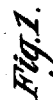


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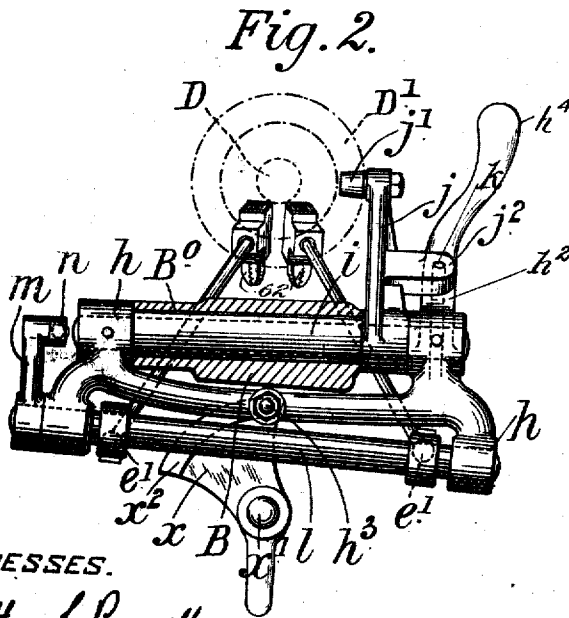
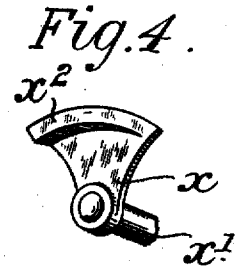
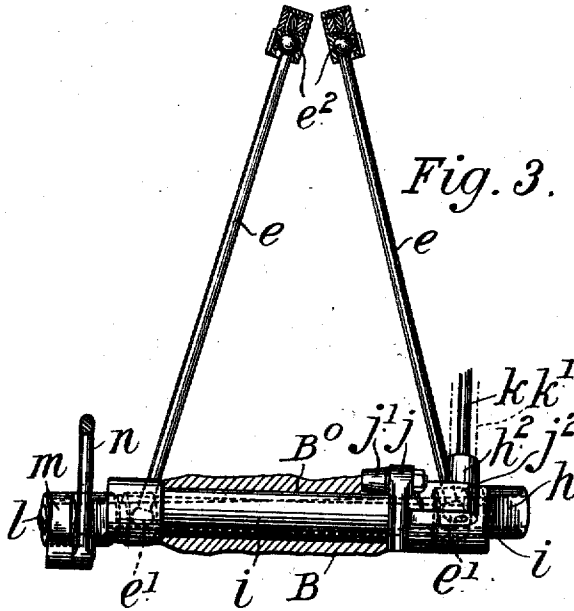


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1,006,821.

Patented Oct. 24, 1911.
3 SHEETS—SHEET 2.



WITNESSES.

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PULLING OVER MACHINE.
APPLICATION FILED MAY 9, 1904.

1,006,821

Patented Oct. 24, 1911.
3 SHEETS—SHEET 3.

