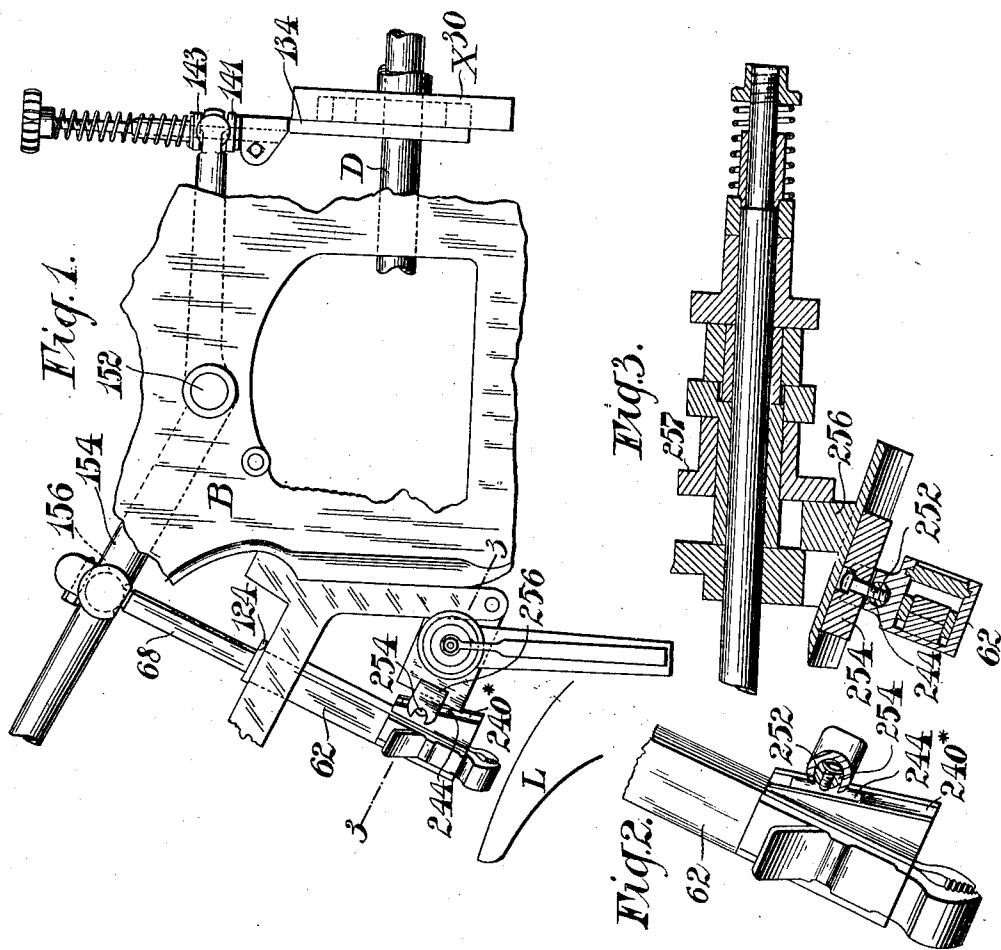


A. BATES.
PULLING OVER MACHINE.
APPLICATION FILED FEB. 23, 1904.

1,006,456.

Patented Oct. 24, 1911.

5 SHEETS-SHEET 1.



WITNESSES.
Elizabeth C. Cope
Edith C. Hallbrook

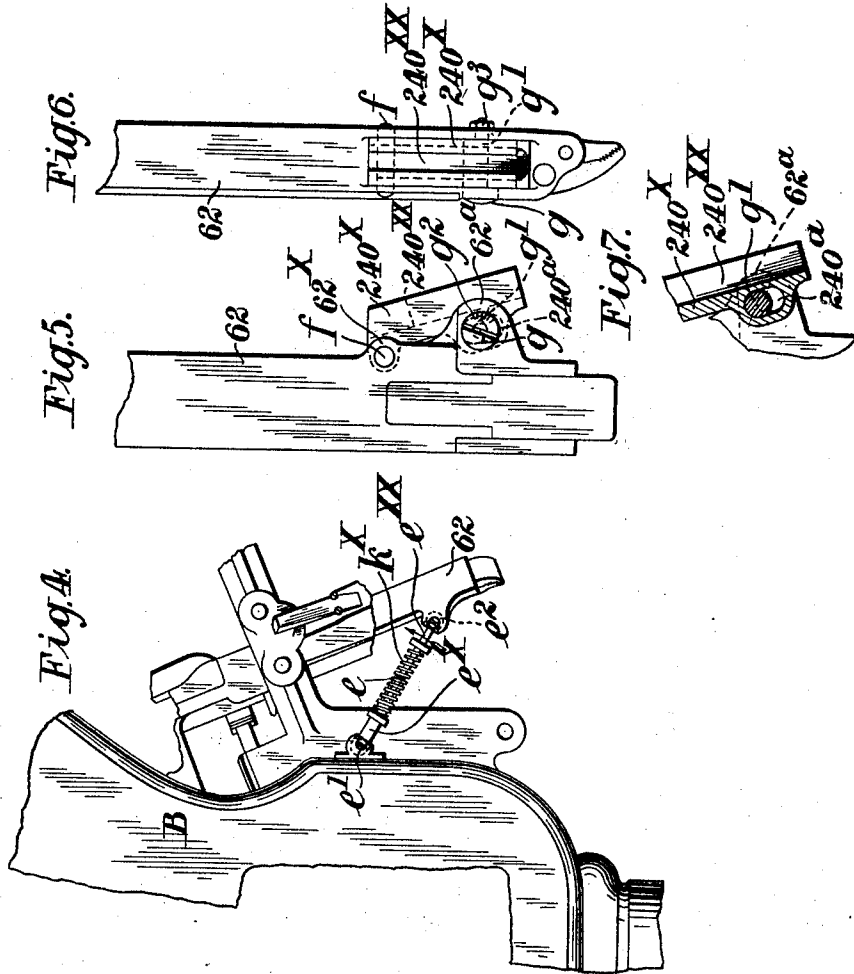
INVENTOR.
Arthur Bates
By his Attorney,
Nelson W. Howard

