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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED JUNE 17, 1910.

1,068,839. Patented July 29, 1913.

3 SHEETS—SHEET 1.

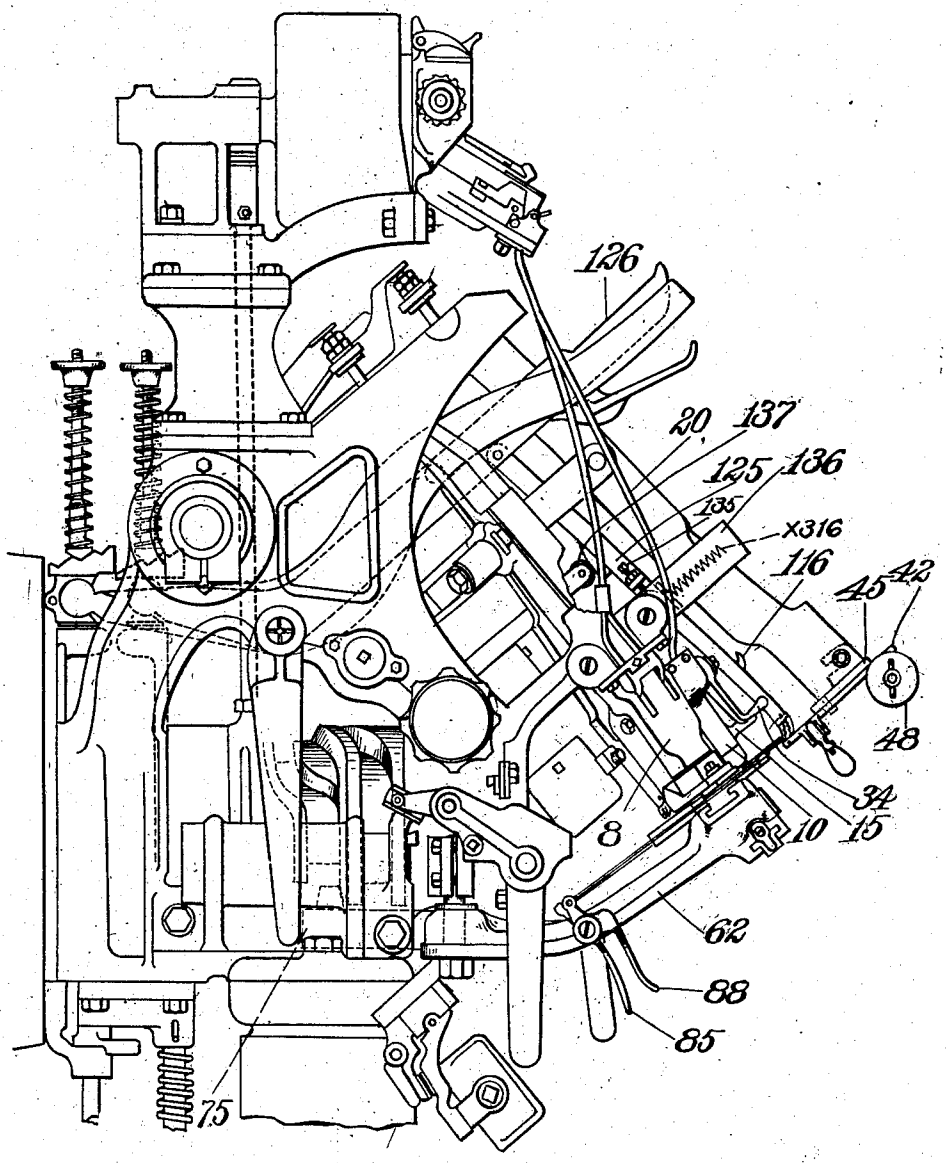


Fig. 1.

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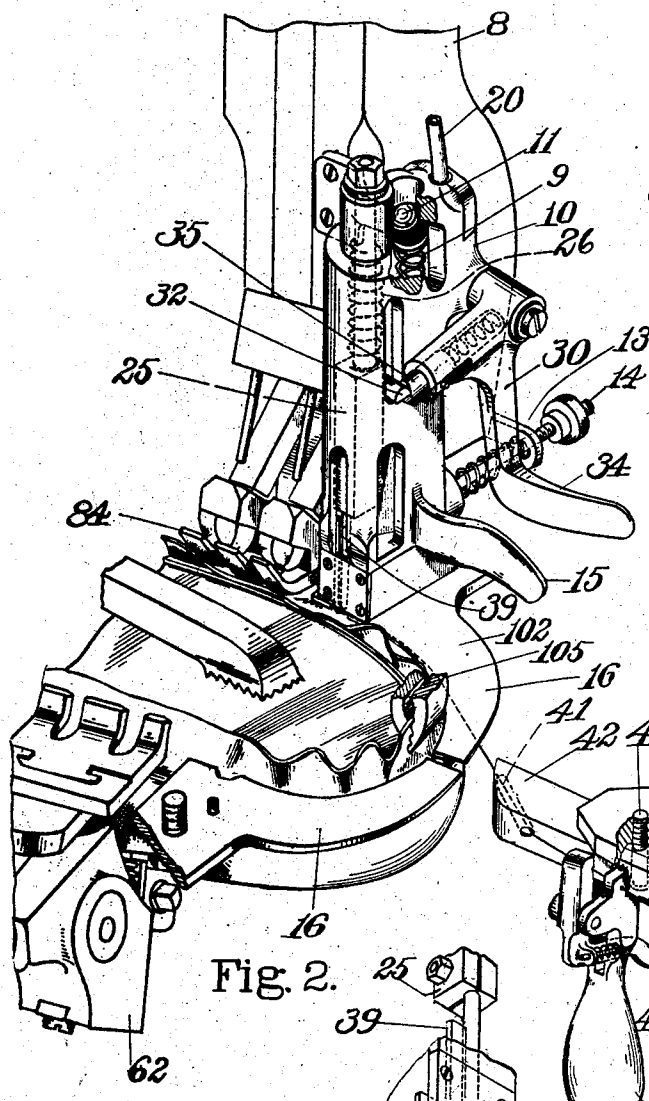


Fig. 2.

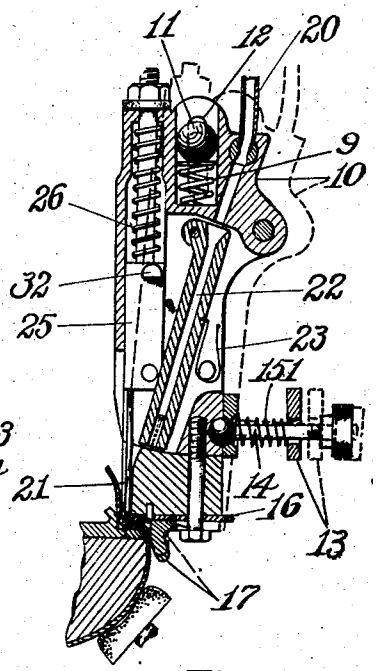
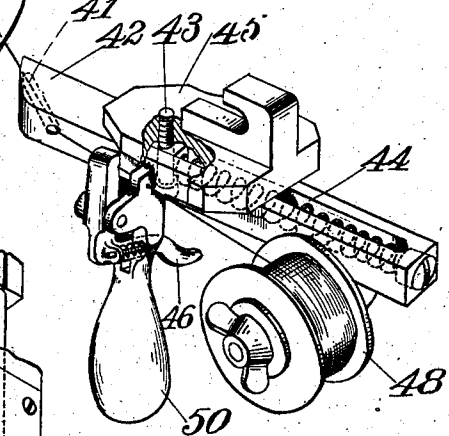


Fig. 3.



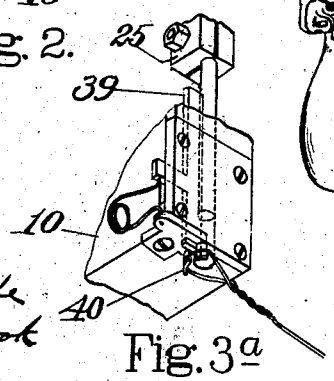


Fig. 3a

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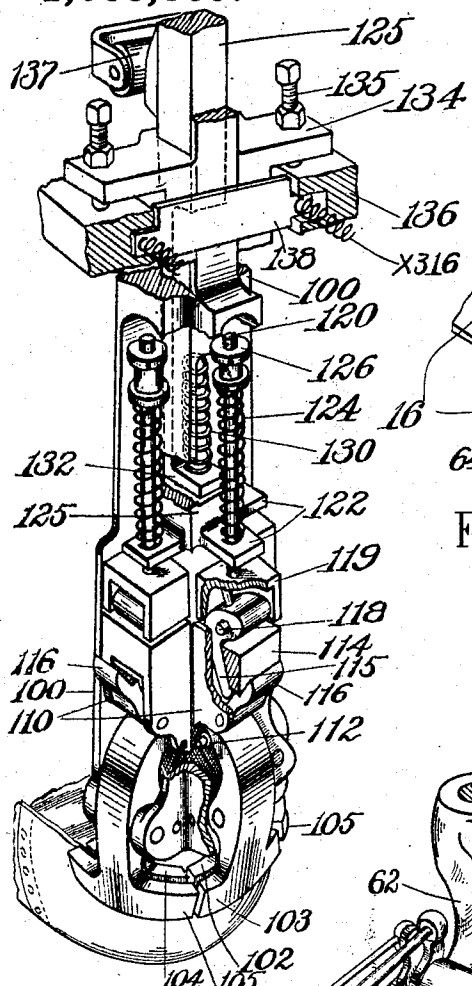


Fig. 6.