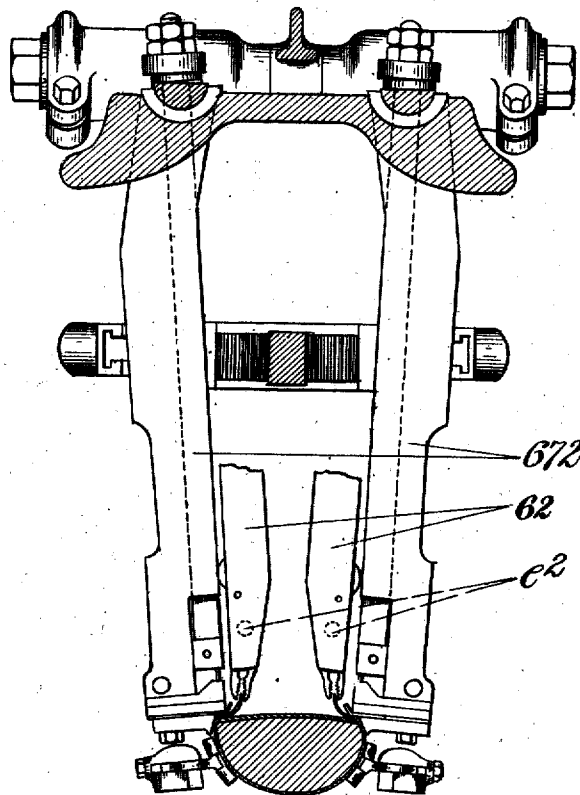


Fig. 5.

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UNITED STATES PATENT OFFICE.

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PULLING-OVER MACHINE.

1,006,821.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Original application filed February 23, 1904, Serial No. 194,875. Divided and this application filed May 9, 1904. Serial No. 207,108.

To all whom it may concern:

Be it known that I, ARTHUR BATES, a subject of the King of England, residing at Leicester, in the county of Leicester, England, have invented certain Improvements in or Relating to 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 pulling-over machines and particularly to machines of the type shown in United States Letters Patent No. 663,777, granted December 11, 1900, on application of Ronald F. McFeely.

The object of the invention is to secure more satisfactory positioning and fitting of uppers on lasts, especially of uppers which are not formed initially to fit dead to the last, but which are formed to have what is commonly termed "spring", this spring necessitating a drafting or stretching of the upper material longitudinally of the last to secure a proper fitting of the upper to the last. This formation of the upper with spring is generally customary in British boot manufacture. To this end I have provided a machine of the type shown in the Letters Patent above mentioned with means for moving the side grippers longitudinally of the last after they have grasped the upper, in addition to the usual means with which the machine is equipped for moving the grippers upwardly. By thus imparting to the upper a forward pull or foredraw as well as an upward pull or updraw, I am enabled to pull forwardly toward the toe a portion of the excessive slack material thrown by the spring formation into the upper at the waist of the last, thus securing a better distribution of material and a smoother and better fit of the upper to the last.

I have described and claimed this invention broadly in my pending application Serial No. 194,875, filed February 23, 1904, from which this present application is a division.

An important feature of the present invention consists in providing means for effecting a movement of the grippers longitudinally of the last, which is independent of the updraw movement. It has been found that the best results are obtained by effecting the foredraw movement prior to the upper being drawn tightly into contact with the last by the side grippers, that is to say, during the first portion only of the updrawing movement of the grippers. The means for effecting the foredraw movement of the grippers is therefore arranged, according to the present invention, so that this movement is independent of the updraw movement, both in the time at which it takes place and also in the extent to which it is effected.

Preferably, and as herein shown, the means for effecting the foredraw movement of the grippers is automatically actuated, and means under the control of the workman is provided for rendering the actuating mechanism operative or inoperative, as well as for varying the extent of the foredraw movement produced. Provision is also made for manually actuating the grippers to produce foredraw of the upper.

A convenient form of mechanism according to this invention for effecting the foredraw movement of the side grippers comprises a reciprocating frame or support connected by links with the side grippers. A connection, which is preferably yielding, is provided between the frame or support and an actuator, which may be some moving part of the machine such as a cam on the driving shaft.

In the preferred embodiment of this invention the means for effecting the foredraw movement of the grippers is associated with mechanism for adjusting the upper upon the last in, or approximately in, the plane of the inner sole of the shoe. This mechanism is usually termed the "tip straightening" mechanism and is actuated for moving one side gripper in one direction while the other side gripper is moved in the opposite direction. As herein shown, the tip straighten-

ing mechanism is sustained in the frame or support in such manner as to be unaffected by the movements of the frame for imparting foredraw to the upper, but so that it can be actuated independently for straightening the shoe tip. To this end the frame or support may conveniently carry a shaft located at the axis of movement of the frame and capable of being turned through a part of a revolution. The shaft acts through links extended from its opposite sides to the side grippers for moving the grippers in opposite directions to adjust the shoe tip upon the last.