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5 SHEETS—SHEET 2.



WITNESSES.
Elizabeth C. Cope
Edith C. Holbrook.

INVENTOR.
Arthur Bates
By his Attorney,
Nelson W. Howard

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5 SHEETS—SHEET 3.

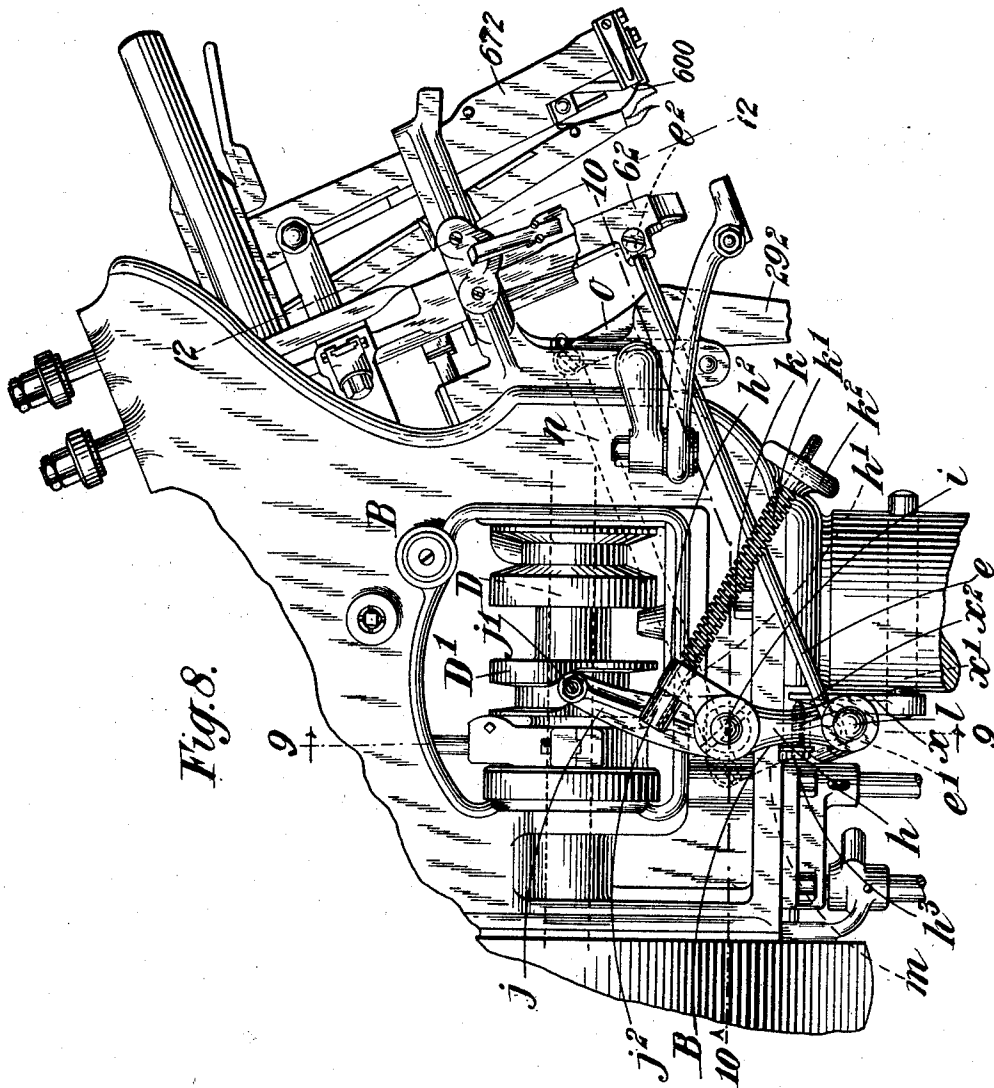


Fig. 8.

