

Nov. 6, 1923.

O. ASHTON

1,472,823

LASTING MACHINE

Filed Dec. 23, 1918

4 Sheets-Sheet 1

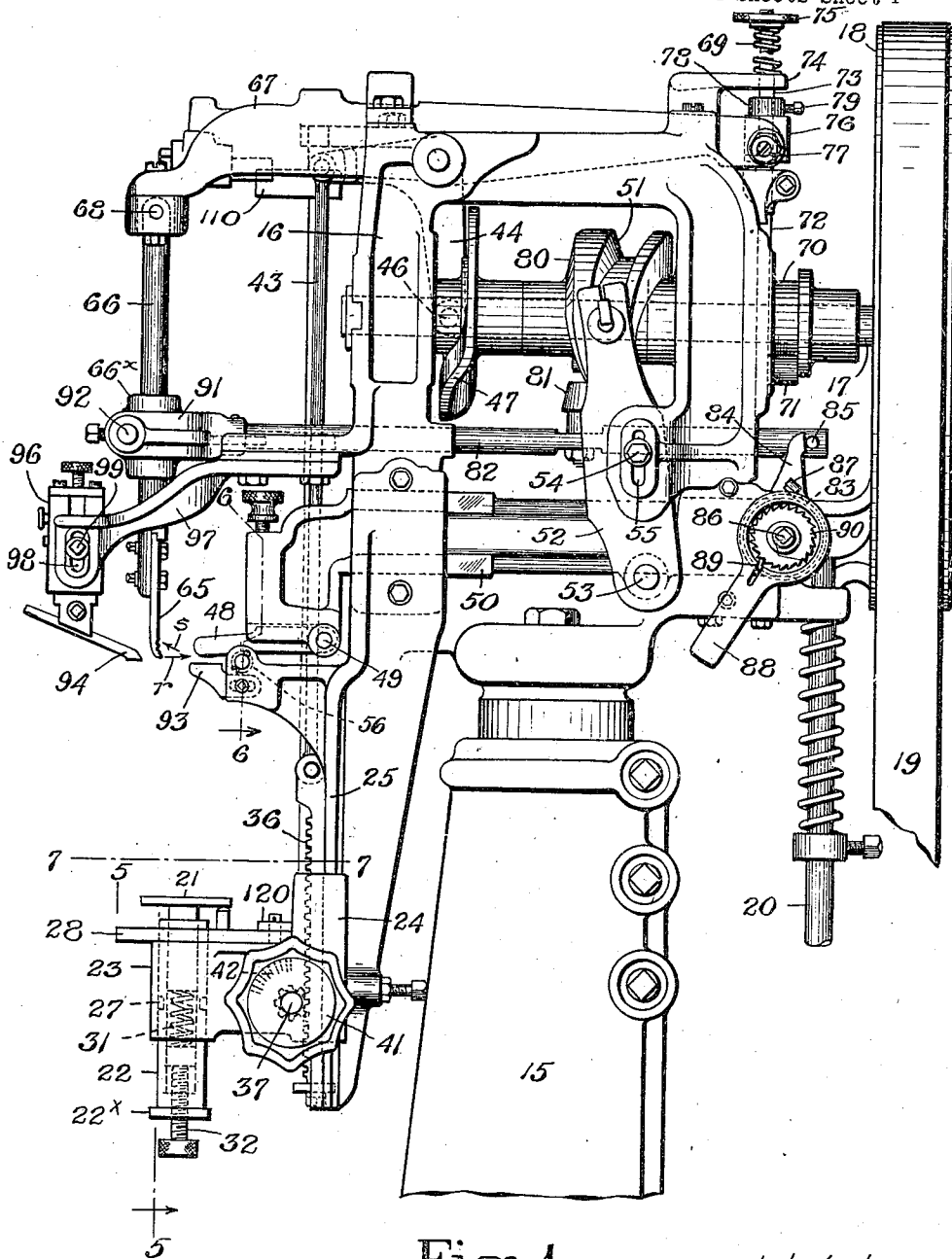


Fig. 1