Other features of the invention, including certain details of construction and combinations of parts, will be hereinafter described and pointed out in the claims.

Figure 1 is a side elevation of a portion of the head of a pulling-over machine embodying the present invention. Fig. 2 is a rear elevation, partly in section, of certain portions of the machine detached, the plane of section being indicated by the dotted line 2-2. Fig. 3 is a plan view of the parts shown in Fig. 2, the plane being indicated by the dotted line 3-3 in Fig. 1. Fig. 4 is a detail view of the manually controlled device for determining the extent of the foredraw movement. Fig. 5 is a vertical sectional view looking from the front of the machine.

The head B of the machine supports a main driving shaft D provided with cams by which the several automatic mechanisms are operated. The cam X^{30} acts through suitable connecting devices 134, 141, and 143 for yieldingly actuating levers 154. The levers are fulcrumed at 152 and are pivotally connected near their front ends at 156 to the operating bars of the grippers 62. The movements of the levers 154 tend to move the grippers in the direction of their lengths for effecting the updraw of the upper for straining it about the last. Thereafter the grippers are moved inwardly over the last by springs, not shown, to lay the upper over the inner-sole in order that it may be secured thereto for holding it in the position to which it has been pulled. The securing of the upper is effected by tack driving mechanisms mounted on arms 672 one of which is associated with each pair of grippers. One of the tack driving mechanisms is shown in side elevation and indicated at 600 in Fig. 1. These parts of the machine may be all substantially as fully shown and described in said Letters Patent No. 663,777.

In the embodiment herein shown of the present invention a frame or support h is secured to and oscillates with a shaft i turning in a bearing B^o in the head B of the machine. An arm j loosely mounted upon the shaft i is provided at its upper extremity with a bowl j' which engages in a cam-

groove of the cam D' keyed on the main shaft D. A lug j^2 extending from the arm j carries a rod or spindle k which passes through a hole k' in a projecting part h^2 of the oscillating frame h . A spring k' surrounds the rod or spindle k and is held in compression between a hand-wheel k^2 screwed upon the threaded end of the rod or spindle k and the projecting part h^2 .

The projections j^2 and h^2 are normally held against one another by the spring k' , the degree of compression of which can be adjusted as desired by the wheel k^2 . This spring connection will prevent undue stressing of the upper and allow the parts j^2 and h^2 to separate before damage is done to the work being operated upon.

As heretofore suggested, means may be provided for manually actuating the grippers to produce foredraw of the upper instead of producing said foredraw automatically or, it may be, for giving to said grippers foredraw movement in addition to that automatically imparted to them. A convenient means for manually producing foredraw consists in a handle h^4 applied to or extended from the part h^4 of the frame into convenient position to be engaged by the operator.

The oscillating frame or support h carries a shaft l which is capable, (for a purpose hereinafter to be described), of independent partial rotary motion, and the shaft has connected to it, by ball and socket joints e' , the ends of two links e , the links being connected to the shaft on opposite sides of its axial line, the other ends of the said links e being connected by other ball and socket joints e^2 with the side grippers 62. In order that the ends of the links e that are in the ball and socket joints e' may, despite their connection with opposite sides of the shaft l , be equidistant from the axis of the shaft i about which they are oscillated to impart the foredraw motion to the grippers, the shaft l is inclined in relation to the shaft i . To enable the shaft l to be partially rotated when desired an arm or lever m is secured upon one end of the said shaft and is connected by a link n with an arm o of another lever, centered upon the head B of the machine, the other extremity of the lever terminating in an operating handle 292.