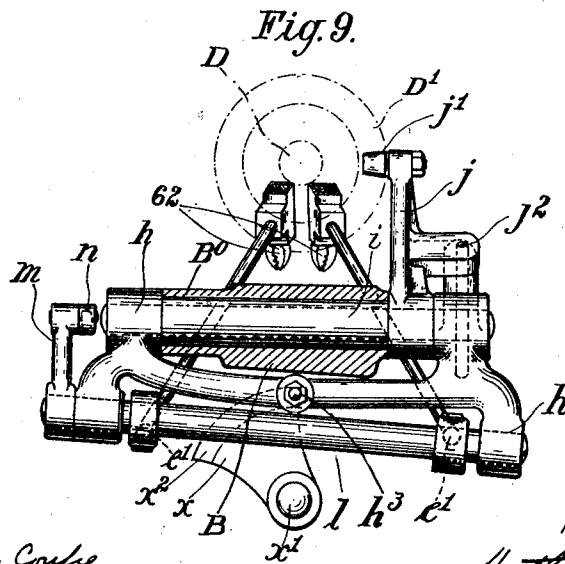
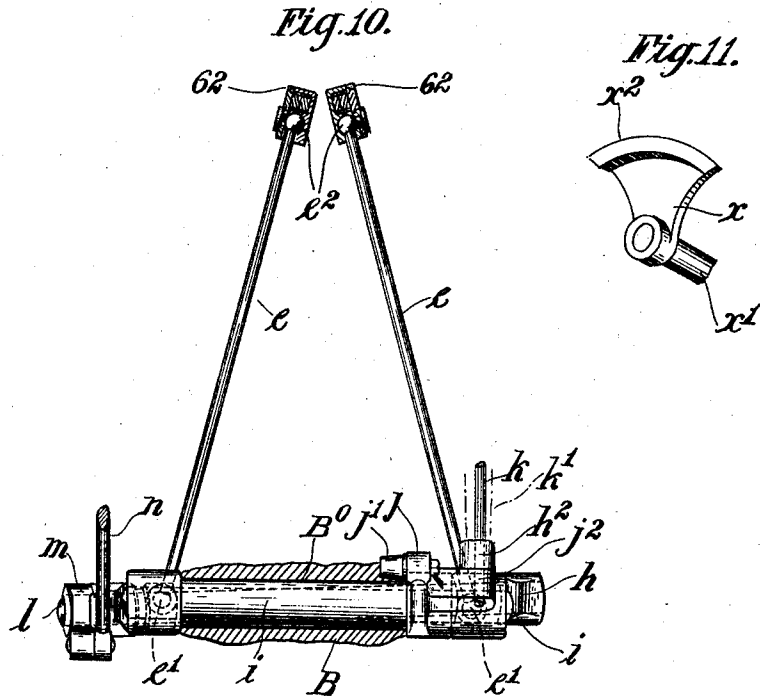
WITNESSES.
Eligabete C. Coupe
Edith C. Holbrook

INVENTOR.
Arthur Bates
By his Attorney,
Nelson W. Howard

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5 SHEETS—SHEET 4.



WITNESSES.
Elizabeth C. Couper
Edith C. Hallbrook

INVENTOR.
Arthur Bates
By his Attorney,
Nelson Howard

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5 SHEETS—SHEET 5.

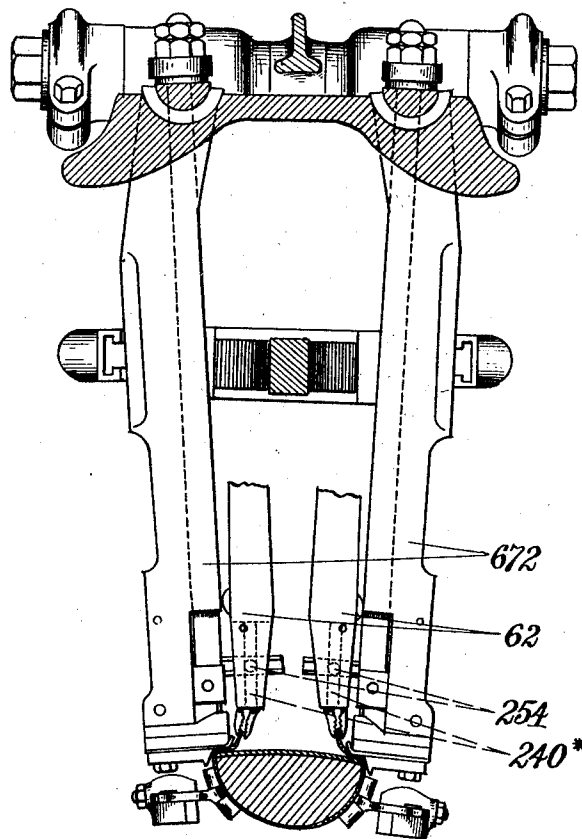


Fig. 12.