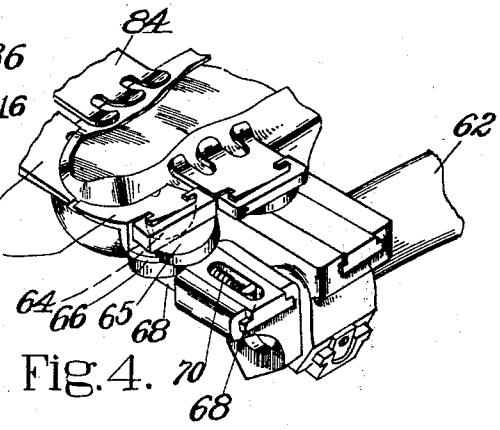


Fig. 4.

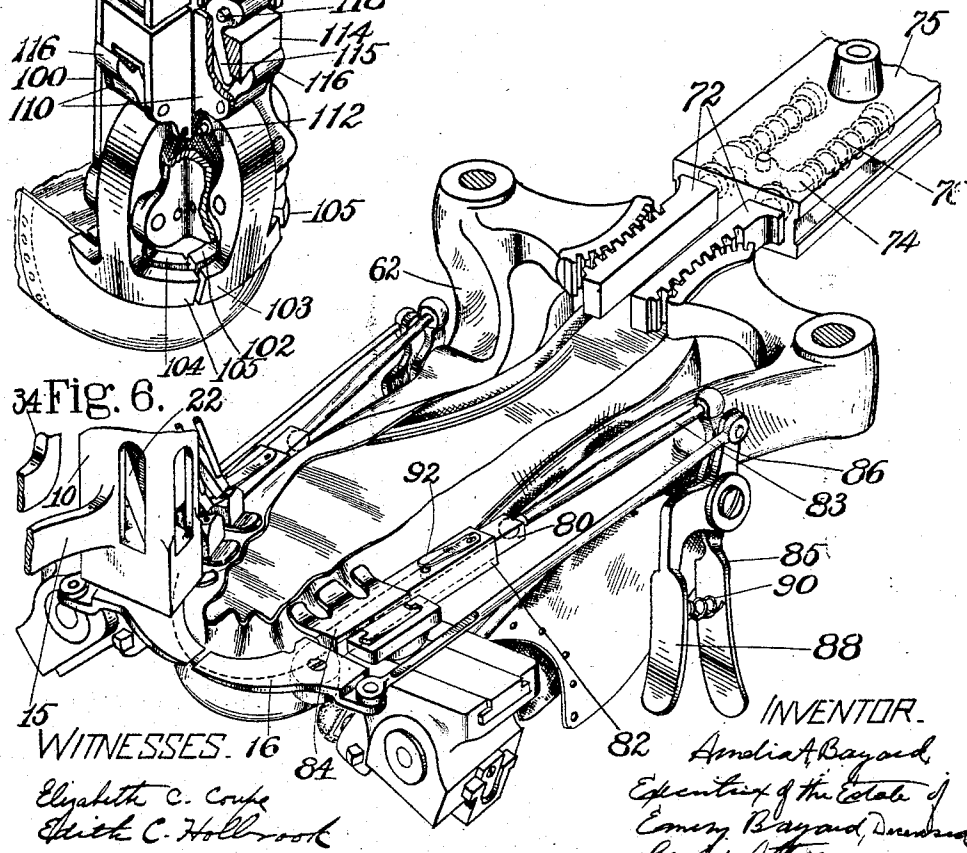


Fig. 5.

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UNITED STATES PATENT OFFICE.

EMERY BAYARD, DECEASED, LATE OF ROCHESTER, NEW YORK, BY AMELIA A. BAYARD, EXECUTRIX, OF ROCHESTER, NEW YORK, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

1,068,839. Specification of Letters Patent. Patented July 29, 1913.

Application filed June 17, 1910. Serial No. 567,529.

To all whom it may concern:

Be it known that EMERY BAYARD, deceased, late of Rochester, in the county of Monroe and State of New York, did invent certain Improvements in Machines for Use in the Manufacture of Boots and Shoes, 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 has for its object to provide an improved machine for pulling-over a shoe, and it may be also for lasting the toe portion of the shoe, said pulling-over means and the lasting means, if a lasting operation is performed, preferably operating while the shoe remains in a single working position.

Many features of the pulling-over mechanism may be of a known type or of any construction suitable for the purpose, and this invention consists generally in novel combinations with pulling-over mechanism of devices for shaping the corners of the toe of the shoe and securing the upper, some of which devices are being claimed specifically in divisional applications Ser. Nos. 657,535, 657,536, 657,537, and 657,538, filed Oct. 30, 1911.

In the operation of pulling-over a shoe the upper is gripped and pulled at the opposite sides of the ball and at the tip of the toe and is drawn over the last and tacked at each of these places. At either side of the toe tack, that is, at the corners of the toe, the upper stands out in a projecting pucker which is called a "dog-ear" in the shoe shop. An important feature of the present invention is embodied in automatic means for turning inwardly during the pulling-over operation the fullness at the corners of the toe instead of allowing it to stand out and form these dog-ears. By forcing the upper inwardly at the corners of the toe at this stage of the manufacture of the shoe, this fullness is distributed and prevented from localizing so that later operations are made easier. It is broadly new, as I am advised, to provide a pulling-over machine with means operating as an incident to the pulling-over operation to turn in the upper at the opposite corners of the toe to prevent the formation of dog-ears. In accordance with a preferred embodiment of this feature of the invention, the devices which turn in the upper at the corners of the shoe are formed as lasting plates or corner wipers. These end lasting plates for wiping over the two corners of the toe are here shown as separate from one another as distinguished from the connected wiper plates of the bed lasting machines in common use. It is new to provide, in combination with pulling-over means, separate lasting means for the opposite corners of the toe. In one embodiment of this feature of the invention each lasting plate is arranged to extend from the side of the shoe around the corner toward the middle of the toe and is mounted for inward movement transversely over the shoe bottom and also rotatively, the latter movement being about a center located at the rear of the toe and preferably near the rear end of the plate. The lasting plates may be carried by power operated means, shown in one embodiment of the invention as the inwardly moving tacker arms of the pulling-over machine, into working position. The plates may be so connected to said arms that they may be manually manipulated, if necessary, for further pressing the upper into the position required for the particular shoe being treated. It is a feature of the illustrated embodiment of the invention that the end lasting plates are arranged to approach their working position by movements transversely of the last from opposite directions; also that they can be turned, each about its own center located at the rear of the toe of the shoe, to sweep the upper inwardly and backwardly over the end and corners of the toe.

In a further embodiment of this invention the wipers are mounted upon other inwardly moving arms which are the side-clamp arms of the pulling-over machine and are actuated by said arms in a manner which is entirely automatic. In the use of wipers so actuated the binding wire will be depended upon to draw the upper into finally lasted position against the lip or shoulder of the innersole as well as to bind it in such position. These corner wipers are mounted to adapt themselves to the contour of the work by automatic adjustments about axes which are respectively perpendicular to the plane

of the shoe bottom and parallel with said plane as well as to yield laterally of the shoe in the carrying arms. This mounting for end lasting devices is entirely new as I am advised and is of obvious advantage, particularly in a machine in which the lasting devices are automatically operated. The arms on which the corner wipers are mounted are pivoted to swing about separate centers which are so located at opposite sides of the shoe at the rear of the toe that the wipers have a backward as well as an inward sweep to draw the upper rearwardly from the toe end of the last.

Another object of this invention is to provide improved means for actuating end lasting plates which may be in the form of the corner wipers before mentioned or in any other form to which such operating means is applicable. An important feature of this phase of the invention is found in mechanisms for actuating a wiper in substantially a right line over the shoe and for turning the wiper, which mechanisms permit of separate right line and turning movements being effected. Another feature is found in the provision of mechanisms by which either one of a pair of end wipers may be moved lengthwise of the last independently of the other one of the pair, and a still further new feature provides for turning either end wiper plate independently of the other plate.

A further feature of this invention is to be found in means for carrying a wire around the toe of the shoe to bind the upper in lasted position. In the illustrated embodiment of this invention the wire carrier is mounted for manual operation. It is also arranged so that it can be used to bind one corner of the toe after the upper has been overworked by one wiper, and can thereafter be further actuated to bind in the other corner when that is ready to be secured. This binding device is also equipped with a tension device by which the wire can be held taut in position to secure one corner of the upper while the other corner is being lasted. The tension device includes means arranged to be engaged by one finger of that hand of the operator by which the carrier is being moved whereby the tension can be increased or diminished by the binding or the placing of the wire proceeds about the toe. As advised it is new by this invention to provide for varying the tension as a wire carrier moves to place a binder about the toe of a shoe. In accordance with the illustrated embodiment of this invention, a reel for holding a supply of wire is mounted on and movable with the wire placing device so that excess of wire is not drawn off, as it would be from a stationary reel, when the device reaches backwardly to carry the binder into position to be anchored; also a spring is arranged to return the wiring device to an out of the way position while it is not in use.

A further feature of this invention is found in a gripper having jaws to engage and pull an upper at the end of the toe and jaws to seize the upper at the corners of the toe. The toe jaws are usually employed to exert longitudinal tension on the upper while the corner jaws do not necessarily apply a corresponding tension but serve the important purpose of straightening the upper over the corners of the last to reduce the unequal strains which result in wrinkles when the tip of the toe alone is gripped and to bring the corners of the upper into position to be bent inwardly over the last bottom as a part of the pulling over operation preparatory to lasting, or during the toe lasting if that is done while the shoe remains in the pulling over machine. In the illustrated embodiment of this invention the toe jaws and the corner jaws are separate and are connected to a common operating member through devices which permit of closing the corner jaws upon the upper less firmly than the toe jaws so that the corners of the upper can slip between the jaws that hold them. Said connecting devices are adjustable to vary the relative forces with which the jaws are closed and include a closing spring common to all the pairs of jaws and between which and the jaws are arranged separate, independently adjustable springs for each pair of jaws.