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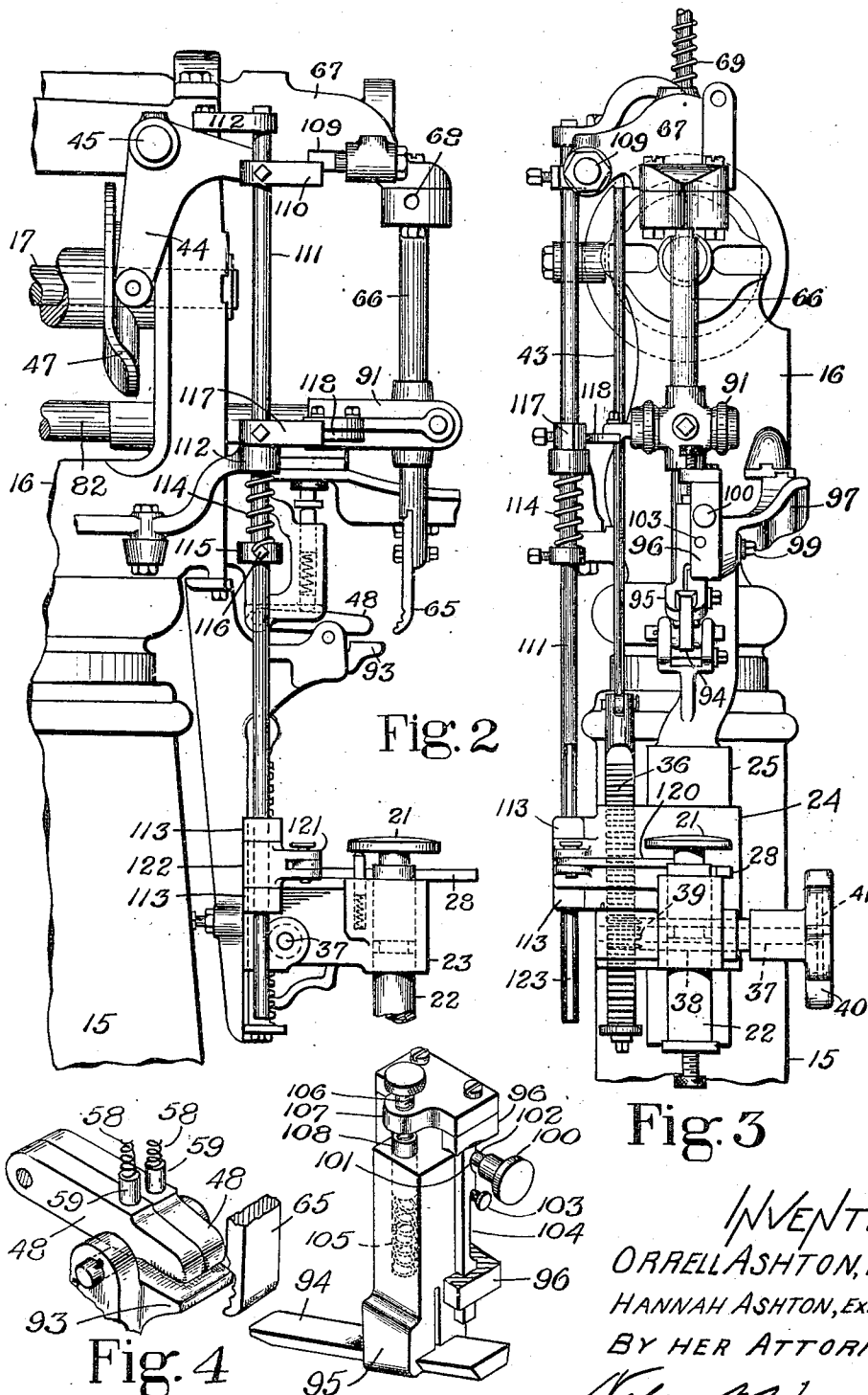
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4 Sheets-Sheet 2