WITNESSES.

N. L. Smith
H. S. Smith.

INVENTOR.

Arthur Bates
By his Attorney
Nelson H. Howard

UNITED STATES PATENT OFFICE.

ARTHUR BATES, OF LEICESTER, ENGLAND, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PULLING-OVER MACHINE.

1,006,456.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Application filed February 23, 1904. Serial No. 194,875.

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, Eng-
land, have invented certain new and useful Improvements in or Relating to Pulling-Over Machines, of which the following is a specification.

This invention relates to pulling-over or like machines, its object being the improvement of, for example, such a pulling-over machine as is described in the specification of Letters Patent of the United States No. 663,777, issued December 11, 1900, on the application of Ronald F. McFeely, with the object of securing more satisfactory positioning and fitting of the uppers on their lasts, especially when the machine is operating on uppers not formed initially to fit dead to the last, but which are formed initially to have what is commonly termed "spring", this spring necessitating a drafting or stretching of the material in a direction longitudinally of the last to secure a proper fitting of the upper thereto. This formation of the uppers with spring is generally customary in British boot manufacture.

In the pulling-over machine above referred to by way of example there are in addition to the toe gripper, two side grippers for engaging opposite sides of an upper placed on the last, and yielding means by which the relative position of the last and grippers is changed to effect the updraw and means for securing the upper after it has been pulled.

According to this invention a side-gripper has combined therewith devices which will automatically cause the gripper to move in such a direction in relation to the last as to impart, for the purpose of dealing with the "spring", both foredraw and updraw to a part or to certain parts of the upper. Where two or more side-grippers are employed it is part of the present invention to combine therewith either hand-operated or power-operated mechanism which moves either manually or automatically different grippers simultaneously in like or in different degrees to impart for the purpose described like or different degrees of foredraw movement, prior to or at the same time as

or subsequently to the updraw, to certain parts of the upper.

The extent of the foredraw movement imparted to the side-gripper or side-grippers in relation to the last according to this invention may be variable. The means for obtaining the foredraw may also include a yielding device which will yield under excessive stress and prevent any damage being done to the work being operated upon. To enable that part of the mechanism which effects the foredraw to be put into or out of operation when desired a control device may be combined with the mechanism and operated by means such for example as a hand lever or pedal, or otherwise.

The present invention comprises also the combination in a pulling-over or like machine, with a last, a side gripper and means by which the relative position of the last and gripper is changed to effect the updraw, of a sliding or other guiding device which, while the updraw is taking place, constrains the gripper to have a positive motion in the direction of the length of the last. The said sliding or guiding device imparts a foredraw movement, which is additional to and simultaneous with the updraw movement, to the part of the upper gripped by the gripper, for the purpose of so pulling upon a portion of the excessive slack upper material thrown by the spring formation into the waist of the last that it is removed and carried forward toward the toe, thus securing a better distribution of the material and a cleaner and better fit of the upper to the last. The foredrawing movements of the grippers also stretch the upper longitudinally more or less. The tacking mechanisms at the opposite sides of the shoe secure the upper while it is in this stretched condition.

The sliding or guiding device may be so fixed relatively to the gripper that only one range of movement lengthwise of the last is obtained for a given amount of updraw movement thereof or it may be in adjustable connection with the gripper by which means the extent of movement of the gripper lengthwise of the last in relation to the extent of the updraw may be varied as desired, or even reduced to zero in which latter instance the sliding or guiding device

will be out of action or neutralized so as not to produce any foredraw.

Another convenient form of mechanism according to this invention for effecting the foredraw movement of the side gripper for the purpose hereinbefore described may consist of a frame or support reciprocated upon bearings in the main frame of the machine and connected by a link with a side gripper. To operate the side gripper to effect the foredraw movement this frame or support is reciprocated automatically or by hand, its link conveying the motion to the side gripper whereby the upper is given foredraw as before described. The gripper will be moved in the direction of the length of the last by the reciprocation of the frame or support and it can be arranged to act either subsequently to or simultaneously with or prior to the updrawing according to the timing of the oscillations of the reciprocating frame relatively to the timing of the operations of the parts of the machine by which the updraw is effected.

