. This turning movement also has the effect of carrying forwardly as well as inwardly the upper from the rear of the grippers and
 50 causes it to lie in a desirable manner in over the shoulder of the last edge that is located where the shank joins the ball of the last. The upper is fastened by a plurality of tacks in the described overdrawn position and lies
 55 into the shank better than it otherwise would do in the side lasting operation.

These and other features of the invention, including certain details of construction and combinations of new devices with old mechanisms, will now be described and will then be pointed out in the claims.

Figure 1 is a side elevation of a pulling-over machine of the type represented in said prior patent and equipped with the present
 65 improvements; Fig. 2 is a section approxi-

mately perpendicular to the plane of the shoe bottom in Fig. 1 and extending through the tip straightening mechanism by which the opposed side grippers can be adjusted simultaneously in opposite directions length-
 70 wise of the last for shifting the pulled upper longitudinally around the last; said section also shows the toothed shaft of the foredrawing mechanism by which the two side grippers are moved simultaneously in the
 75 same direction to draw the upper forwardly at the two sides of the last. These two mechanisms are not new with me, the tip straightening mechanism being like that shown in said prior patent, while the foredrawing
 80 mechanism is like that shown in United States application Serial No. 577,054, filed Aug. 13, 1910, and these mechanisms are here shown only for the purpose of disclosing their coöperative relation to the mecha-
 85 nism which is added to the machine by the present invention; Fig. 3 is in section taken approximately parallel to the plane of the shoe bottom in Fig. 1 and extending through the grippers and directly above the fore-
 90 drawing shaft and above the new gripper turning and guiding devices; Fig. 4 is a view similar to Fig. 3 but showing the adjusted position of the grippers effected by the new mechanism; Fig. 5 is a detail of the
 95 eccentric adjuster by which to control the angular relation of the grippers while in shoe receiving position; Fig. 6 represents the bottom of a shoe and shows the change in the overdraw effected by the use of the
 100 present invention.

Reference may be had to said prior patent and to British specification 12,304/03 for detailed description of the machine as a whole and it will, therefore, be only necessary to
 105 refer here briefly to the general construction.

The head of the machine has bearing for a cam shaft 2 by which are turned updraw cams shown in dotted lines in Fig. 1, which have connection with the gripper closing
 110 and updrawing levers 4. From these levers depend the toe gripper mechanism and the two side gripper mechanisms, the latter of which each comprises a bar 5 suspended from a lever 4 by a ball connection which
 115 permits universal movement of the side gripper. Each bar 5 extends through a gripper casing 6 and is operatively connected to the gripper jaws so that upward movement of the bar first closes the jaws and then
 120 lifts them, together with the casing 6, for seizing and then updrawing the upper to strain it about the last which is rested upwardly against the sole or bottom rest 8. The sole rest also has a downward move-
 125 ment derived from a cam on the shaft 2, by means of which it takes part in the upper straining operation. The cam shaft 2 has also a cam 10, a groove in which receives a roll on a slide formed in two parts with a

yielding connection between them as fully explained in said British specification 12,304/03. The front, yieldingly driven section has an upright arm 12 from which is forwardly projected a rod 13 encircled by a spring 14, passing through a block swiveled in a lever 15 that has a depending handle and is fast on a rock shaft 16, Fig. 2, of the foredrawing mechanism. By toothed portions the shaft 16 has driving engagement with blocks 18 to slide them forwardly and backwardly in the machine head. In these blocks, and moved lengthwise of the shoe with and by them is the toothed rock shaft 20 of the tip straightening mechanism. This rock shaft, to which a hand lever 21 is fastened, has driving engagement with a rack bar 22 located under it and with a rack bar 23 located over it, said bars being connected respectively with the left and right side gripper for moving said grippers respectively in opposite directions simultaneously to adjust the upper held by them around the last for straightening the toe tip seam.