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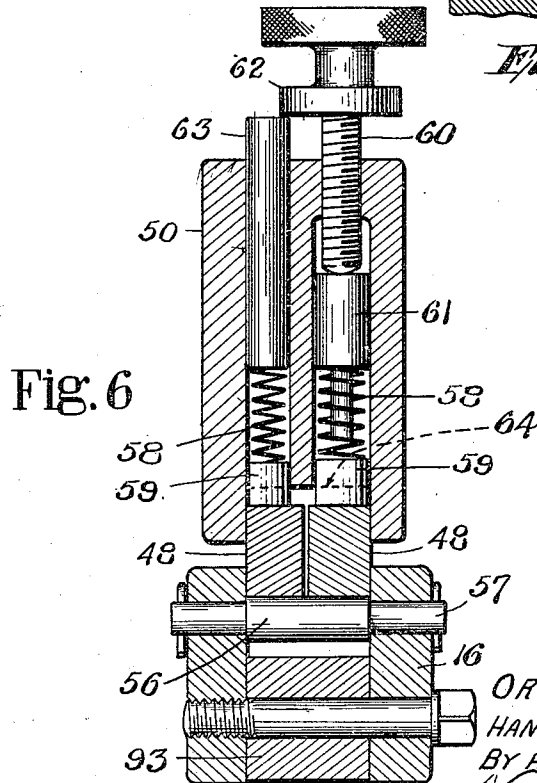
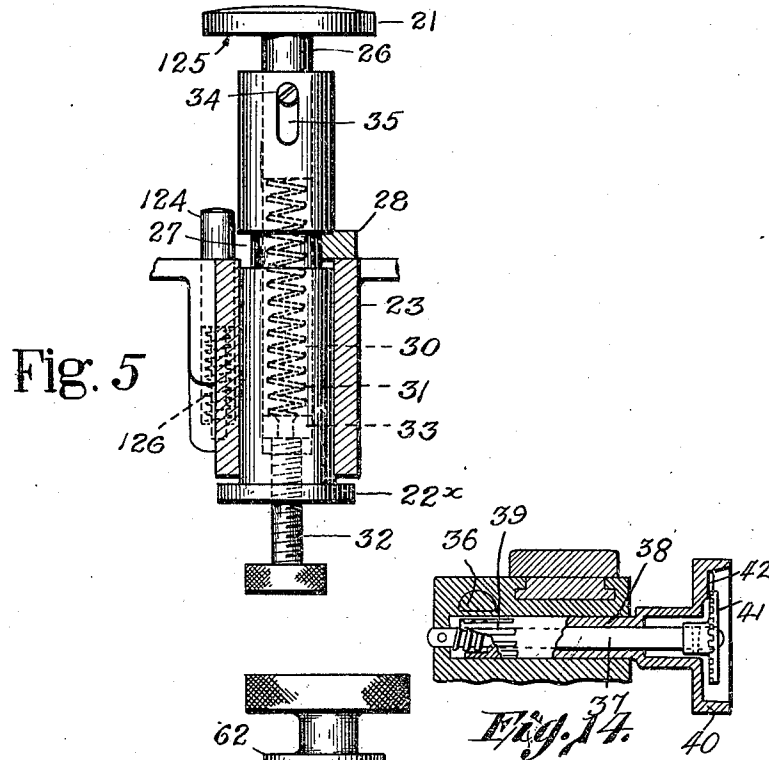
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4 Sheets-Sheet 4