In a pulling-over machine in which as heretofore an adjusting mechanism is employed for adjusting the upper upon the last in or approximately in the plane of the sole thereof which mechanism is usually termed the "tip straightening" mechanism and whereby one of the side grippers can be moved in one direction while the other side gripper is moved in the opposite direction a movement can be advantageously given to the support carrying the said mechanism, which movement will so operate the side grippers that they will be moved in a direction lengthwise of the last to impart the foredraw to certain parts of the upper as hereinbefore described, this foredraw device being arranged to act yieldingly when so desired in order to avoid damage to the work being operated upon. In such a combined tip straightening and foredraw mechanism the reciprocating frame or support may for example carry a shaft or member capable of being partially rotated thereon by hand. The shaft or member has connected to it at opposite sides of its axis of rotation links extending from and connected with the side grippers so that by rotating the shaft or member the side grippers will be moved in opposite directions to effect the usual tip-straightening adjustment of the upper upon the last. In such a tip-straightening and foredraw mechanism that part thereof by which the foredraw is effected can be put into or out of operation and can also have the extent of its foredrawing movement varied by a control device such for instance as is hereinafter described with reference to Figs. 8, 9 and 10.

That feature of my invention which includes effecting the foredraw movement independently of the updraw movement is not

herein specifically claimed as it forms the subject-matter of a divisional application, Serial No. 207,108, filed May 9, 1904.

In the accompanying drawings which illustrate examples of constructions in which this invention is carried into practical effect:—Figure 1 is a side elevation of part of a pulling-over machine modified according to the present invention, being a portion of Fig. 3 of the drawings of said Letters Patent No. 663,777 altered to comprise one of the combinations of devices according to the present invention. Fig. 2 is a part of Fig. 1 drawn to a larger scale and with a portion shown in section. Fig. 3 is a section on the line 3—3 of Fig. 1 drawn to a larger scale than that of Fig. 1 and indicating that the devices by which engagement is obtained between the improved gripper and the device over which it slides according to the present invention are the same as the parts that in the aforesaid prior Letters Patent are correspondingly numbered; Fig. 4 is a side view, similar to Fig. 1 to illustrate a modified arrangement of the means whereby the foredraw motion is imparted to the gripper; Figs. 5 and 6 are views at right angles to one another of the lower part of a gripper similar to that shown in Fig. 1 but with one element of the means by which the foredraw motion is imparted made so as to be adjustable to vary the extent of the foredraw motion; Fig. 7 is an enlarged section of a part of Fig. 5. Figs. 8, 9 and 10 are respectively a side view, a vertical section (on line 9—9 of Fig. 8) and a plan (on line 10—10 of Fig. 8) of part of the head of a pulling-over machine to illustrate a further alternative arrangement in which the tip-straightening mechanism is movable bodily in order that the foredraw may be effected by that movement. Fig. 11 is a perspective of a detail of Figs. 8, 9 and 10 hereinafter specifically described. Fig. 12 is a vertical sectional view looking from the front of the machine, as from line 12 in Fig. 1 or Fig. 8.

Like letters of reference indicate like parts in all the drawings, as do like numerals.

Referring first to Figs. 1, 2 and 3 the framework B, (except that those portions of it which constitute guides for the gripper bar members 62 have a little extra clearance in relation to the grippers in order to enable the gripper to move laterally far enough to give foredraw) the lever 154 pivoted on a pin 152 in that framework, the shaft D, the cam X³⁰ and the parts 134, 141, 143, 156, 68, 124, 62 together with the tacking mechanisms, including the arms 672 and tack blocks 600 located at each side of the machine for securing the upper in the position to which it is pulled by the grippers are of the same construction as the parts correspondingly numbered in the specifica-

tion of the aforesaid prior Letters Patent, as also are the parts 257, 256, 254, 252, and 244, the part 62 being acted upon as in the said Letters Patent by the lever 154 so as to tend to move it in the direction of its own length; but according to the present invention there is a guide or groove 240^{*} in the gripper bar member 62 which unlike the groove 240 of the prior Letters Patent aforesaid is not parallel to the direction in which the gripper would move to effect the updraw alone but is inclined thereto, that is to say in the present example it is at an angle to the axis of the gripper with its lower end farther from the gripper bar member than the upper end and is in or approximately in the plane in which the gripper is required to swing in effecting the foredraw. Consequently as the member 62 is raised to cause the gripper to effect the updraw it will be simultaneously caused by the interaction of the slide 244, which for the time being is intended to be kept stationary with regard to the framework B, with the inclined guide or groove 240^{*} to have a component of motion in the direction of the toe of the last L, that is, toward the toe gripper to effect the foredraw, said last being held up by the hand of the operator or by the action of the machine against last-supporters or supported by a jack as may be desired. If foredraw is at any time not desired the support 256 upon which the slide 244 is mounted may, instead of being kept stationary be allowed to recede under the influence of the thrust applied to it by the guide 240^{*} during the updraw; the slide 244 under such circumstances will no longer interact with the guide 240^{*} and thus goes out of action with respect to foredraw.