In the operation of the machine the arm j is oscillated by the cam D' about the shaft i , as aforesaid. In its movement toward the left in Fig. 1 there is applied a thrust by way of the projection j^2 , rod k , wheel k^2 , and spring k' to the projection h^2 of the frame h , thereby moving that frame toward the right, and by the links e moving each gripper 62 in the same direction to impart the foredraw, this motion being imparted through the spring k' as described. The frame h , links e and grippers 62 can yield

under control of the spring k' should the resistance offered by the work to the foredrawing operation exceed the force applied to it through the spring in the reverse direction.

5 The spring may, if desired, be so adjusted by means of the nut k^2 as to vary the time when the movement of the arm j will become effective for moving the frame or support h and thereby causing the foredraw movement of the grippers to begin. In the
10 return movement of the arm j , that is to say, movement toward the right in Fig. 1, the projections j^2 and h^2 come into contact with one another and this insures the return
15 of the grippers 62 to their normal starting position after each foredraw, which in this arrangement may be imparted either subsequently to or simultaneously with the updraw or prior to the updraw, this depending
20 upon the setting of the cam D' with relation to the cam of the usual updraw mechanism, also operated by the shaft D . The adjustment of the upper upon the last, or "tip
25 straightening", in this construction is effected by partially rotating the shaft l about its own axis by means of the handle 292 so that one side gripper (by its link e connecting it with one side of the shaft l)
30 is moved outwardly or away from the frame, while simultaneously the other side gripper is moved in the opposite direction or toward the frame by its own link e connected
35 with the other side of the shaft l ; thus the two grippers cooperate to move the toe of the upper around the last. According to the direction in which the handle 292 is
40 operated the shaft l will be turned in one or the other direction, this having the effect of causing the grippers to straighten the toe toward one side of the last or the other. To
45 vary the extent of the foredraw movement of the grippers or to discontinue entirely the foredraw movement, if so desired, a segment x fixed on a shaft x' can be provided, the shaft being supported in bearings in the
50 main frame of the machine and being adapted to be rotated either by a hand lever upon it or by connection with a pedal. The segment x with its shaft, shown separately in
55 Fig. 4, has an inclined or wedge-shaped projection x^2 formed upon its face, so that by partially rotating the segment x some part of the incline will be brought into position to oppose the movement of the frame or support
60 h , an adjustable bearing-screw h^3 being screwed through the frame to afford a suitable bearing surface. According to the height of the part of the incline rotated into position opposite the screw h^3 so will the
65 movement of the frame or support h be more or less restricted, the projection h^2 on the frame h being thereby separated for a corresponding distance from the projection j^2 on the lever j which operates it, the said projection j^2 , which has a constant range of

movement, being thus made operative upon the projection h^2 through varying degrees of the range of the former. When the highest part of the incline is brought opposite to the screw h^3 any movement of the frame or support will be entirely prevented.

It will be understood that the segment with its inclined projection moves the side grippers together in the same direction
75 lengthwise of the last when the segment is turned in the direction to bring a higher portion of the inclination into contact with the stop screw h^3 . The segment acts for this purpose through the frame h and the connecting rods e , e and against the tension of
80 the spring k' which moves the grippers forwardly when the segment is reversely turned. The segment and the devices cooperating with it may obviously be employed to adjust the side grippers either before the grippers engage the upper or after
85 the upper is gripped and pulled. If the grippers are moved by the segment and its associated parts while they are in engagement with the upper they will effect an adjustment of the upper either forwardly or
90 backwardly upon the last depending upon the direction in which the segment is turned. This adjustment may be desirable, for example, to position the upper longitudinally
95 of the last to straighten a bowed or curved toe tip seam or to seat the upper against the instep of the last. If adjustment of the upper longitudinally around the last is required this will be effected by manipulating
100 the hand lever 292 for turning the shaft l by which the grippers are moved together in opposite directions.

It will, of course, be understood that this invention is not limited to the embodiment
105 thereof described and shown in this specification, but that the invention may be embodied in many different mechanical forms and is broad enough to cover any means by which the grippers can be actuated to impart
110 to the upper a foredraw which is independent of the updraw.