Another feature of the invention is found in provision for adjustment of the grippers relatively to the plane of the shoe bottom which is desirable for long and short uppers and for similar adjustment of the toe gripper relatively to the side grippers for lasts having differences in longitudinal inclination, or "pitch" of their bottom faces. A further feature is found in arranging the toe gripper for lateral movement and providing means for frictionally retaining the gripper in its lateral adjustment during its inward and outward operative movements. Other features of the invention consist in combinations with the toe gripping jaws and the corner holding jaws of means for bending the corners of the upper inwardly in the pulling over operation of means for forcing the corners inwardly in the lasting or the toe bending operation.

These and other features of this invention including certain details of construction and more important combinations of parts will be explained in the following description of a preferred embodiment of the invention and will then be pointed out in the claims.

Figure 1 is a side elevation of a machine equipped with this invention. Fig. 2 is a perspective view. Fig. 3 is a vertical transverse section. Fig. 3ª is a perspective de-

tail. Fig. 4 is a perspective of a modification. Fig. 5 shows a further modification. Fig. 6 is a perspective view of the grippers which may be used at the toe and corners of the forepart.

The invention is herein shown for the purpose of explanation, as applied to a machine like the well-known commercial pulling-over machine shown and fully described in United States Letters Patent No. 1,029,387, granted June 11, 1912. It is not necessary herein to show, or to describe, that machine and its operation except in those particulars in which it coöperates with the lasting devices of the present invention, which are arranged to operate after the shoe upper has been pulled and adjusted upon the last and while the shoe is held in the machine with the upper under tension over the last, the power driven mechanism of the machine being temporarily at rest. It is contemplated that the machine shall be organized to come to rest with the side clamps closed against the sides of the shoe and the automatically actuated inswinging tack carrying arms 8 at the sides of the machine in their tack inserting positions over the shoe, said tacker arms and the parts carried by them having their positions determined in accordance with the width and location of the last by the engagement of stops carried on the lower faces of the tackers with abutting faces on the side clamps or shoe supporters, all as is well understood in machines of this class.

In the embodiment of the invention first to be described an attachment, shown in Figs. 2 and 3, is loosely applied to each side tack arm 8. The body portion of the attachment is indicated at 10, Fig. 2, and the connection with the arm is made by a ball headed pin 11 which projects from the tack arm through a slot 12 into a spring chamber in the upper portion of body 10. The slot, ball and spring 9 allow sufficient play to permit the attachment to be moved, as will be suggested, automatically and also by the handle 15. The lower portion of the body 10 is connected yieldingly to the automatically moved arm 8 by a rod 14 and an ear 13 which acts through a spring 151 to hold the lower end of the attachment tilted inwardly relatively to the tack arm as indicated in dotted lines in Fig. 3. In this relative position the attachment approaches the shoe with the arm 8 and rides over the shoe bottom until it is stopped by the abutment 17. In the continued movement of arm 8 the upper portion of the attachment 10 is carried forwardly, its lower face fulcrums on the edge of the shoe bottom, the spring 151 yielding if necessary to allow this movement, and the inner edge of the attachment, or of the wiper 16 carried thereon, tips downwardly as indicated by the full lines in Fig. 3 to compress the upper down upon the feather of the shoe innersole and into the angle between the feather and the lip or shoulder of the innersole where it should be secured. This mounting has an important advantage in that the attachment, which preferably includes both a tacker and a lasting wiper as will be explained, is yieldingly actuated into place over the shoe bottom in such manner that no injury is liable to occur to the work and also approaches the work with the advance edge of its bottom face tilted upwardly, thus further guarding against injury to the shoe. There is also the further positive advantage that the stock after having been first wiped or bent inwardly is then automatically pressed down upon the shoe bottom.

The body 10 supports the curved lasting plate 16 which has an inner acting edge shaped to fit the corner of the shoe approximately and to extend forwardly toward the middle of the toe. This plate is preferably detachable to enable others of different shapes to be readily substituted. The lasting plate is carried automatically by its carrying arm 8 transversely of the shoe into approximate lasting position over the shoe bottom. By means of the handle 15 the operator further moves the plate 16 as may be required for forcing the upper into lasted position over one corner of the last, the loose connection 12 with the tack arm permitting sufficient freedom of manual movement transversely of the shoe and also rotatively for this purpose and also permitting enough vertical movement to enable the desired downward pressure upon the upper to be effected for molding it into lasted position upon the innersole. The two independent plates 16 of the two attachments permit separate lasting of the two corners of the toe. This arrangement also allows conformation to the differences found in the toe portions of right and left crooked lasts.

The tack driver of the prior machine is omitted from the front tack arm and, in place of the usual tack conductor tube leading thereto, two tubes 20 are diverted from the automatically operated multiple tack supplying apparatus of the machine and led to the attachments 10 at either side of the machine. Each attachment is provided with a tack pocket 21, Fig. 3, with which coöperates a swinging tube 22 connecting with the conductor 20, and is further provided with a manually operated tack driver on a driver bar 25. This bar is impelled downwardly by a spring 26 and stands normally down in the position shown in Fig. 3, and while in this position, a tack is fed through the conductor and comes to rest in the lower end of the swinging tube 22. The driver is lifted, when the operator desires to insert a tack, by force transmitted through

the bell crank 30 to the stud 32 projecting from the side of the driver bar. The bell crank has the handle 34 located adjacent to the handle 15 to be conveniently operated in connection with the latter and it has the bevel ended spring plunger 35 which is automatically withdrawn from stud 32 when the driver has been lifted. As the driver bar is raised it allows the tube 22 to be swung by its spring 23 into position to deliver a tack to the pocket under the driver where it is inserted by the downcoming of the driver under influence of its spring 26. The driver bar returns the tube 22 to the position shown in Fig. 3. When the bell crank is reversely moved the plunger 35 snaps under the stud 32 for use again.

The attachment at one side of the machine will preferably have a provision as at 40 for retaining an eye or loop which has been previously formed in the end of a binding wire and through which the tack from the pocket 21 is driven to anchor the wire at one end. The tack pocket has a slot through which is movable a yieldingly upheld blade 39, see Fig. 3a, which is depressed by the driver bar and extends slightly below the tack driving face of the bar. The blade 39 serves to force the wire down off the projection 40 and to a level to be tightened around the stem of the tack below its head. The wire is led through a guideway 41 in a wire placing arm 42 which has a pin 43 and slot 44 connection with a plate 45 on the lower end of the front tack arm of the machine which may have an automatic movement from its inoperative position, as in said patent, into an appropriate position adjacent to the shoe for the toe wiring operation to be effected. The wire passes from the guide under a tension lever 46 to a reel 48 which is carried by the wire placing arm. The wire placing arm has a rigidly attached handle 50 by which the arm is turned and slid under the plate 45 for drawing the wire around the toe of the shoe under the wiper plates 16 where it is held under tension in binding relation to the overwiped upper while the machine is restarted to release the shoe, after which the wire will be twisted around the tack which has been driven at the second side of the shoe in the same manner that a hand operator is accustomed to twisting the wire around the anchor tack in binding by hand. The possibility which this apparatus affords for lasting one corner of the toe at a time and binding it in by the wire before the second corner is necessarily lasted and bound gives opportunity for the workman to last the toe in the pulling-over machine progressively and to exercise great skill and care in obtaining a smooth, well formed toe and binding it tightly. It is contemplated that the pulled over shoe turned out by the machine equipped with this invention will be in condition for presentation to the welt sewing-on machine without further treatment of its forepart.

In Fig. 4 is illustrated a modified construction in which the corner wiper plates 16, which in Fig. 2 are mounted on the auxiliary tacker of the attachment 10, are supported independently of the tacker and upon the usual side clamp carrying arms 62 of the pulling over machine shown in said patent above referred to. Each of these wiper plates 16, which have working edges curved to extend forwardly around the corner of the toe, have at their rear or heel end, segment formations 64 interlocking with a suitably formed recess in the block 65. This connection permits the wiper plate to adjust itself angularly about an axis extending laterally across the last and located near the rear end of the plate and substantially in the plane of the last bottom whereby each wiper plate can adapt itself automatically and independently of the other plate 16 to the longitudinal inclination of the portion of the shoe bottom over which the plate presses the upper. The block 65 is mounted to turn in a segmental block 66 on the front end of a horizontally movable slide 68 mounted in a suitably formed guideway on the front end of the arm 62. The slide 68 is pressed yieldingly toward the shoe in the direction of the shoe by the spring 70. This mounting permits each wiper plate 16 to turn about a vertical axis located near its rear end and also permits each wiper plate to yield against the action of its spring 70. These self adapting movements of the wiper plates enable them to conform their positions to the contour of the opposite corners of the last.

The arms 62 extend rearwardly and are pivotally supported at opposite sides of the shoe near its rear end, as shown in Fig. 5, and have segment racks connected with rack bars 72 which in turn are yieldingly connected together and to their actuating slide 75 by an equalizer 74 and springs 76, this mounting for the side arms being the same as that shown in said prior patent. It will be readily understood that the movement of the arms 62 about their respective centers carries the corner wipers 16 laterally toward the shoe from opposite directions and that these wipers which project inwardly toward each other from the front ends of the arms are moved in the arc of a circle which carries them backwardly as well as inwardly as they approach and move over the corners of the shoe. This mounting gives to the wipers an automatic movement similar in direction to that of the wipers shown in Fig. 2, although the component of backward movement is smaller.