Although in the example illustrated in Figs. 1, 2 and 3 the inclined groove is on the gripper and the device in relation to which it has motion is virtually on the main framework of the machine, the converse of this arrangement might be adopted so that a gripper having a projection stationary upon it engaged with an inclined groove on the stationary framework for the purpose of the obtainment of foredraw simultaneously with updraw would be within the present invention. Various other mechanical arrangements may be devised within the scope of this invention for producing foredraw movement of the grippers either during the relative movement of the last and grippers for pulling the upper about the last or prior to or subsequent to such pulling movement.

Although in the example above described the slide 244, being already present in a known type of machine can very conveniently be utilized to coöperate for the purposes of the present invention with the inclined guide or groove upon the gripper bar member, any device which will cause a grip-

per by reason of its updraw movement relatively to a stationary framework such as B to receive simultaneously with such updraw a foredraw movement is within the present invention.

According to the modification illustrated in Fig. 4 of the drawings, the foredraw movement of the side gripper is obtained by a link *e* connecting the gripper bar member 62 with a point on the framework B of the machine, so placed that as the gripper is moved upward by the updraw mechanism the lower end of the link *e* connected with the gripper cannot do otherwise than move in the direction of the arrow adjacent to it whereby the gripper is constrained to move outward from the framework B toward the toe of the last to effect the foredraw. The link *e* is connected with the framework B and gripper bar member 62 by ball and socket joints *e'*, *e''* respectively to permit angular movement of the link in relation to the gripper bar member 62 and the framework B not only in the foredraw and updraw but also in the usual overdraw movement. To render the gripper capable of yielding, the link *e* is made in two parts *e^x* and *e^{xx}* telescopically arranged. The two parts are held in their extended position by a spring *k^x* which will yield when subjected to undue stress.

In the arrangement shown in Figs. 1 and 2 the amount of foredraw given to the side-gripper depends on the degree of inclination of the guide or groove 240^{*} and the range of updraw movement of said side gripper. In the construction illustrated in Fig. 4 the amount of foredraw depends on the length of the link *e* and the angle it makes with the parts 62 and B when the gripper is at say, the lowest limit of its vertical travel, except as it may be modified by yielding of the spring *k^x*.

In the arrangement shown in Figs. 5, 6 and 7 a foredraw movement of the side gripper is obtained the extent of which can be varied relatively to the updraw according to requirements. The guide 240^{*} provided with the slot or groove 240^{xx} instead of being rigidly secured to the gripper bar member 62 as described with reference to Fig. 1, is in this case hinged to that member. A pivot pin *f* passes through an opening in the upper part of the guide 240^{*} and through other openings in lugs 62^x projecting from the member 62. In the lower part of the guide 240^{*} is a slot 240^a in which an eccentric part *g'* (see Fig. 7) of a control bolt *g* is located, the bolt being centered in lugs 62^a forming part of the gripper bar member 62. By turning the bolt *g* in the lug 62^a the eccentric portion *g'* engaging the slot 240^a will cause the guide 240^{*} to assume a desired angle so that the gripper will be moved a greater or a lesser distance toward the toe

of the last upon its next upward movement. The part g' of the control bolt g may if desired, be given a degree of eccentricity greater than that which it possesses in Fig. 7 and sufficient to enable it to move the guide 240 $\times$ into parallelism with the length of the gripper bar member 62. The control bolt g may thus serve to put into or out of action with respect to foredraw the portion 240 $\times$ of the mechanism which is adapted to give the foredraw motion to the gripper, for when the guide 240 $\times$ is thereby put parallel with the length of the gripper in which case it will be parallel with the direction in which updraw occurs, the updraw will not bring about foredraw also. The head of the bolt g can be provided as shown with a scale g^2 a corresponding mark being arranged upon one of the lugs 62 a so as to afford an indicator for showing the amount of inclination to which the guide 240 $\times$ is adjusted, a fixing nut g^3 being employed to secure the bolt g when it has been rotated sufficiently for the amount of foredraw required. Like degrees of foredraw movement or different degrees of foredraw movement may be imparted to different grippers where two or more of them are employed according to this invention to effect foredraw. For instance, where two or more grippers are each provided with the adjustable guide 240 $\times$ of Figs. 5, 6 and 7 the guide-ways if adjusted to different angles by their bolts g will receive different amounts of foredraw movement if each receives the same amount of updraw movement; by such devices the grippers receive different degrees of foredraw movement which are variable.

The alternative arrangement represented in Figs. 8, 9 and 10, shows a "tip-straightening" mechanism which is arranged to effect foredraw also, according to this invention. A frame or support h is secured to, and oscillates with a shaft i turning in a bearing B^o in the framework 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 of the machine. A lug j^2 extending from the arm j carries a rod or spindle k which passes through a hole h' 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. 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 gripper bar members 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 framework B of the machine, the other extremity of the lever terminating in an operating handle 292.