In accordance with this invention the front end of each rack bar 22, 23 has a pivotal connection with a horizontally extending gripper guide 25, which formerly was integral with the rack bar and constituted a rigid head therefor as in Fig. 33 of said Patent 663,777. In each guide 25 slides the horizontal member 26 of a connection which comprises also a vertical member 28 with which the gripper casing has sliding engagement upwardly and downwardly by reason of the actuation of updraw lever 4. The pivoted gripper guides 25 are connected together at their adjacent ends by a link or block 30 which is in turn pivoted to a lever 32 and constitutes an equalizer between the two guides for transmitting movement of the lever 32 and a compensator for permitting use, Fig. 4, of the tip straightening mechanism without disarranging the connection with lever 32. Said lever is fulcrumed to a bracket 34 on the machine head and has at its outer end an operative connection with a rod 35 which is movable endwise in the head by a bell crank 36, 37 fulcrumed at 38. The rear arm 37 of this bell crank has a roll resting on the upper edge of a cam block 40 that is adjustably attached at 39 to the yieldingly driven section of the slide which actuates the foredrawing devices. By these connections the gripper guides 25, 25 are turned together automatically in time relation to other gripper movements. Each of the gripper casings has an inwardly extending abutment 41 that is held against the guide 25 for that gripper by the pressure of the overdraw springs 42, 42 which act laterally against the gripper casing through the plate 43. Through engagement with said abutments 41 the guides 25 transmit turning

movement to the gripper casings, the ball connections of the rods 5 with updraw levers 4 permitting this turning of the grippers to take place about an axis that is approximately perpendicular to the shoe bottom and approximately in the line of the updrawing strain on the upper. An abutment 45 located on the outer side of each rack bar 22, 23 limits the outward turning of the guides and grippers, any excess of movement from cam 10 being taken up by the spring that connects the sections of the cam actuated slide. This arrangement provides for turning the grippers, during each cycle of the machine, from a position such as that shown in Fig. 3 where the jaws are parallel with the side edges of the last and with the portion of upper which they are to seize, into the position shown in Fig. 4 where the jaws are approximately parallel with the median line of the last and the guides 25 extend in a direction approximately perpendicular, or normal, to the median line of the last and of the machine.

The exact angular position to which the guides and grippers are turned may be varied by adjusting stops 46 in the abutments 45. As shown this turning movement of the side grippers is timed to occur in the first portion of the machine's cycle, the cam 40 being formed to cause the turning movement near the end of that portion and during the last part of the updrawing movement of the grippers or after the updraw may have been completed. The adjustment for the cam block at 39 permits selection of the exact time best suited to the requirements of the work in hand. In any case this turning or angular adjustment of the grippers in the illustrated embodiment of the invention, takes place in advance of and preparatory to the overdrawing movement and positions the gripper guides 25, 25 for directing that movement in lines approximately normal to the median line of the last instead of in lines inclined at a substantial angle backwardly toward the heel of the last. The overdraw movement is effected by the action of the springs 42, 42 when the spreader 50, shown in detail in Fig. 37 of said United States patent, is withdrawn. Thereafter when all the grippers are restored to their upper seizing position for another cycle of the machine the cam 10 allows a spring 52 to return the side grippers to their angular position, Fig. 3, approximately parallel with the sides of the last. The angularity of this position can be varied to suit lasts having more or less diverging sides by adjustment of the eccentric connection 54 between the bell crank arm 36 and the sliding rod 35. The equalizer 30 permits one side gripper to be positioned at a slightly different angle from the other one for unsymmetrical lasts, which

are sometimes nearly straight on the inner side and have a large swing or inclination on the outer side. With the present improvement each gripper can take, during the initial updrawing movement, the angular position into which the strain of the upper over the adjacent side of the last tends to throw that gripper. From these positions, whatever they are, the side grippers are each turned automatically into approximately perpendicular relation to the median line of the last and are held in that relation and guided in directions approximately normal to the median line of the last during the overdraw movement. Thus the upper is drawn squarely across the last bottom and the overdraw has not the backward component of movement which tends to cause the tip seam to run off toward the heel of the last. The turning of the grippers preparatory to the overdrawing movement carries the rear ends of the jaws inwardly, as will be evident from a comparison of Figs. 3 and 4, and causes a tightening of the portion of upper held by the rear ends of the jaws relatively to the portion at or nearer to the tip seam. It will be understood that the foredrawing mechanism drafts the upper forwardly on the last, as contemplated by prior inventions, and that the new direction of overdrawing carries the upper inwardly over the last bottom without counteracting the effect of the foredraw by dragging the upper backward.

The operation of the machine has been sufficiently set forth in connection with the foregoing description to make it clear.

Having explained the nature of the invention and described a preferred embodiment thereof, I claim as new and desire to secure by Letters Patent of the United States:—

1. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and means by which to effect turning movement of a side gripper, while it holds the upper, about an axis extending in substantially the direction of the pulling strain.

2. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and means by which to impart to the side grippers, while they hold the upper, turning movements to change the position of the jaws from approximate parallelism with the respective sides of the last into approximate parallelism with the median line of the last.

3. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the

grippers and the last for straining the upper about the last and for actuating the grippers to draw the upper over the last bottom; and means for turning the grippers, while they hold the upper and prior to the overdraw, about axes substantially perpendicular to the plane of the shoe bottom.

4. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and means for actuating the side grippers, while they hold the upper, to carry the rear ends of the gripping jaws and the portions of stock held thereby on both sides of the last inwardly relatively to the front ends of the jaws.

5. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers to effect overdrawing of the upper, gripper guides for controlling the direction of overdrawing movement; and means for adjusting said guides angularly in the same direction toward the center line of the last to vary alike for both side grippers the direction of the overdrawing movement.

6. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers to effect overdrawing of the upper, gripper guides normally extending obliquely to the median line of the machine for controlling the direction of the overdrawing movement; and means for adjusting said guides automatically after the grippers have seized the stock and before the termination of the overdraw.

7. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers to effect overdrawing of the upper, gripper guides which position the gripper jaws angularly and relatively to the edge of the last for seizing the upper; means operating as a part of the normal operation of the machine for turning the guides to position the grippers more nearly parallel with one another after the upper has been seized, and means for actuating the grippers along the guides so positioned for effecting the overdrawing of the upper.

8. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers to effect overdrawing of the upper; and means permitting angular positions of

the grippers with their jaws parallel to the diverging right and left sides of the last for seizing the upper and operating after the upper has been seized to cause the grippers to move parallel with the toe tip seam in overdrawing the upper.

9. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers to effect overdrawing of the upper; and mechanism for controlling the angular position of the gripper jaws operating to locate the jaws parallel to the sides of the last for gripping and to turn them into right angular relation to the tip seam for overdrawing.

10. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers to effect overdrawing of the upper; and controlling mechanism operating to locate the jaws of the grippers parallel to the diverging sides of the last for gripping and to cause the grippers to move in a direction squarely across the last bottom in overdrawing.

11. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers to effect overdrawing of the upper; and controlling mechanism operating to locate the jaws of the grippers parallel to the diverging sides of the last for gripping, to turn the grippers in the direction to tighten the upper held by their rear ends inwardly over the last edge, and to direct overdrawing movement squarely across the last bottom at right angles to the median line of the last.

12. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and mechanism attached to one lateral edge of each side gripper and arranged for operation to turn the grippers.

13. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and mechanism attached to one lateral edge of each side gripper and operating automatically in time relation to the updrawing movement to twist as well as to strain upwardly the upper.

14. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining

the upper about the last; and mechanism for causing each side gripper to strain more the portions of upper held by the rear ends of each pair of gripper jaws than the portions held by the front ends of that pair.

15. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for actuating the grippers inwardly over the last bottom to overdraw the upper; and means operating automatically to cause a greater overdrawing strain on the portion of upper which is held by the rear ends of the gripper jaws and extends about the ball of the last than the overdrawing strain on the portion of upper which is held by the front ends of the jaws and extends across the last at or near the toe tip seam location.

16. A pulling over machine having, in combination, grippers located normal to the opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and mechanism by which overdrawing of the upper is effected in lines normal to the median line of the last without special attention from the operator.

17. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and mechanism which can be adjusted to effect overdrawing of the upper in lines normal to the median line of the last or inclined more or less in either direction relatively thereto and automatic operating means for said mechanism.

18. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; mechanism which can be adjusted to change the angular relation of the grippers to bring them into upper receiving positions parallel with the sides of differently shaped lasts, and operating means turning the grippers to effect overdrawing movement at an oblique angle to the sides of the last and automatically returning the grippers to normal angular shoe receiving position.

19. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and mechanism operating automatically to turn the side grippers from one angular relation to the median line of the machine to another relation and back again during each pulling over operation.