In Fig. 5 each wiper plate is connected to

its arm 62 by a slide 80 which is movable endwise through a rectangular guide 82 which is attached to the side clamp 84 of the pulling-over machine. This side clamp is mounted to have angular and sliding movements for adapting itself to the last which correspond essentially to the above described self adapting movements of the wiper in Fig. 4, and therefore the wiper in Fig. 5 receives from the side clamp its movements to adapt its position to the inclination, contour and size of the last. The slide 80 is connected by a link 83, having ball heads, with a lever 85 which is fulcrumed on the arm 62 in a position where it is within convenient reach of the operator whereby the lasting plate may be given manually a movement lengthwise of the last to draw the upper rearwardly over the toe of the last. The wiper is also pivoted to the head of the slide 80 and has an outwardly projecting arm by which it is connected through a link 86 with a lever 88 which is fulcrumed on the same pivot as lever 85 and is bent to cross lever 85 so that with the same hand an operator may press the two levers together and effect a backward and a turning movement of the wiper. The levers are separated by a spring 90 and the operator can tell by the sense of feeling when the wiper has been pressed backwardly or turned inwardly or moved in both directions as far as is required to wipe the upper against the lip or shoulder of the sole or innersole. A friction screw 92 causes the wiper slide 80 to maintain the position to which it is moved so as to hold the upper until it is fastened or bound in by the wiring device of Fig. 2. It will be noted that in each of the constructions the wipers are pivoted in the rear of the toe for their inward turning movement and in each they also approach working position and have their initial working movement transversely of the shoe. It should also be appreciated that while the devices 16 are herein termed wipers and are shown as having a construction and arrangement which enables them to have the well recognized functions of lasting machine end wipers in the production of a pulled over shoe having its toe fully lasted, it is within the broad scope of this invention to equip a pulling-over machine with devices which merely gather in or turn inwardly the upper material at the corners of the toe. The purpose of such devices is to facilitate the subsequent lasting which may constitute an entirely independent operation. It will of course also be understood that wipers having the novel characteristics herein described may be employed in lasting apparatus which does not also include any pulling-over mechanism.

The gripper shown in Fig. 6 which may be advantageously used to seize and pull the toe portion of the shoe is a modification of the gripper shown in British Patent No. 7247 of 1901 and in United States Letters Patent No. 1,030,264 and comprises in this embodiment of the invention a single carrier 100 having three pairs of jaws. One pair of jaws 102, 103 are centrally arranged and adapted to seize and pull the upper at the end of the toe while the other pairs of jaws which are alike are arranged to grip the upper at the corners of the toe. The inner jaws 102 of the end pair and 104 of the side pair are rigidly attached to the carrier 100. The outer jaws 103, 105, 105 are pivotally attached to the carrier which is suitably formed for this purpose as shown and also has guideways for each of three closing devices 110. The closing device comprises a sliding frame having a roll 112 at its lower end to engage the inner side of the tail of the pivoted jaw and rock it to grip the stock against the fixed jaw, a hook bar 114 at its upper end to be detachably engaged by a hook 115, and a pivoted latch 116 adapted for use in disengaging hook 115 from bar 114. These parts resemble those of said patent and operate to close the jaws and to uplift the entire gripper mechanism for pulling the upper when the hooks are drawn upwardly. Each hook is pivotally connected at 118 to the forked foot 119 of a rod 120 which projects upwardly through a flange 122 of an operating bar 125 and is encircled by a spring 124. Each spring is adjustably regulated as to tension by a nut 126 by which the closing and the pulling force of the several pairs of grippers may be independently regulated, it being preferable to operate the corner jaws with a relatively light tension compared with the tension by which the end jaws hold and pull the upper. The operating bar 125 is guided centrally in the gripper carrier above which it projects to a connection with the toe gripper lever 126, Fig. 1. The operating bar is longitudinally recessed to receive a stiff closing spring 130 which rests at its lower end upon a shelf 132 projecting forwardly from the carrier 100 between the two sides of the bar. The carrier has at its upper end shoulders 134 in which are adjustable stops 135 to engage a portion 136 of the machine frame Fig. 1, in which the carrier is guided with provision for lateral positioning movement therein, being held in laterally adjusted position by a friction plate 138, Fig. 6. When the operating bar 125 is depressed through the lever 126 it moves the carrier 100 and the entire gripper mechanism downwardly to a position in relation to the plane of the shoe bottom which is determined by the adjustment of the stops 135, the side grippers of the machine being similarly lowered to an appropriate receiving position relatively to the plane of the shoe bottom. Continued depression of bar

125 thereafter compresses the gripper closing spring 130, and through engagement of the parts 122, 119, 115, 114, depresses the closing frames 110, causing the hubs of the latches 116 to contact with the front of the tails of the pivoted jaws and turn them to open the jaws and hold them prepared for the insertion of the work. When the upward movement of the gripper lever permits the spring 130 will raise the operating bar 125 which will act upwardly through the separate springs 124, rods 120, hooks 114, and closing frames 110 to effect gripping of the upper by the several pairs of jaws with forces proportional to the relative tension of the several springs 124. The force of the spring 130 having been balanced by the resistance to further closing of the jaws the continued upward movement of the lever 126 and bar 125 acts through t e described connections, including the independently adjustable springs 124 to lift the jaws while holding them closed by forces depending on the relative tension of said springs. If the springs of the corner jaws are under less tension than the springs of the toe end jaws then the upper may slip between the corner jaws after being lightly pressed and while the upper is being held and more strongly pulled by the toe end jaws. The jaws may be released in any desired order while the shoe is in the machine by the engagement, effected automatically, of suitably arranged devices carried by the front tack arm with the latches 116, or by manual manipulation of said latches, or if the herein described toe lasting devices or the lasting and bending-in devices 16 are employed, the jaws may advantageously retain their hold upon the upper until the shoe is to be released from the machine, the entire toe gripper mechanism having meanwhile received by well-known means described in said patent an inward and downward movement to facilitate the overworking of the upper.

In the use of the machine a shoe will be presented thereto and the upper pulled and adjusted as described and shown in said prior patent. The machine will then be restarted and caused to come to rest with the side clamps holding the shoe and side tack carrying arms closed over the shoe bottom. In this movement the corner benders or wipers 16 will have turned in the upper at the corners of the last between the side grippers and the toe gripper to prevent the formation of the outturned dog-ears. These devices may then be further manipulated, if the construction shown in Figs. 2 or 4 are used, to wipe and press the upper into lasted position about the end of the last and a strand of binding wire anchored by hooking a loop over the projection 40 of the tacker at the right-hand side of the machine and inserting a tack by that tacker. This tack also serves to fasten the overworked upper at the point where it is inserted. The binding device will then be manipulated to draw the wire tightly around the toe portion of the shoe to bind the upper against the lip or shoulder of the innersole. The toe gripper preferably retains its grip and assists the wipers and benders in holding the upper in position for the action of the binder thereon. If the multiple end gripper of Fig. 6 is used the corner jaws serve to straighten up the upper at the corners of the last and hold it with a light grip in position for the corner wipers and the binding device to force it inwardly to lasted position. When the binder has been tightened and the supplemental tack driven at the other side of the shoe the machine is again treadled and caused to release the shoe. The operator receives the shoe in one hand while holding and manipulating the bending device with the other to twist and anchor the wire around its tack for securing it in holding position.

Specific claims are not herein made to the modifications shown in Figs. 4 and 5 nor to the construction of the grippers shown in Fig. 6 and of the wire carrier shown in Fig. 2 but all of these constructions are covered by divisional applications.

Having fully explained the nature of this invention and described how it may be embodied in suitable mechanism I claim as new and desire to secure by Letters Patent of the United States:—

1. A pulling-over machine having, in combination, grippers arranged for acting upon an upper at opposite sides of the forepart of a shoe and at the end of the toe, operating mechanism to cause said grippers to seize and pull the upper and to come to rest holding the upper under tension for inspection of the shoe, means for moving the grippers to adjust the upper on the last while the machine is at rest, mechanism for overlaying the upper and fastening it when the machine is restarted, and means occupying positions laterally removed from the shoe and out of the way of inspection of the shoe while the machine is at rest and movable automatically in a direction transversely of the shoe to turn in over the last bottom the upper between the toe and the side grippers when the machine is restarted and prior to the fastening of the upper.

2. A machine of the class described having, in combination, means for pulling an upper over a last including means for gripping the upper at the opposite sides of the ball and at the end of the toe and operating to stretch the upper and lay it over the last bottom, means for fastening the upper at the sides of the ball, and means operated by said fastening means to turn in the upper at the corners of a shoe adjacent to the toe gripper to prevent the formation of out-

standing puckers at the corners of the toe of the pulled over shoe.

3. A pulling-over machine having, in combination, grippers arranged for acting upon an upper at the end and sides of the toe; operating mechanism to cause said grippers to seize the upper, to pull it, and to come to rest holding the upper under tension for inspection, devices for laying the upper over the sides of the last and for fastening it, mechanism for automatically operating said fastening devices, and means operated automatically by said last mentioned operating mechanism to turn in the upper at the corners of the toe before the upper is fastened.

4. A pulling-over machine having, in combination, grippers arranged for acting upon an upper at the end and sides of the toe; operating mechanism to cause said grippers to seize the upper, to pull it, and to come to rest holding the upper under tension for inspection, corner bending devices having acting edges curved to conform approximately to the curvature of the corners of the toe, devices to fasten the upper at the sides and at the end of the toe, and mechanism for advancing over the shoe bottom said corner bending devices and said fastening devices and for actuating the latter to fasten the upper.