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

1. In a machine for pulling uppers over a last, the combination with grippers for
115 engaging the upper at opposite sides of the last and automatically operating means for relatively moving said grippers and last to impart updraw to the upper, of independent means for actuating said grippers to
120 impart foredraw to the upper.

2. In a machine for pulling uppers over a last, the combination with grippers for
125 engaging the upper at opposite sides of the last and automatically operating means for relatively moving said grippers and last to impart updraw to the upper, of means for moving the grippers longitudinally of the
130

last during a portion of the updraw movement.

3. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper at opposite sides of the last and means for relatively moving said grippers and last to impart updraw to the upper, of automatic means for actuating the grippers to impart foredraw to the upper during a desired portion of the updraw.

4. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper at opposite sides of the last and means for relatively moving said grippers and last to impart updraw to the upper, of automatic means comprising a yielding element for actuating the grippers to impart foredraw to the upper, and means under the control of the operator for limiting the movement imparted by said actuating means.

5. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper at opposite sides of the last and means for relatively moving said grippers and last to strain the upper against and about the last, of means operating automatically for relatively moving said grippers and last for straining the upper forwardly on the last before it is drawn tightly against the last.

6. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper at opposite sides of the last and means for relatively moving said grippers and last to impart updraw to the upper, of automatic means for actuating said grippers to impart foredraw to the upper and means under the control of the operator for rendering said automatic means operative or inoperative.

7. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper at opposite sides of the last, and means for relatively moving said grippers and last to impart updraw to the upper, of automatic means for actuating said grippers to impart foredraw to the upper, and means under the control of the operator for varying the extent of the foredraw.

8. In a machine of the class described, the combination with grippers for engaging an upper at the sides of a last and means for relatively moving the grippers and the last to impart updraw to the upper, of an automatically operating actuator and connections between said actuator and the grippers by which said grippers may be moved together in the same direction longitudinally of the last independently of their movement for updrawing the upper.

9. In a machine of the class described, the combination with grippers for engaging the upper at the side of the last, of auto-

matic means for actuating said grippers in a direction longitudinal of the last, and adjustable means for limiting the extent of said last-mentioned movement.

10. In a machine of the class described, the combination with a pair of grippers for engaging the upper at the side of the last and means for relatively moving the grippers and the last to impart updraw to the upper, of a movable frame, connections between said frame and the grippers, and an automatically operating actuator for said frame, whereby a movement may be imparted to the grippers in a direction longitudinal of the last to effect foredraw of the upper.

11. In a machine of the class described, the combination with a pair of grippers for engaging the upper at the side of the last and means for relatively moving the grippers and the last to impart updraw to the upper, of a movable frame, a link connection between the frame and the grippers, automatic means for actuating the frame, and adjustable means for engaging the frame to limit the movement imparted thereby to the grippers.

12. In a machine of the class described, the combination with a pair of grippers for engaging the upper at the side of the last and means for relatively moving the grippers and last to impart updraw to the upper, of a movable frame, a link connection between the frame and the grippers, and automatic means for actuating the frame, said actuating means including a cam and a connection between the cam and the frame whereby the grippers may be moved longitudinally of the last to impart foredraw to the upper, and adjustable means for engaging the frame to limit the movement imparted to the grippers.

13. In a machine of the class described, the combination with a plurality of pairs of grippers for engaging the upper at opposite sides of the last, of means for automatically moving the grippers together longitudinally of the last to impart foredraw to the upper, said means having provision for moving the grippers also in opposite directions to move the upper around the last longitudinally.

14. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper, of means for lifting the grippers to impart updraw to the upper, means for moving the grippers forwardly to impart foredraw to the upper, and means under the control of the operator for rendering said last-mentioned means operative or inoperative.