20. A pulling over machine having, in combination, grippers located on opposite

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- sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and mechanism including a driver, an equalizer, and connections from the equalizer to opposed side grippers arranged for turning the side grippers.
21. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and mechanism including a driver operating in time relation to the upper straining movement and connections from the driver to the side grippers to turn them, said mechanism having provision for adjustment to vary said time relation.
22. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for effecting foredrawing of the upper; and mechanism by which overdrawing of the upper is effected in lines substantially normal to the median line of the last.
23. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for effecting foredrawing of the upper; and guides operating to turn the grippers from upper receiving positions oblique to the median line of the last and direct overdrawing movement in lines substantially normal to the said median line.
24. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last, means for effecting foredrawing of the upper, means for moving the side grippers respectively in opposite directions for straightening toe tip seams; and mechanism connected with said side grippers to change their angular relation to the median line of the last between the gripping and the overdrawing of the upper and having an equalizer to permit the tip straightening movement of the grippers.
25. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; a guide for each gripper slidingly connected therewith and having an abutting face for engagement with the gripper, and means for actuating the guide to turn the gripper through said connection and abutting engagement.
26. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; a guide for each gripper slidingly connected with the rear lateral edge or rear end of the gripper, an abutting face arranged for engagement with the gripper at the inner side of said connection, means for yieldingly holding the gripper against said abutting face, and means for operating the guide to turn the gripper against the pressure of said yielding holding means.
27. A pulling over machine having, in combination, grippers located on opposite sides of the last, means for relatively moving the grippers and the last for straining the upper about the last; and means for turning the side grippers, while they hold the upper under strain, about axes located forward of their rear ends whereby the rear ends are caused to draw the upper from the shank forwardly and inwardly over the shoulder of the last edge that is located where the shank joins the ball of the last.
28. A pulling over machine having, in combination, grippers arranged to engage the upper at opposite sides of the last and actuating and controlling mechanism therefor operated and arranged to cause the grippers to stand with their jaws approximately parallel with the side edge of the last when they grip the upper and in their overdraw movement be approximately parallel with and move in a direction approximately perpendicular to the median line of the last.
29. A pulling over machine having in combination, side gripper jaws that have a closing, an updrawing and an overdrawing movement and that while closing are approximately parallel with the portion of upper that they grip, and means to adjust both pairs of side gripper jaws together so that in their overdraw movement they shall be approximately parallel with and shall move in a direction approximately perpendicular to, the median line of the last.
30. A pulling over machine having, in combination, side grippers, means for closing and for updrawing the grippers, means operating automatically for foredrawing the grippers, and means for effecting overdraw movement of the grippers in directions approximately perpendicular to the median line of the last.
31. A pulling over machine having, in combination, side grippers, means for closing and for updrawing the grippers, means for foredrawing the grippers, and means for turning each side gripper on an axis extending substantially in the direction of upward strain effected by that gripper.
32. A pulling over machine having, in combination, side grippers, means for closing and for updrawing the grippers, means for turning each side gripper on an axis extending substantially in the direction of

upward strain effected by that gripper, and means for effecting overdrawing movements of the grippers.

5 33. A pulling over machine having, in combination, side grippers, means for closing and updrawing the grippers, and means acting on the grippers which can be caused to effect overdrawing of the marginal edge of the upper on both sides of the last in 10 directions inclined forwardly on the shoe bottom.

15 34. A pulling over machine having, in combination, side grippers, means for closing and updrawing the grippers, means for overdrawing the grippers, means for turning the grippers after they have seized the upper, and means for returning the grippers to upper seizing position, said machine having provision for adjusting the angular 20 position to which the side grippers are restored to suit the inclination of the side edge of the last to the median line of the last.

25 35. A pulling over machine having, in combination, side grippers, means for closing and updrawing the grippers, means for overdrawing the grippers, and means connected with both side grippers and arranged for adjustment to change simultaneously and in the same direction either forwardly 30 or backwardly the angular relation of both side grippers to the median line of the last.

35 36. A pulling over machine having, in combination, side grippers, means for closing and updrawing the grippers, means for overdrawing the grippers, and means connecting the two side grippers and including

an equalizing connection which governs the angular relation of the grippers to the median line of the last and permits the side grippers to adjust themselves unsymmetrically for lasts, the inner and outer sides of which are inclined unequally to the median 40 line of the last.

45 37. A pulling over machine having, in combination, side grippers, means for closing and updrawing the grippers, means for overdrawing the grippers, and mountings for said side grippers permitting them to turn to aline the jaws with the diverging side edges of the last and connecting the 50 opposite side grippers to cause one gripper to turn reversely to the other.

55 38. A pulling-over machine having, in combination, shoe resting means, grippers located on opposite sides of the last, and operating means effecting relative movements of the grippers and the last and arranged to cause the upper to be pulled with the jaws approximately parallel to the adjacent portions of the sides of the last and 60 to be automatically drafted forwardly relatively to lines extending perpendicular to said adjacent side portions of the last and to be laid down upon the last bottom under such forward draft. 65

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR BATES.

Witnesses:

FREDERICK WILLIAM WORTH,
CLAUD RENNION.