5. A machine of the class described having, in combination, means for pulling an upper over a last including means for gripping the upper at the opposite sides of the ball and at the end of the toe and operating to stretch the upper and then come to rest automatically for inspection of the shoe, other devices for laying the upper over the last bottom, and additional means, including devices which are independent of one another and operate locally at the corners of the toe to turn the upper inwardly and backwardly over the last bottom at the corners of the toe.

6. A pulling-over machine having, in combination, grippers arranged at the end and sides of the toe, tacking devices to fasten the upper pulled by the grippers, and upper bending devices supported at each side of the shoe and arranged between successive tacking devices and each having a movement transversely of the shoe to bend the upper inwardly and hold the upper between the tackers while the tackers operate whereby the entire edge line of the upper is held over the last bottom while the tacks are driven at intervals.

7. A machine of the class described having, in combination, means for pulling an upper over a last, including means for gripping the upper at the opposite sides of the ball and at the end of the toe and operating to stretch the upper and then come to rest automatically for inspection of the shoe, other devices for laying the upper over the last bottom, and operating devices movable transversely of the shoe in substantially right lines toward and from operative relation to the shoe and operating automatically to turn inwardly over the last bottom at the corners of the toe the portions of upper on opposite sides of the toe gripper which normally tend to project outwardly in the pulled over shoe.

8. A machine of the class described having, in combination, pulling-over means including means to seize and pull a shoe upper at the opposite sides of the ball and at the toe end, mechanisms to fasten the upper at opposite sides of the ball and devices operated automatically by said side fastening mechanisms to gather inwardly over the edge of the last bottom the upper between the toe and the side grippers.

9. A machine of the class described having, in combination, pulling-over means including means to seize and pull a shoe upper at the opposite sides of the ball and at the toe end, separate devices for each corner of the toe movable automatically into position to gather inwardly over the edge of the last bottom the upper on either side of the toe gripper, and means arranged for manual operation to effect supplemental actuation of said devices separately from one another at the will of the workman.

10. A machine of the class described having, in combination, pulling-over means including means to seize and pull a shoe upper at the opposite sides of the ball and at the toe end, devices to gather inwardly over the edge of the last bottom the upper on either side of the toe gripper, and means arranged for manual operation to effect right line movement of said devices and to turn them for the purpose described.

11. A machine of the class described having, in combination, pulling-over means including means to seize and pull a shoe upper at the opposite sides of the ball and at the toe end, devices to gather inwardly over the edge of the last bottom the upper on either side of the toe gripper, means operating automatically for initially actuating said devices to do their work, and means arranged for manual operation for additionally actuating said devices.

12. A machine of the class described having, in combination, pulling-over mechanism, means for separately lasting the corners of the toe of the shoe, means for securing the upper of the forepart of the shoe, and connected operating mechanism for the pulling-over mechanism and the securing means.

13. A machine of the class described having, in combination, power driven mechanism for pulling-over a shoe, power driven mechanism for fastening the upper in pulled over position and means supported and

moved toward and from operative relation to the shoe by one of said power driven mechanisms and capable of manual actuation while in operative position for separately working into lasted position the upper at the two corners of the toe of the shoe.

14. A machine of the class described having, in combination, pulling-over means for the end and sides of the toe, means for separately working into lasted position the upper at the two corners of the toe of the shoe, and operatively connected means for securing the upper.

15. A machine of the class described having, in combination, separate devices arranged to be used successively for separately working into lasted position the upper at the two corners of the toe of the shoe, and means for placing a binder in position to secure the upper at one side of the toe and then, after the other corner has been overworked, further placing the binder to hold the entire toe.

16. In a machine of the class described, the combination with the automatically actuated swinging arm, the lasting plate 16 moved thereby transversely over the shoe bottom, the loose connection at 12 permitting independent movement of the lasting plate and the manual operating means 15 by which the plate can be turned relatively to the arm to sweep the upper substantially longitudinally of the shoe backwardly from the toe end, and by which the plate can also be further moved transversely of the shoe, substantially as and for the purpose described.

17. A machine of the class described having, in combination, a lasting plate formed to extend from one side of a shoe around the corner toward the middle of the toe and mounted for movement transversely over the shoe bottom and also rotatively about a center in the rear of the toe of the shoe.

18. A machine of the class described having, in combination, a lasting plate formed to extend from one side of a shoe forwardly around the corner of the toe, and means by which said plate may be actuated transversely of the shoe and rotatively.

19. A machine of the class described having, in combination, a lasting plate formed to extend from one side of a shoe around the corner toward the middle of the toe and mounted for movement rotatively about a center located back of the toe.

20. A machine of the class described having, in combination, end lasting mechanism comprising lasting plates which are mounted for movement of their adjacent ends rotatively about centers nearest to their rear ends.

21. A machine of the class described having, in combination, end lasting mechanism comprising lasting plates which are mounted for independent movement of their adjacent ends rotatively about centers nearest to their rear ends to adapt their configuration to the varying contours of right and left crooked lasts.

22. A machine of the class described having, in combination, end lasting plates, power operated means to actuate the plates over the last and come to rest, and means by which said plates may be further actuated manually and independently of one another.

23. A machine of the class described having, in combination, end lasting plates, power operated means to actuate the plates over the last and come to rest, and means permitting further actuation of said plates separately.

24. A machine of the class described having, in combination, end lasting plates, power operated means to actuate the plates over the last and come to rest, means for manually actuating said plates transversely of the last and supporting means in which the plates may be maintained substantially stationary lengthwise of the last during their actuation transversely of the last.

25. A machine of the class described having, in combination, end lasting plates, power operated means to actuate the plates transversely over the last from opposite sides of the shoe, supporting means in which the plates may be maintained substantially stationary lengthwise of the last during their actuation transversely of the last, and means for moving said plates angularly to sweep the upper inwardly and backwardly over the corners of the toe.

26. A machine of the class described having, in combination, end lasting mechanism comprising wiper plates which are arranged to approach their working position by movement transversely of the last from opposite directions and can be turned each about its own center to sweep the upper inwardly and backwardly over the end and corners of the toe.

27. The combination with a wiper plate constructed and arranged for use in lasting an end portion of a shoe, of means for actuating said plate transversely of the shoe toward working position, and means for turning said plate independently of said transverse movement to cause it to sweep the upper inwardly and backwardly from the corner and end of the toe of the shoe.

28. The combination with a wiper plate constructed and arranged for use in lasting an end portion of a shoe, of means for actuating said plate in a substantially right line perpendicular to the edge of the shoe to effect lasting of the upper, and means for turning the plate as a part of its working movement and independently of said first mentioned movement.

29. The combination with a wiper plate arranged for use in lasting an end portion of a shoe and mounted for turning and advancing movement about an axis substantially perpendicular to the shoe bottom to close over the end of the shoe, of means arranged for separate actuations to impart to the wiper plate independent lasting movements transversely and lengthwise of the shoe.

30. The combination with a wiper plate arranged for use in lasting an end portion of a shoe, of means arranged for separate actuations to impart to the wiper plate lasting movements substantially transversely of the shoe bottom, and lasting movements substantially lengthwise of the shoe bottom, one of said movements being a turning movement.

31. The combination with a wiper plate arranged for use in lasting an end portion of a shoe, of means arranged for separate actuations to impart to the wiper plate lasting movements substantially transversely of the shoe bottom, and lasting movements substantially lengthwise of the shoe bottom, one of said means being automatically actuated and said machine having provision for further manual actuation thereof.

32. A machine of the class described having, in combination, shoe resting means, toe lasting means, a toe binder placing device and means by which said device is guided for movement in and out in a plane substantially parallel with the plane of operation of the lasting means and movable in said plane manually around the toe of the shoe from one side thereof to the other to place a binder in holding relation to the overworked upper material.

33. A machine of the class described having, in combination, means for resting a shoe with its sole face uppermost, toe lasting means supported from above the shoe bottom to present a clear space around and below the forepart of the shoe, and a wiring device arranged to move in such space for placing a binding wire about the toe under the lasting means.

34. A machine of the class described having, in combination, toe lasting means including wiper plates having curved acting edges to embrace the toe of the shoe, said plates being adapted for operation to press opposite corners of the toe into lasted position separately, and a toe wiring device adapted to hold a binding wire under tension about one corner of the toe while the other corner is being lasted.

35. A machine of the class described having, in combination, toe lasting means, a wire carrying device, mountings for said device permitting the device to be moved partially around the toe and adapted then to hold said device at rest with the wire under tension along one side of the toe, and operating means by which said toe lasting means may be caused to prepare one side of the toe for the action of the wiring device and then to prepare the other side of the toe for the action of said device

36. A machine of the class described having, in combination, toe lasting means, toe wiring means movable about the toe of the shoe, and wire tensioning means having provision for permitting variation of the tension during the wiring operation, said lasting and wiring means being arranged to be operated alternately each in a plurality of steps and the tensioning means coöperating to assist in maintaining the wire in binding position after actuation of the wiring means partially around the toe.

37. A machine for working an upper over a last having, in combination, means for positioning a shoe, manually actuated toe lasting means, manually actuated toe wiring means, and supporting and operating devices for said lasting and wiring means permitting the wiring means to be moved manually for carrying the wire around the toe under the lasting means from one side of the shoe to the other side of the shoe while the lasting means is being manually manipulated.

38. A machine for working an upper over a last having, in combination, means for positioning a shoe, toe lasting means, toe wiring means, and supporting and actuating devices for said lasting and wiring means permitting the wiring means to be moved for carrying the wire around the toe under the lasting means from one side of the shoe to the other side of the shoe while the lasting means holds the upper in position to be bound.

39. A machine of the class described having, in combination, toe lasting means, a support, the toe wiring arm 42 mounted on said support for pivotal and sliding movement at 43, 44, the handle 50 by which the arm may be actuated, and the tension lever 46 mounted relatively to said handle in position to be engaged by a finger of the operator to control the tension on the wire.