15. In a machine for pulling uppers over a last, the combination with side grippers, of a frame, a member rotatable in the frame, means connecting the opposite side grippers to said member upon opposite sides of

its axis of rotation, means whereby said member may be actuated to move the grippers in opposite directions for shifting the upper around the last longitudinally, and means for actuating the frame to move the grippers in the same direction.

16. In a machine for pulling uppers over a last, the combination with a plurality of pairs of side grippers, of a frame, a member rotatable in the frame, means connecting opposite pairs of side grippers to said member upon opposite sides of its axis of rotation, means whereby said member may be actuated to move the grippers in opposite directions for shifting the upper around the last longitudinally, and automatic means for actuating the frame yieldingly to move said grippers in the same direction for imparting foredraw to the upper.

17. In a machine of the class described, the combination with a plurality of pairs of grippers for engaging the upper at opposite sides of the last, of a movable frame, means for actuating said frame, and connections between said frame and the pairs of grippers whereby they are moved longitudinally of the last to impart foredraw to the upper, said connections having provision to permit the pairs of grippers to be actuated manually in opposite directions for moving the upper around the last longitudinally.

18. In a machine of the class described, the combination with a plurality of pairs of grippers for engaging the upper at opposite sides of the last, of a movable frame, means for actuating said frame, and connections between said frame and the pairs of grippers whereby they are moved longitudinally of the last to impart foredraw to the upper, said connections comprising an independently movable oscillatory member and means connecting the opposite pairs of grippers to said member upon opposite sides of its axis of oscillation, and means whereby said member may be moved to actuate the grippers in opposite directions for moving the upper around the last longitudinally.

19. In a machine of the class described, the combination with a plurality of pairs of grippers for engaging the upper at opposite sides of the last, of a shaft, links connecting opposite grippers with opposite sides of said shaft, a lever, and connections between the lever and the shaft by which the grippers may be moved in opposite directions for shifting the upper about the last.

20. In a machine of the class described, the combination with a plurality of pairs of grippers for engaging the upper at opposite sides of the last, of a driven shaft and connections intermediate the shaft and the grippers for automatically moving the grippers in a direction longitudinal of the last.

21. In a machine of the class described, the combination with a plurality of pairs of

grippers for engaging the upper at opposite sides of the last, of means for moving the grippers in a direction longitudinal of the last, said means including a cam, a lever, a yielding connection between the cam and the lever, and unyielding connections between the lever and said grippers whereby the grippers are yieldingly actuated both through the same distance.

22. In a machine of the class described, the combination with grippers for engaging the upper at the sides of the last and means for relatively moving the grippers and the last to impart updraw to the upper, of means for automatically moving the grippers longitudinally of the last to impart foredraw to the upper, said machine also having provision for manually moving the grippers longitudinally of the last.

23. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper at the side of the last, and means for actuating the grippers for updrawing the upper, of an automatically operated actuator, and connections between said actuator and the grippers for moving the grippers longitudinally of the last.

24. In a machine of the class described, the combination with a pair of grippers for engaging an upper at the side of a last, of a movable frame, connections between said frame and the grippers, and automatic means for actuating the frame to impart movement to the grippers lengthwise of the last for effecting foredraw of the upper.

25. In a machine for pulling uppers over a last, the combination with a pair of grippers for engaging the upper at the side of the last, of automatic means for moving the grippers to impart updraw to the upper, and independent means operating automatically for actuating the grippers longitudinally of the last.

26. In a machine for pulling an upper over a last, the combination with a plurality of pairs of grippers for engaging the upper at opposite sides of the last, of means for actuating the grippers to pull the upper forwardly simultaneously at the opposite sides of the shoe, and automatic means for actuating the grippers to pull the upper upwardly at opposite sides of the shoe.

27. A machine for pulling an upper over a last, comprising a plurality of pairs of grippers for engaging the upper at opposite sides of the last, means for actuating the grippers forwardly to strain the upper lengthwise of the last simultaneously at opposite sides of the shoe, independent means for actuating the grippers to strain the upper upwardly, and means for securing the upper.