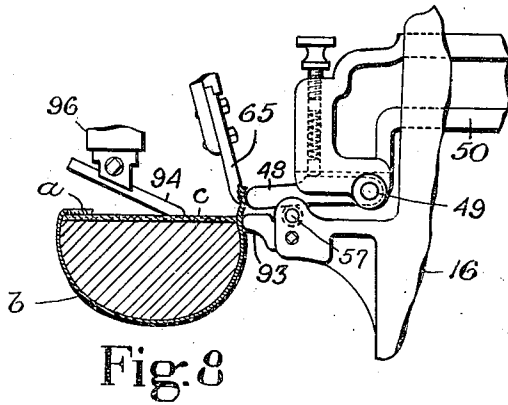


Fig. 8

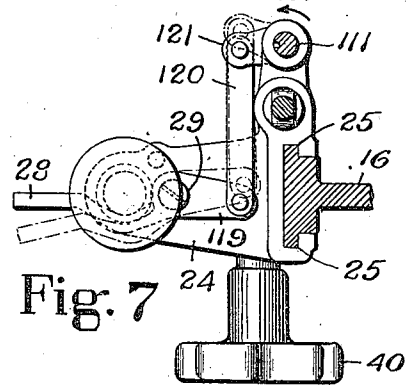


Fig. 7

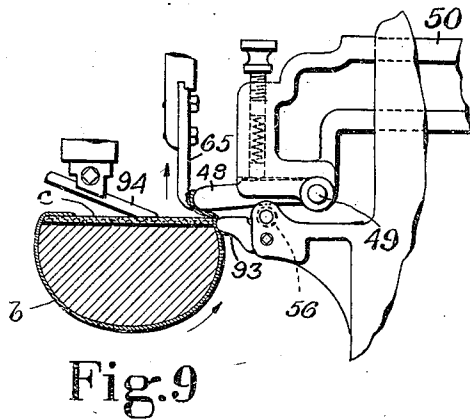


Fig. 9

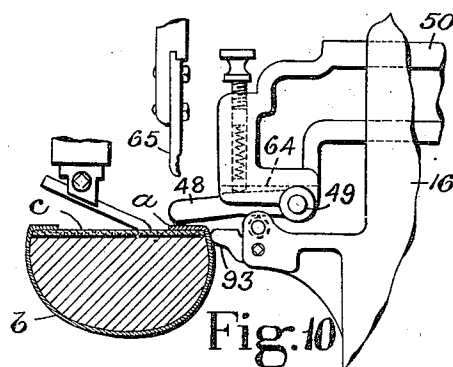


Fig. 10

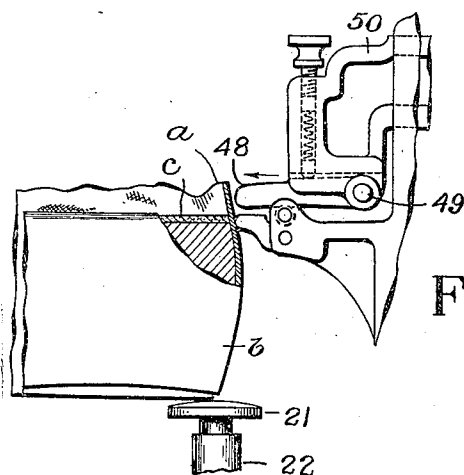


Fig. 11

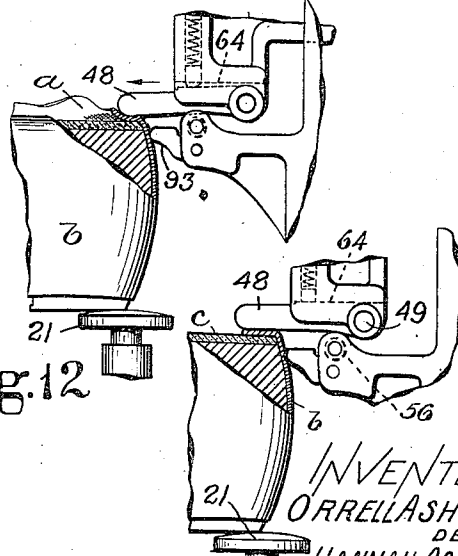
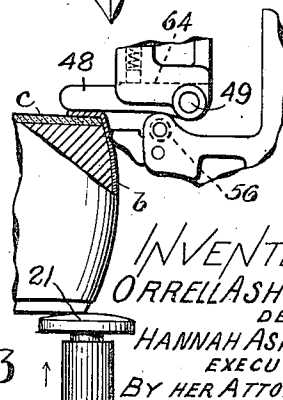


Fig. 12

Fig. 13



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UNITED STATES PATENT OFFICE.

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LASTING MACHINE.

Application filed December 23, 1918. Serial No. 267,973.

To all whom it may concern:

Be it known that ORRELL ASHTON, late of Swampscott, in the county of Essex and State of Massachusetts, deceased, invented certain Improvements in Lasting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to that class of shoe machinery known as lasting machines, and especially to machines of the type in which the shoe is moved to cause the work-engaging instrumentalities to operate progressively around the margin of the shoe, as distinguished from machines of the type in which the toe end is lasted by a single operation and the heel end likewise lasted by a single operation.