40. A machine of the class described having, in combination, toe lasting means, and toe wiring means movable about the toe of the shoe, a support on which said wiring means is mounted for pivotal and endwise movement, and a spring to return said device to and maintain it normally in a retracted position.

41. A machine of the class described having, in combination, means for holding a shoe and means supported in operative relation therewith and arranged for manual operation to carry a binder around the toe end of the shoe from one side thereof to the other.

42. A machine of the class described having, in combination, means for holding a shoe and means for carrying a binder under tension around the toe end of the shoe, said binding means having provision for variation of the tension at will during the binding operation.

43. A machine of the class described having, in combination, toe lasting means, means for applying a binder to secure the upper, and a support upon which the binder applying means is mounted for manipulation in operative relation with the toe lasting means, said lasting means comprising wipers located on opposite sides of the toe and which are separately movable to coöperate with the wiring means in placing the wire in binding relation to the upper.

44. A machine of the class described having, in combination, a gripper for pulling and holding an upper at the middle of the toe of the shoe, and toe lasting means comprising separate wipers which terminate at their adjacent ends at either side of the middle of the toe and are supported for movement about a point located rearward of the toe end of the last.

45. A machine of the class described having, in combination, toe lasting means and toe wiring means comprising a wiring bar supported for pivotal and longitudinal sliding movements, substantially as described.

46. A machine of the class described having, in combination, toe lasting means and toe wiring means comprising a wiring bar movable to carry the wire around the end of the shoe and tension means for the wire movable with the bar.

47. A machine of the class described having, in combination, toe lasting means and toe wiring apparatus comprising a wiring bar, a tension device and a reel movable together to place a binder under tension around the toe of a shoe.

48. A machine of the class described having, in combination, toe lasting means and toe wiring devices having a handle and a device associated with the handle by which to control the tension on the wire.

49. An end lasting machine having, in combination, the toe wiring arm 42, a support, a pivot pin and slot connection between the arm and support, and means to maintain the arm in a normal position.

50. An end lasting machine having, in combination, the holder for a shoe and a toe wiring arm mounted for movement longitudinally and rotatively to carry a wire around the toe of a shoe.

51. An end lasting machine having, in combination, means for working an upper over a last, and means guided for endwise and swinging movements in substantially the plane of the shoe bottom and arranged for manual actuation in and out and laterally in said plane in a path determined by the operator to carry a wire around the toe end of a last.

52. An end lasting machine having, in combination, means for preparing the toe portion of an upper to be bound and manually guided means mounted for movement around the toe of the shoe to bind in the upper.

53. An end lasting machine having, in combination, toe wiring means comprising a wire guide, means for yieldingly holding said guide away from the shoe and means for moving said guide around the toe end of the shoe.

54. An end lasting machine having, in combination, upper manipulating means, a wire guide, means for normally holding said guide out of engagement with the shoe, and mountings for the guide permitting movements thereof at times and to extents determined by the operator from and toward the shoe and angularly for carrying the wire around the toe of the shoe.

55. An end lasting machine having, in combination, upper manipulating means, a member normally positioned in front of the last and adapted for movement alternatively toward either side of the last and forwardly and backwardly to carry a wire around the toe of a shoe on the last.

56. A machine of the class described having, in combination, upper manipulating means, means for stretching a securing wire around the toe of the shoe, and a tension device for the wire arranged for operation to hold and release said wire at the will of the operator.

57. A machine of the class described having, in combination, upper manipulating means, means for stretching a securing wire around the toe of the last, and a tension device for the wire arranged to apply a constant tension to the wire, means for operating the wire stretcher manually and means associated with said operating means and adapted for manual control to increase the tension.

58. A machine of the class described having, in combination, wipers, means for actuating the wipers, means for carrying a securing wire around the toe of a shoe being lasted, and means by which the wire carrying means and the wipers may be actuated independently or together in coöperation with one another at the will of the operator.

59. A machine of the class described having, in combination, upper manipulating means, a pivoted and sliding arm adapted to draw a securing wire around the toe of a shoe being lasted, a support for said arm and means for turning and sliding said arm.

60. A machine of the class described having, in combination, upper manipulating means, means movable from adjacent to the

shoe on one side of the shoe around the toe to the other side of the shoe for stretching a securing wire around the toe of the last, automatic mechanism for moving the first mentioned means and provision for manually operating the second means.

61. A machine of the class described having, in combination, means for separately working into lasted position the upper at opposite corners of the toe of a last, and additional automatic mechanism for actuating said separate corner lasting means.

62. A machine of the class described having, in combination, wipers arranged to engage a shoe at opposite sides of the toe end of the shoe and mountings therefor arranged to permit said wipers to have independent positioning movements about axes extending transversely of the last.

63. A machine of the class described having, in combination, wiper plates having curved acting edges shaped to extend around the corners of the toe of the last, mechanism for supporting and actuating said plates to wipe an upper inwardly and backwardly over the end of a last from opposite corners, and connections between said mechanism and plates arranged to permit a limited angular movement of said plates about axes located at the ends of said plates which are farthest from the tip end of the last.

64. A machine of the class described having, in combination, end lasting plates, and means for relatively actuating said plates and last to work an upper over the toe portion of the last, said machine having provision for automatic angular movement of the plates to adapt them to the longitudinal inclination of the bottom of that portion of the shoe engaged by them.

65. A machine of the class described having, in combination, a pair of end wiper plates and operating mechanisms for said plates having provision for imparting to said wipers substantially right line movements over the last independently of one another and also turning movements independent of the right line movements.

66. A machine of the class described having, in combination, a pair of end wiper plates arranged to cooperate in embracing the same end of a shoe and operating mechanisms for said plates having provision for imparting working movements to one of said plates independently of the other transversely and lengthwise of the last and for imparting working movements to said plates together.

67. A machine of the class described having, in combination, end lasting plates, supports upon which said plates are mounted for substantially right line movement relatively to the last, and means for turning said plates independently of one another.

68. A machine of the class described having, in combination, a lasting plate for each corner of a toe, a separate support for each plate upon which the plate is mounted to turn about an axis substantially perpendicular to the shoe bottom and move lengthwise of the last, and a carrier upon which the plate and support are mounted for movement transversely of the last.

69. A machine of the class described having, in combination, the side clamps 84 for opposite sides of the shoe, and the corner lasting plates 16 supported for permitting angular positioning movements about axes, one of which is perpendicular to the plane of the shoe bottom, and another parallel with said plane and extending transversely of the shoe.

70. A machine of the class described having, in combination, means for working an upper over a last, means operating automatically to insert a predetermined number of tacks in the shoe while it is still held in the machine, and means capable of operation at the will of the workman for inserting additional tacks before the shoe is released from the machine.

71. A machine of the class described having, in combination, means operating automatically to work an upper over a last, additional means for use in working the upper over the last, means operating automatically to insert a tack to secure the upper overworked by the first mentioned means, and means for inserting an additional tack to hold the upper overworked by the additional means.

72. A machine of the class described having, in combination, means for working an upper over a last, and means operating automatically to insert a predetermined number of tacks, said machine having provision for inserting additional tacks at the will of the workman.

73. A machine of the class described having, in combination, means for working an upper over the toe portion of a last into position to be bound by a wire, means for anchoring an end of the binding wire, and means for applying the wire around the toe portion of the shoe.

74. A machine of the class described having, in combination, means for working an upper over the toe portion of a last into position to be bound by a wire, means under control of the operator to insert tacks at opposite sides of the shoe for anchoring the binder, and means for use in tightening the binder into binding engagement with the shoe upper.

75. A machine of the class described having, in combination, means for working an upper over one side at a time of the toe of a last into position to be bound by a strand of wire or other continuous material, and means for anchoring one end of the bind-

ing material at one side of the shoe independently of the other end.

76. A machine of the class described having, in combination, means for working an upper over a last into position to be bound by a strand, means for anchoring one end of the binding strand at one side of the shoe, and means arranged for subsequent actuation for leading the binder around the toe into position to be anchored at the second side of the shoe.

77. A machine of the class described having, in combination, means for working an upper over a last into position to be bound by a strand, means for anchoring one end of the binding strand at one side of the shoe, means for inserting a tack at the other side of the shoe in position for the binder to be anchored to it after having been drawn into holding relation to the shoe upper, and means by which the binder may be so drawn after having been anchored at one end.

78. A machine of the class described having, in combination, means for anchoring a binder to one side of a shoe, and means for leading the binder under tension around the toe of the shoe to the other side thereof.

79. A machine of the class described having, in combination, means for anchoring a binder to one side of a shoe, and means for leading the binder under tension around the toe of the shoe to the other side thereof, said machine having provision for inserting an anchor tack at the second side of the shoe.

80. A machine of the class described having, in combination, a tacker provided with means for holding a binder in position to be anchored by the driven tack, and means for drawing the binder under tension around the toe of a shoe, said means being arranged for actuation to tighten the binder after one end thereof has been anchored by the tacker.

81. A machine of the class described having, in combination, a tacker provided with means for holding a binder in position to be anchored by the driven tack, means for drawing the binder under tension around the toe of a shoe, said means being arranged for actuation to tighten the binder after one end thereof has been anchored by the tacker, and a second tacker arranged to insert a second anchor tack at the side of the shoe opposite to that at which the binder was first anchored.

82. A machine of the class described having, in combination, means for inserting tacks at opposite sides of a shoe in suitable location to serve as anchors for a toe binder, and means movable around the toe of the shoe for drawing the binder under tension from one of said tacks around the toe of the shoe.

83. A machine of the class described having, in combination, means for inserting tacks at opposite sides of a shoe in suitable location to serve as anchors for a toe binder, said machine having provision for effecting anchorage of the binder to one of said tacks, and means for drawing the binder under tension around the toe of the shoe toward the other tack.