28. In a machine for pulling an upper over a last, the combination with grippers arranged to engage the upper at opposite

sides of the ball of the last, and grippers for engaging the upper at the toe of the last, of means for actuating said side grippers to strain the upper lengthwise of the last from the heel end toward the toe end, means for actuating the toe grippers to pull the upper, and independent means to actuate the side grippers to pull the upper upwardly.

29. In a machine for pulling an upper over a last, the combination with grippers arranged to engage the upper at opposite sides of the ball of the last, of means for actuating said grippers to stretch the upper lengthwise along the sides of the last from the heel end forwardly, means for actuating the grippers to pull the upper upwardly, and means for securing the upper while it is in a longitudinally stretched condition along the sides of the last.

30. In a machine of the class described, the combination with grippers for engaging the upper at the side of the last, of automatic means for actuating the grippers to pull the upper about the last, and means whereby said grippers may be actuated longitudinally of the last in the same direction or in opposite directions to adjust the upper upon the last.

31. In a machine for pulling an upper over a last, the combination with grippers for engaging the upper, of means for lifting the grippers to impart updraw to the upper, and yielding means for moving the grippers forwardly to impart foredraw to the upper.

32. In a machine for pulling an upper over a last, the combination with grippers for engaging an upper at opposite sides of a last, of mechanism for automatically moving said side grippers together in the same direction lengthwise of the last, said machine having provision for also manually actuating the side grippers together in the same direction and also in opposite directions for adjusting the upper lengthwise upon the last.

33. In a machine for pulling an upper over a last, the combination with a plurality of pairs of grippers for engaging an upper at opposite sides of a last, of a frame to which the grippers are connected, means to move the frame and the grippers for adjusting the upper upon the last, and means to move the grippers with relation to the frame for further positioning the upper upon the last.

34. In a machine of the class described, the combination with grippers for engaging an upper at opposite sides of a last, of manually controlled means for actuating the grippers to strain the upper forwardly with relation to the last, and means for securing the upper while it is under lengthwise strain.

35. In a machine of the class described, the combination with grippers for engaging an upper at opposite sides of a last, of automatically operated means to actuate the grippers and last relatively for straining the upper forwardly upon the last, manually controlled means to move the grippers and last relatively lengthwise of the last, and means for securing the upper while it is under lengthwise strain.

36. In a machine of the class described, the combination with grippers for engaging an upper at opposite sides of a last, of automatically operating means to actuate the grippers for stretching the upper forwardly with relation to the last, manually controlled means for relatively adjusting the actuating means and the grippers to vary the extent to which the upper is stretched, and means for securing the upper while it is in a stretched condition.

37. A machine of the class described having, in combination, grippers for engaging the upper at the toe of the shoe, side grippers for engaging the upper at the ball of the shoe, and actuating mechanism operatively connected with the toe and side grippers, and a single manually actuated device for moving the side grippers together, said machine being constructed and arranged to permit free movement of the upper between the ball and the heel end of the last.

38. A pulling-over machine, having, in combination, grippers for pulling an upper, means for resting a last, means for actuating the grippers, and means for adjustably limiting the length of the movement of the grippers.

39. A pulling-over machine, having, in combination, grippers for pulling an upper; a last rest; automatically operating means for yieldingly effecting movement of the grippers, comprising the cam D', the yielding lever mechanism j, h, k, k', and the connecting rods e, e'; and the adjustable stop a' to limit the automatically effected movement of the grippers.

40. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a rest for the last, means for actuating the grippers to pull the upper, power driven mechanism for moving the grippers lengthwise of the shoe, and means adapted to render said mechanism ineffective.

41. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a rest for the last, means for actuating the grippers and last rest relatively to pull the upper, power driven mechanism for moving the grippers lengthwise of the shoe, and means for controlling the extent of the lengthwise movement of the grippers.