In the manufacture of shoes of some types it is desirable to coat the bottom face of the insole with adhesive substance prior to pulling over the margin of the upper, relying upon the adhesive coating, rather than tacks or other fasteners, to hold the pulled-over margin on the face of the insole until the operation by which the outsole is permanently secured to the upper. It frequently happens that the adhesive coating of the insole becomes considerably dried before the margin of the upper has been pulled over, with the result that the coating becomes very tenacious. This condition of the coating renders the pulling-over operation more difficult, particularly when the upper is lasted by a wiping action. Incidentally to a wiping action, the upper is bent over the edge of the insole and is pressed upon the face of the insole before it has been drawn to the intended degree of tightness against the last, and if the coating on the face of the insole is very tenacious at such times it will materially oppose the creeping of the upper and cause the wiper to slip without fulfilling its upper-tightening function.

The present invention is shown by the accompanying drawings as being embodied in a machine comprising a device arranged to bend the margin of the upper over the edge of the insole, and to press the bent-over portion against the face of the insole. This device, under conditions to be described later,

has the action of a wiper, and, for convenience, the latter term is applied to it, although, under conditions to be described first, its action is not that of a wiper. The machine as shown comprises a gripper arranged to act conjointly with the wiper to grip the upper and to pull it over the face of the insole without touching it to said face until the overdraft has been completed. As shown these instrumentalities are actuated in such manner that the wiper does not exercise its function of passing the pulled-over portion against the face of the insole until after the upper has been drawn tightly against the last, thus avoiding whatever opposition the aforesaid adhesive coating on the insole might otherwise offer to the drawing of the upper.

The wiper is, for the purposes above stated, under the stress of a spring that tends normally to press it against the face of the insole, and the gripper that co-acts with the wiper is under the stress of a spring that maintains the gripping action. Also, incidentally to the pulling-over action, the upper is drawn tightly about the last, then, being incapable of following the gripping elements after having given up all its slack, the pulled-over margin slips from the grip of the grippers, and as soon as it has escaped from such grip the wiper responds to the stress of its spring to move the pulled-over portion into contact with the adhesive coating and to press it against the face of the insole. The margin of the upper is thus assured of being pulled over as far as the last will permit before being permitted to contact with the adhesive coating, the subsequent pressing of the pulled-over portion against the face of the insole being executed so closely upon the escape of the upper from the grip of the gripper that the upper has no appreciable opportunity to lose the tension applied to it by the gripper. This tension is maintained in part by an edge rest against which the shoe may be held during the operation described, said edge rest being arranged to press the upper against the edge of the insole.

The pulling-over operation above described is intended to be practised on the forepart and shank portion of the shoe after the heel end has been lasted, and may also be

practised on the heel end if desired. Ordinarily, however, it would be sufficient to rely, so far as the heel end is concerned, upon the simpler and more rapid operation of wiping the upper over the insole without gripping it. This is accounted for by the fact that the necessity for tightening the upper about the last does not apply to the heel end excepting as to tension lengthwise of the shoe, and this tension cannot begin until after one end has been lasted. In order, therefore, to dispense with the gripping action at the heel end, and to expedite and improve the lasting of the latter, I have provided the machine with other means for co-operating with the wiper to last the heel end before lasting the other parts. By following this order of procedure the machine will have the benefit of the grippers to take up whatever slack may be necessary to tighten the upper after the heel end has been lasted.

For the purpose of promoting the lasting of the heel end as above outlined the machine shown is provided with a work-rest arranged to sustain the heelpart of the shoe to the action of the wipers, and is further provided with driven mechanism arranged to move the work-rest toward the wiper, while the latter is overlying the wiped-over portion, to cause supplemental pressure of the wiped-over portion against the coated face of the insole. Inasmuch as this part of the lasting operation does not require the gripper in the vicinity of the wiper the machine is provided with a detent arranged to hold the gripper away from the wiper to avoid interference with the latter, and to enable the operative to manipulate the shoe without interference from the gripper. This detent may be moved to release the gripper whenever it is desired to call the latter into play.

The aforesaid work-rest, which is intended to be used only when operating upon the heel end, is mounted in such manner that it may be moved to and from its work-sustaining position, and a detent is provided for holding it in said position. This detent also is capable of being moved to release the work-rest so that the latter may move to a remote position where it will not interfere with the manipulation of the shoe while the forepart and shank part are undergoing their part of the lasting operation.