84. A machine of the class described having, in combination, means for inserting tacks at opposite sides of a shoe in suitable location to serve as anchors for a toe binder, means for drawing the binder under tension from one of said tacks around the toe of the shoe, and means for guiding the binder into holding relation to the shoe upper as it is drawn around the toe.

85. A machine of the class described having, in combination, means for supporting a shoe, means for inserting tacks at opposite sides of the shoe and anchoring one end of a binder to one of said tacks, means for leading the binder around the toe to the other side of the shoe, and means for causing the shoe to be released to facilitate the anchoring of the binder at the second side of the shoe.

86. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe and having provision for lateral movement of the toe gripper, and friction means to hold the toe gripper normally in the lateral position to which it is moved.

87. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe and having provision for lateral movement of the toe gripper, shoulders on the toe gripper, abutments for said shoulder, and yielding means for holding said shoulders down on said abutments while the toe gripper is open whereby said gripper is held in the lateral position to which it may be moved.

88. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe and having provision for lateral movement of the toe gripper, a guideway wider than the toe gripper to allow movement of the gripper, a movable back support for the gripper, a friction plate extending across said guideway in front of the gripper, and springs operating to cause said plate to follow the backward movement of the gripper and restrain it from loose lateral movement while permitting lateral adjustment by force applied for that purpose.

89. A machine of the class described hav-

ing, in combination, pulling-over mechanism including means for pulling an upper at the middle of the toe and means including a yielding element for straightening up the upper at the corners of the toe into a position corresponding to the upper at the middle of the toe, but without tensioning the upper over the corners of the toe to a corresponding extent.

90. A machine of the class described having, in combination, pulling-over mechanism including means for pulling an upper at the middle of the toe and means for straightening up the upper at the corners of the toe into a position corresponding to the upper at the middle of the toe, and additional means operating automatically for thereafter bending said straightening portions of the upper inwardly over the corners of the toe.

91. A machine of the class described having, in combination, pulling-over mechanism including means for pulling an upper at the middle of the toe and means for straightening up the upper at the corners of the toe into a position corresponding to the upper at the middle of the toe, and means for drawing a binder under tension around the toe portion of the shoe to bind in the upper against the shoulder of the shoe sole.

92. A machine of the class described having, in combination, grippers, means for actuating them in pulling-over an upper, means movable transversely of the shoe from opposite sides thereof for pressing the upper over the last bottom from the sides and also from the toe end and mechanism operatively connected with the gripper actuating means for imparting the specified movements to the upper pressing means.

93. A machine of the class described having, in combination, grippers, means for actuating them in pulling-over an upper, means permitting movement of the grippers for adjusting the upper about the last, and corner wiper plates movable from opposite sides of the shoe to force the upper toward lasted position over the corners of the toe of the shoe.

94. A machine of the class described having, in combination, grippers comprising jaws to seize the upper at the end of the toe and at the corners of the toe, corner wipers to coöperate with the corner jaws in working the upper over the last bottom, and tackers associated with the corner wipers for fastening the upper in overworked position.

95. A machine of the class described having, in combination, grippers comprising jaws to seize the upper at the end of the toe and to seize and hold the upper in relatively light grip at the corners of the toe, means for actuating the gripper rearwardly to carry the upper over the last bottom, and corner wipers for laying over the last bottom the upper which is lightly held by the corner gripper jaws.

96. A machine of the class described having, in combination, grippers comprising jaws to seize the upper at the end of the toe and to seize and hold the upper in a relatively light grip at the corners of the toe, means for actuating the gripper rearwardly to carry the upper over the last bottom, and means for drawing a binder under tension around the toe portion of the shoe to fasten the upper in lasted position against the shoulder of the shoe sole and adapted to draw the upper from the relatively light grip of the corner jaws as may be required in forcing the upper into position to be bound.

97. A machine of the class described having, in combination, means operating at the sides of the ball and the top of the toe to pull over an upper, and means for seizing and straightening up the upper at the corners of the toe with a distinctly different degree of pulling strain from that applied at the other specified points.

98. A machine of the class described, having, in combination, pulling-over mechanism, means for turning inwardly over the last bottom the upper at the corners of the toe, and devices for anchoring a binder at one end and for then applying it around the end of the toe to bind the toe portion of the upper.

99. A machine of the class described having, in combination, means for separately working into lasted position the upper at the two corners of the toe of a shoe and devices located on opposite sides of the shoe and arranged for individual control for inserting tacks into the portions of upper overworked by said means.

100. A machine of the class described having, in combination, means for separately working into lasted position the upper at the two corners of the toe of a shoe, devices for inserting tacks into the portions of upper overworked by said means, and means for applying a binder of continuous material progressively around the toe end of the shoe, all of said means and devices being arranged to operate on the shoe while the shoe remains in one position.

101. A machine of the class described having, in combination, pulling-over mechanism including means for pulling an upper at opposite sides of the ball and at the toe end of the shoe and upper fastening mechanism including separately controlled tackers for the two sides of the shoe.

102. A machine of the class described having, in combination, pulling-over mechanism including means for pulling an upper at opposite sides of the ball and at the toe end

of the shoe, means for tacking the upper at the two sides, and separately operated means for turning in the upper at the corners of the toe and fastening the corner portions of the upper so turned in.

103. A machine of the class described having, in combination, pulling-over mechanism including means for pulling an upper at opposite sides of the ball and at the toe end of the shoe, means for tacking the upper at the two sides, and separately operated means for turning in and tacking the upper at the corners of the toe.

104. A machine of the class described having, in combination, means for working an upper over a last, a tacker movable automatically over the last toward position to insert a tack in the upper, and means controlled by the operator to trip the tacker.

105. A machine of the class described having, in combination, means for working an upper over a last, a tacker for inserting tacks on each side of the toe of the shoe, automatic means for supplying said tackers with tacks, automatic means for moving the tackers over the shoe, and manual means for independently effecting the insertion of the tack for each tacker.

106. A machine of the class described having, in combination, mechanism for working an upper over a last, and a tacker movable automatically over the shoe bottom toward position to insert the tack and mounted for manual adjustment relatively to such position before the tack is inserted.

107. A machine of the class described having, in combination, mechanism for working an upper over a last, a tacker movable automatically over the shoe bottom and mounted for manual movement to desired tack inserting position, and means to trip the tacker for causing a tack to be driven.

108. A machine of the class described having, in combination, mechanism for working an upper over a last, and a tacker to secure the upper comprising a tack guide, a driver, a spring to depress the driver, and manually operated means to raise the driver.

109. A machine of the class described having, in combination, mechanism for working an upper over a last, and a tacker in operative relation to said mechanism and comprising an upper wiping member and a manually operated driver, said parts being arranged for actuation together by the same hand of the operator.

110. A machine of the class described having, in combination, pulling-over mechanism including overworking devices arranged at opposite sides of the shoe and tackers similarly arranged and adapted for manual operation independently of one another.

111. A machine of the class described having, in combination, pulling-over mechanism including automatic over-working means arranged at opposite sides of the shoe and similarly arranged tackers moved automatically over the shoe bottom, and adapted to be caused to insert tacks at the will of the operator after reaching such position.

112. A machine of the class described having, in combination, upper overworking mechanisms arranged at opposite sides of the shoe and adapted for independent manipulation to overwork and tack the upper.

113. A machine of the class described having, in combination, a wiper and a tacker which are mounted for movement together by the same hand of the operator manually to overwork and then to tack the upper and means for supplying tacks to the tacker.

114. A machine of the class described having, in combination, a connected wiper and tacker for each side of the shoe, each wiper and tacker being arranged for separate manual manipulation to overwork an upper and then tack the upper.

115. A machine of the class described having, in combination, pulling-over mechanism including tacking means and a supplemental wiper and tacker arranged for manual manipulation to overwork and tack the upper.

116. A machine of the class described having, in combination, pulling-over mechanism including tacking means and a supplemental tacker arranged to be used optionally.

117. A machine of the class described having, in combination, pulling-over mechanism including means for laying over and tacking the upper at the opposite sides of the ball of the shoe and separate devices located at each side of the machine for turning inwardly the upper at the corners of the toe and means for driving tacks into the upper inturned by said devices.

118. A machine of the class described having, in combination, pulling over mechanism including overlaying and tacking means and supplemental corner wipers mounted for movement laterally of the shoe toward and from operative position.

119. A machine of the class described having, in combination, coöperating end lasting plates, power operated means to actuate said plates over the shoe bottom and come to rest, means by which said plates may be further actuated manually, and tackers carried by said plates and arranged to insert tacks at the will of the operator.

120. A machine of the class described having, in combination, a lasting plate, power operated means to actuate said plate and come to rest with the plate over the last, means for manually manipulating said plate for overworking the shoe upper, and a

tacker movable with the plate and adapted to be actuated to insert a tack at the will of the operator.

121. A machine of the class described having, in combination, toe lasting means, means for anchoring the free end of a strand of binder material at one side of the shoe, and means movable to place the binder around the toe of the shoe in holding relation to the upper.

122. A machine of the class described having, in combination, toe lasting means, means movable manually around the toe of the shoe to place a binder in holding relation to the material overworked by the lasting means, and means for driving a binder anchoring tack.

123. A machine of the class described having, in combination, toe lasting means, a tacker arranged to fasten one end of a binder to the shoe, and means arranged for operation independently of the toe lasting means for carrying the binder around the toe of the shoe.

124. A machine of the class described having, in combination, a connected tacker and wiper constructed and arranged to force an upper into position to be secured and to drive a tack for securing the upper at one point and anchoring a binder by which the upper is to be further secured.