In the operation of the machine constructed according to these Figs. 8, 9 and 10, the arm j is oscillated by the cam D' about the shaft i as aforesaid. In its movement toward the left of an observer of Fig. 8 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 in the direction of the right hand of an observer of that figure and by the links e moving each gripper bar member 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 gripper bar members 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. In the return movement of the arm j , that is to say movement toward the right of an observer of Fig. 8, projections j^2 and h^2 come into contact with one another and this insures the return of the gripper bar members 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 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-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) 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 with the other side of the shaft *l*; thus the two grippers coöperate to move the toe of the upper around the last. According to the direction in which the handle 292 is 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 vary the extent of the foredraw movement of the gripper bar member 62 or to render that member entirely inoperative in respect to foredraw, if so desired, a segment *x* fixed on a shaft *x'* can be provided, the shaft being supported in bearings in the 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* shown, with its shaft in Fig. 11 separate from the machine has an inclined or wedge-shaped projection *x²* 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 *h*, an adjustable bearing-screw *h³* 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 *h³* so will the movement of the frame or support *h* be more or less restricted, the projection *h²* on the frame *h* being thereby separated for a corresponding distance from the projection *j²* on the lever *j* which operates it, the said projection *j²* which has a constant range of movement being thus made operative upon the projection *h²* through varying degrees of the range of the former. When the highest part of the incline is brought opposite to the screw *h³* any movement of the frame or support will be entirely prevented.

It will of course be understood that this invention is not limited to the embodiments thereof herein described and shown but that the invention may be embodied in other constructions and is broad enough to cover any means by which the grippers can be actuated to impart to the upper a foredraw movement. Mechanism for moving the grippers forwardly to impart foredraw independently of the updraw, an example of which is shown in Figs. 8 to 11, is not herein claimed but is claimed in the divisional application before mentioned.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a machine for pulling uppers over a last, the combination with means for engaging the upper, of devices for actuating said engaging means to strain the upper upwardly, said machine having provision for automatically imparting a forward movement to the grippers during the upward straining of the upper.

2. In a machine for pulling uppers over

a last, the combination with means for engaging the upper, of automatic actuating means therefor, comprising devices for causing said engaging means to impart to the upper at the side of the shoe a strain both upwardly and forwardly relatively to the last.

3. In a machine for pulling uppers over a last, the combination with means for engaging the upper, of means for relatively moving the grippers and last to impart updraw to the upper, and other means adapted for automatic operation to move the grippers forwardly to impart foredraw to the upper.

4. In a machine for pulling uppers over a last, the combination with means for engaging the upper, of operatively connected devices for simultaneously lifting the grippers and moving them forwardly to strain the upper obliquely upwardly and forwardly.

5. 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 and adjustable means for automatically moving the grippers forwardly to impart foredraw to the upper.

6. 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, said means having provision for automatically moving the grippers forwardly through variable distances to impart foredraw to the upper.

7. 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 automatic means for lifting said grippers to strain the upper about the last, and means for moving said grippers longitudinally of the last to strain the upper toward the end of the last.

8. 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 devices for automatically actuating the grippers in a direction perpendicular to the last bottom and also longitudinally of the last bottom, whereby the upper is strained obliquely about the last.

9. 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 devices for automatically actuating said pairs of grippers to impart foredraw as well as updraw to the upper.

10. 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 relatively moving the last and grippers to strain the upper about the last, and means constructed and arranged to insure movement

of the side grippers together longitudinally of the last as an incident to their first-mentioned movement for straining the upper, whereby the upper is drawn forwardly as it is strained about the last.

11. In a pulling-over machine, the combination with means for engaging the upper at the side of the last, of means for lifting the engaging means, and guiding means for causing said engaging means to move in a direction longitudinal of the last while it is being lifted.

12. 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 lifting said grippers to strain the upper about the last, and means for moving said grippers together to strain the upper at the opposite sides of the last toward the end of the last, said last-mentioned means having provision for moving the grippers at opposite sides of the last forwardly through different distances.

13. In a machine for pulling uppers over a last, the combination with means for engaging the upper, of means for lifting the engaging means to strain the upper about the last, and means intermediate said engaging means and a fixed part of the machine for automatically actuating the engaging means forwardly as it is lifted.

14. In a machine for pulling uppers over a last, the combination with means for engaging the upper, of means for lifting the engaging means to strain the upper about the last, and adjustable means for controlling the path of movement of said engaging means as it is lifted.

15. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper near the toe of the last, grippers for engaging the upper at the side of the last, and connected means for moving the several grippers and the last relatively to strain the upper about the last, of means for moving the side grippers toward the toe grippers to impart foredraw to the portions of upper acted upon by the said side grippers.