42. A pulling-over machine, having, in combination, grippers to engage an upper at opposite sides of a last, means to actuate the grippers to pull the upper, and means to actuate the grippers to impart foredraw to the upper, said means including an angularly movable member, means to actuate it, and separate connections from the opposite sides of the center of movement of that member to the side grippers arranged to allow movement of the side grippers relatively to one another.

43. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a last rest, means for actuating the grippers and said last rest relatively to pull the upper, automatic means for actuating the grippers and the last relatively to draft an upper forwardly on the two sides on the shoe, and manual means for longitudinally moving the grippers relatively to one another to adjust the draft on one side relatively to that on the other side of the shoe.

44. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a last rest for the last, means for actuating the grippers and last rest relatively to pull the upper, said machine having provision for yieldingly actuating the grippers lengthwise of the shoe to impart foredraw to the upper.

45. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a rest for the last, means for actuating the grippers and last rest relatively to pull the upper, and means including a yielding element by which the grippers may be actuated to impart foredraw to the upper.

46. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a rest for the last, means for actuating the grippers and last rest relatively to pull the upper, and means including a yielding element for automatically actuating the side grippers forwardly to strain the sides of the upper between the grippers and the heel end of the last.

47. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a rest for the last, means for actuating the grippers and last rest relatively to pull the upper, and means including a yielding element for automatically actuating the side grippers forwardly to strain the sides of the upper between the grippers and the heel end of the last, said machine having provision for further manual movement of the grippers forwardly after their automatically effected movement.

48. A pulling-over machine, having, in combination, grippers for engaging an upper at opposite sides of a last, a rest for the last,

means for actuating the grippers and last rest relatively to pull the upper, said machine having provision for yieldingly actuating the grippers lengthwise of the shoe to impart foredraw to the upper, and means for adjustably limiting said yieldingly effected foredrawing movement.

49. A pulling-over machine having, in combination, grippers to engage the upper at opposite sides of the last, a last rest, means for relatively actuating the last rest and the grippers to apply updraw to the upper, automatic means for relatively moving the grippers and rest lengthwise of the last to impart foredraw to the upper and come to rest to permit inspection of the shoe, said machine having provision for manual actuation of both side grippers together longitudinally of the shoe to increase or diminish the forward drafting of the upper.

50. A pulling-over machine having, in combination, means for gripping an upper at the toe and opposite sides of the ball, means for adjusting the upper on the last, means for advancing the side grippers and the adjusting means to effect foredraw, and means to actuate the grippers to effect updraw.

51. A pulling-over machine having, in combination, side grippers, a cam shaft, a transmitter, a foredraw shaft connected with the side grippers, and yielding connections from the transmitter to the shaft to effect foredrawing of the upper.

52. A pulling-over machine having, in combination, side grippers, a cam shaft, a transmitter, a foredraw shaft connected with the side grippers, and adjustable connections from the transmitter to the shaft to effect variable foredrawing of the upper.

53. A pulling-over machine having, in combination, side grippers, tip straightening mechanism therefor substantially as described, and means for moving the side grippers at the two sides of the last longitudinally of the last together in the same direction.

54. A pulling-over machine having, in combination, grippers for seizing the upper at opposite sides of the last, means adapted for manual operation to impart initial foredraw to the upper, and power operated means for imparting additional foredraw to the upper.

55. A pulling-over machine having, in combination, means for gripping an upper at the toe and opposite sides of the ball, means for adjusting the upper on the last, means for advancing the side grippers and the adjusting means to effect foredraw, and means to actuate the grippers to effect updraw.

56. A pulling-over machine having, in combination, side grippers and tip straight-

ening mechanism arranged to adjust the side grippers simultaneously in opposite directions lengthwise of the shoe, means for adjusting the side grippers together in the same direction lengthwise of the shoe, and power connections for effecting further lengthwise movement of said grippers.

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

ARTHUR BATES.

Witnesses:

GRACE HOLMES,

ARTHUR ERNEST JERRAM.