125. A machine of the class described having, in combination, means for holding a shoe and a manually controlled tacker and wiper arranged to coöperate in wiping an upper into lasted position and tacking it, said tacker having provision for holding a binder in position to be anchored by the inserted tack.

126. A machine of the class described having, in combination, upper manipulating means, means for anchoring the free end of a binder strand, and means movable about the toe of the shoe to guide the binder into engagement with the upper.

127. A machine of the class described having, in combination, upper manipulating means, means for anchoring the free end of a binder strand, a binder guide, and means by which said guide may be moved around the toe of the shoe and causing the same to follow substantially the outline of the said toe.

128. A machine of the class described having, in combination, upper manipulating means, means for anchoring the free end of a binder strand, a binder guide, and means by which said guide may be moved to follow substantially the outline of the toe of the shoe for carrying the binder strand around the toe.

129. A machine of the class described having, in combination, upper manipulating means, means for anchoring the free end of a binder strand, a guide arm pivoted to swing to follow the outline of the shoe toe and means by which said arm may be moved around the toe.

130. A machine of the class described having, in combination, upper manipulating means, means for anchoring the free end of a binder strand, a pivoted arm adapted to be turned to draw the binder strand around the toe of the shoe being lasted, and means by which to turn the arm.

131. A machine of the class described having, in combination, upper manipulating means, and a pivoted and sliding arm adapted to draw a securing wire around the toe of a shoe.

132. A machine of the class described having, in combination, a holder for a binder, means to drive a tack to anchor one end of the binder, and means to release said end of the binder from the holder.

133. A machine of the class described having, in combination, a holder for a binder, means to drive a tack to anchor the binder, and means controlled by the tack driving means to free the binder from the holder.

134. A machine of the class described having, in combination, a holder to maintain a loop in a binder in position for a tack to be driven into the loop, and means for inserting a tack and dislodging the loop from the holder.

135. A machine of the class described having, in combination, a holder to maintain a loop in a binder in position for a tack to be driven into the loop, a tack driver and devices actuated by the driver and extending in relation to the holder into position to force the loop downwardly therefrom as the tack is being inserted.

136. A machine of the class described having, in combination, a slotted holder for a loop of wire, a driver working adjacent to the holder to insert a tack, and a projection extending laterally through the slot to engage the loop and extending below the tack engaging end of the driver to force the loop downwardly slightly in advance of the head of the tack.

137. A machine of the class described having, in combination, a holder for a loop of wire, a driver to insert a tack through said loop, and a wire dislodger arranged to be actuated automatically to dislodge the loop from the holder and position it where it will catch under the head of the tack when the wire is tightened.

138. A machine of the class described having, in combination, a loop holder, a loop dislodger, and a driver to insert a tack in the loop back of the holder and to actuate the dislodger to position the loop for engagement with the tack.

139. A machine of the class described hav-

ing, in combination, a tacker, means to hold a binder in position to be anchored by the tack inserted by the tacker, and means for automatically releasing the binder from the holding means when the tack is in position to retain the binder.

140. A machine of the class described having, in combination, a tacker, a binder holder adjacent to the path of the tack driver and a device arranged to be actuated by the driver to free the binder from its holder and insure its location below the head of the driven tack.

141. A machine of the class described having, in combination, a tacker, and a binder holder adjacent to the path of the tack driver, said machine having provision for freeing the binder from the holder by the driver movement.

142. A machine of the class described having, in combination, shoe supporters arranged at opposite sides of the machine and adapted for location under the shoe, corner wipers for the shoe, and means for positioning the supporters in accordance with the width and location of the last and accordingly positioning the corner wipers.

143. A machine of the class described having, in combination, a lasting device, and means for advancing said device over the edge of a last in a plane inclined inwardly and upwardly with relation to the last bottom, and thereafter tilting said device to effect and concentrate downward pressure at the inner edge of the device.

144. A machine of the class described having, in combination, a lasting device, means for advancing said device over the edge of a last in a plane inclined inwardly and upwardly with relation to the last bottom, and thereafter tilting said device to effect and concentrate downward pressure at the inner edge of the device, and means to insert a tack in the upper material so pressed downwardly.

145. A machine of the class described having, in combination, a lasting device, and means for advancing said device over the edge of a last with a sliding, wiping movement and for then tilting said device to concentrate pressure upon the work at the inner edge of the device.

146. A machine of the class described having, in combination, a lasting device, means for advancing said device over the edge of a last with a sliding, wiping movement and for then tilting said device to concentrate pressure upon the work at the inner edge of the device, and means to insert a tack in the area of concentrated pressure while the work is so held by the lasting device.

147. A machine of the class described having, in combination, a lasting device including a corner wiper, and means to advance said device transversely of the shoe over the shoe bottom while it is held with its lower face in a plane inclined upwardly and inwardly whereby the end of the corner wiper which is adjacent to the tip of the toe is raised clear of the plane of the shoe bottom, and thereafter to tilt the advance edge of the wiper downwardly to press the upper upon the shoe bottom.

148. A machine of the class described having, in combination, means to press an upper toward lasted position over a shoe bottom, said means having a shoe engaging face normally inclined upwardly and inwardly with relation to the plane of the shoe bottom, and actuating mechanism to advance said means over the shoe bottom with a wiping movement in said inclined relation thereto and then to tip it into a plane parallel to the shoe bottom.

149. In a machine adapted for use in working an upper over a last and the feather of an innersole of a welted shoe, an upper bending device, mountings therefor arranged to hold said device with its lower face inclined upwardly and inwardly with relation to the face of the innersole and to permit inward and downward tipping movement thereof, and actuating mechanism to advance said device over the shoe bottom and then tip it to press the upper downwardly and inwardly into the angle between the feather and the shoulder of the innersole.

150. A machine of the class described having, in combination, means to determine the plane of the shoe bottom, a wiper having its acting face normally inclined inwardly and upwardly with relation to that plane, actuating means for advancing the wiper, and a stop to limit the advance and cause the actuating means to tip the wiper downwardly to press the upper upon the shoe bottom.

151. A machine of the class described having, in combination, a wiper, a support upon which the wiper is pivoted above its acting face, means to hold the wiper swung inwardly about said pivot, means to limit the advance of the wiper over the shoe bottom, and actuating means to move said wiper and its support to bend the upper over the last edge and then apply downward pressure by the wiper.

152. A machine of the class described having, in combination, the wiper 16 having the abutment 17 to limit its movement over the shoe, the carrier 10 for the wiper, the spring 151 arranged to hold the wiper normally swung inwardly, and the actuator 8 for carrying the wiper over the shoe bottom and upon which the wiper is movably mounted to cause its advance edge to be tipped downwardly after the abutment contacts with the shoe.

153. A machine of the class described having, in combination, a lasting device and

means for actuating the device bodily over the shoe bottom with a wiping motion in contact with the upper materials, said machine having provision for automatically actuating said wiper downwardly after it has been moved over the shoe bottom.

154. A machine of the class described having, in combination, a pair of end wiper plates mounted to permit angular turning movement in a plane substantially parallel with the plane of the shoe bottom to close over an end of a shoe and also for right line movement over the shoe bottom and separate operating mechanisms for said plates having provision for imparting to one of said plates independently of the other working movements in a substantially right line over the last bottom.

155. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe and having provision for lateral movement of the toe gripper and yielding means to hold the toe gripper normally in the lateral position to which it is moved.

156. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe and having provision for lateral movement of the toe gripper, shoulders on the toe gripper, abutments for said shoulders, and yielding means for holding said shoulders down in said abutments while the toe gripper is open whereby said gripper is held in the lateral position to which it may be moved.

157. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe and having provision for lateral movement of the toe gripper, a guideway wider than the toe gripper to allow movement of the gripper, a movable back support for the gripper, a friction plate extending across said guideway in front of the gripper, and springs operating to cause said plate to follow the backward movement of the gripper and restrain it from loose lateral movement while permitting lateral adjustment by force applied for that purpose.

158. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe, and means for lowering the grippers into position to receive the upper and then reversely moving them to pull the upper, said machine having provision for adjustment to vary the position to which a gripper is lowered without necessarily changing the position to which the gripper is raised under working conditions.

159. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe, and means for lowering the grippers into position to receive the upper and then reversely moving them to pull the upper, said machine having provision for adjustment to vary the relative position to which the side and toe grippers are lowered without necessarily changing the position to which said grippers are raised under working conditions, and means for relatively adjusting the position of the several grippers with respect to the plane of the shoe bottom for receiving the upper to be pulled.

160. A machine of the class described having, in combination, pulling-over means including grippers arranged to engage an upper at the opposite sides of the ball and at the toe and having provision for lateral movement of the toe gripper into different shoe receiving positions, and means, operating with greater effect when said gripper is in shoe receiving position than when it is in upper stretching position, to hold the toe gripper normally in the lateral position to which it is moved.

161. A pulling-over machine having, in combination, pulling over means, side tackers, side tacker carrying arms, and corner wipers on said arms.

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

AMELIA A. BAYARD,
Executrix of the estate of Emery Bayard, deceased.

Witnesses:
THOMAS PIERCE,
FRED C. PAGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Corrections in Letters Patent No. 1,068,839.

It is hereby certified that in Letters Patent No. 1,068,839, granted July 29, 1913, upon the application of Emery Bayard, deceased, by Amelia A. Bayard, Executrix, of Rochester, New York, for an improvement in "Machines for Use in the Manufacture of Boots and Shoes," errors appear in the printed specification requiring correction as follows: Page 13, line 87, for the word "top" read *tip*; and page 14, line 80, strike out the word "manually"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of November, A. D., 1913.

[SEAL.]

R. T. FRAZIER,

Actiny Commissioner of Patents.