16. In a machine for pulling uppers over a last, the combination with grippers for engaging the upper near the toe of the last, grippers for engaging the upper at the side of the last, and means for lifting said grippers to strain the upper about the last, of means arranged to be adjusted into and out of operative position for moving the side grippers toward the toe grippers to impart foredraw to the upper.

17. In a machine of the class described, the combination with grippers for manipulating an upper over a last and means for actuating the grippers, of other means for

automatically actuating the grippers to impart foredraw to the upper.

18. In a machine of the class described, the combination with grippers and mechanism for actuating the grippers to strain an upper and draw it over a last, of automatic means for actuating the grippers to impart foredraw to the upper during said overdraw movement.

19. A pulling-over machine, having, in combination, a vertically movable gripper to pull an upper at the side of a last, an inclined guideway formed on one side of the gripper, and a guiding device coöperating therewith to move the gripper forwardly and backwardly as it is moved vertically.

20. In a machine of the class described, the combination with means for engaging an upper at opposite sides of a last, of means for actuating the engaging means to strain the upper forwardly upon the last, and means for securing the upper, said machine having provision for holding the upper under lengthwise strain while it is being secured.

21. In a machine of the class described, the combination with means for engaging an upper at opposite sides of a last, of means for automatically actuating the engaging means to strain the upper forwardly upon the last, and means for securing the upper while it is under lengthwise strain.

22. In a machine of the class described, the combination with means for engaging an upper at opposite sides of an inverted last, of means for actuating the engaging means to strain the upper forwardly and upwardly with relation to the last, and means for securing the upper while it is under such strain.

23. In a machine of the class described, the combination with means for engaging an upper at opposite sides of a last, of means for actuating the engaging means to strain the upper forwardly upon the last, means for relatively moving the last and engaging means to adjust the upper about the last, and means for securing the upper.

24. In a machine of the class described, means for engaging an upper at opposite sides of a last, and means for actuating the engaging means at the two sides of the last together in the same direction lengthwise of the last to strain the upper forwardly upon the last, said machine also having provision for moving the engaging means at the two sides of the shoe simultaneously in opposite directions lengthwise of the last.

25. 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 mechanism for automatically moving said side grippers together in the same direction

lengthwise of the last, said machine having provision for also moving said grippers manually at the two sides of the shoe simultaneously in opposite directions to adjust the upper lengthwise around the last.

26. In a machine of the class described, the combination with grippers arranged to engage an upper at the opposite sides of the ball of a last, means for actuating the grippers to stretch the upper longitudinally, and means for securing the upper while it is in a stretched condition.

27. In a machine of the class described, the combination with grippers for engaging an upper at opposite sides of a last, of means for automatically actuating the grippers to strain the upper forwardly upon the last, said means being constructed and arranged to impart a variable movement to the grippers, and means for securing the upper while it is under lengthwise strain.

28. In a machine of the class described, the combination with means for engaging and pulling an upper at opposite sides of a last, said means being constructed and arranged for movement to permit of adjusting the upper longitudinally about the last, of means for actuating the engaging means to stretch the upper forwardly upon the last, and means for securing the upper while it is in a forwardly stretched condition.

29. In a machine of the class described, the combination with means for engaging and pulling an upper at opposite sides of a last, said means being constructed and arranged for movement to permit of adjusting the upper about the last, of means for actuating the engaging means to strain the upper lengthwise of the last.

30. In a machine of the class described, the combination with grippers arranged at opposite sides of the shoe and adapted for movement to stretch, foredraw, and over-

draw the upper, of automatic means for actuating the grippers.

31. A pulling-over machine, having, in combination, grippers for engaging the upper at the sides of the last, automatic closing and lifting mechanism therefor, and actuating mechanism adapted to be rendered operative or inoperative to impart to the side grippers a movement lengthwise of the last while they are moving to updraw the upper.

32. A pulling-over machine having, in combination, side grippers, tip straightening mechanism arranged to adjust the side gripper simultaneously in opposite directions lengthwise of the shoe, and power actuating mechanism for said grippers to move them together in the same direction lengthwise of the shoe.

33. A pulling-over machine having, in combination, means for gripping, initially straightening and finally stretching an upper; and means for automatically actuating the grippers to draw the upper forwardly at the two sides of the shoe after the initial straightening operation.

34. A pulling-over machine having, in combination, side grippers; tip straightening mechanism including a hand lever, gripper guide blocks, and oppositely arranged connections to the guiding blocks for adjusting the side grippers in opposite directions; a power shaft; and connections from said blocks to the shaft for moving the blocks and grippers together in the same direction lengthwise of the shoe.

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

ARTHUR BATES.

Witnesses:

ARTHUR E. JETRAM,
JOHN R. LAW.