The work-rest is supported by a carriage that is actuated periodically to apply the aforesaid supplemental pressure by which the wiper-over portion of the upper is pressed against the face of the insole. For reasons that will appear the work-rest is preferably made in two sections one of which will engage the work, and the other of which will hold the work-engaging section. This sectional construction permits

the introduction of a cushioning spring as a backing for the work-engaging section, and permits the work-rest, as a whole, to be shifted relatively to the carriage without alteration of the applied stress of the cushioning spring. The work-rest may, therefore, be moved to and from its operative position without affecting other adjustments.

As another feature of the invention the wiper is preferably divided into a plurality of sections, the latter being movable relatively to each other so as to be capable of exerting their pressure against the face of the insole independently of each other, the several sections of the wiper being thus capable of compensating for variations in the thickness of the pulled-over portion at different points, and being thus adapted to apply their pressure with substantially uniform degree, notwithstanding such variations in thickness. Both sections of the wiper, the latter having only two sections in the example shown, co-act with one gripper, the latter acting conjointly with each of the wiper sections to grip the upper.

When lasting the forepart and the shank portion it is necessary to tilt the shoe to various angles in order to do the work thoroughly and efficiently, but it is nevertheless desirable to have some instrumentality arranged to determine a suitable working position of the part being worked. In view of this reason the invention provides a sole-rest that may be locked in work-sustaining position when the aforesaid work-rest is retracted to its remote position. The sole-rest is, however, supported by a fixture relatively to which it is movable, and a spring is arranged to exert its stress normally to move the sole-rest to said position, but the sole-rest will be fixed or yielding according to whether a locking device with which it is provided is in or out of locking position. In practice, when operating with the aid of the heel part work-rest, the sole-rest may bear upon the face of the insole, but will preferably be unlocked so that it may yield in response to the movement of the heel part work rest that causes the supplemental pressure of the wiper upon the wiped-over portions.

It has been stated that the gripper is provided with a detent to hold it away from the wiper, and that the work-rest is provided with a detent to hold it in work-sustaining position. In practice these two detents are called upon to function at the same time, and their periods of non-use are co-extensive. In view of this condition the invention provides the said detents with connections by which they may be moved in unison to release the gripper and the work-rest collectively, thus enabling the operative to effect the release of both by one operation instead of having to perform two separate re-

leasing operations, and avoiding the possibility of damage that might result from releasing one without releasing the other.

Fig. 1 represents a side elevation of the upper portion or head of a lasting machine embodying my present invention in one form. In this figure the heelpart work-rest is retracted from its work-sustaining position;

Fig. 2 represents an elevation of the front part of the head as viewed from the opposite side with reference to Fig. 1;

Fig. 3 represents a front elevation of the structure shown by Fig. 2;

Fig. 4 represents a perspective view including the sectional wiper, the gripper that coacts therewith, and the sole-rest, the fixture that supports the latter being broken away and shown partly in section;

Fig. 5 represents a vertical section, partly in elevation, of the heelpart work-rest as viewed from line 5—5 of Fig. 1;

Fig. 6 represents a section through the sectional wiper as viewed from line 6—6 of Fig. 1;

Fig. 7 represents a horizontal section as viewed from line 7—7 of Fig. 1;

Fig. 8 includes the wiper, the gripper, and the sole-rest, in elevation as in Fig. 1, the forepart of an unlasted shoe being represented in cross section. This figure represents the wiper and the gripper as having gripped the margin of the upper preparatory to pulling it over the insole;

Fig. 9 is a view similar to Fig. 8, excepting that the wiper and gripper have executed their pulling-over motion, the upper being still gripped and held out of contact with the face of the insole;

Fig. 10 is a view similar to Figs. 8 and 9, excepting that the gripper has been retracted from the shoe and the pulled-over portion of the upper has been pressed against the face of the insole by the wiper in consequence of having escaped from the gripper;

Fig. 11 represents the wiper as being about to wipe the upper over the heelseat of the insole, a portion of the work-rest being shown in work-sustaining position, and the heelpart of the last resting thereon;

Fig. 12 is a view similar to Fig. 11 excepting that the wiper has advanced over the heelseat and has wiped the upper over the insole;

Fig. 13 is a view similar to Fig. 12 excepting that the wiper has moved to its fully advanced position and the work-rest has been moved toward it to apply supplemental pressure to the wiped-over portion upon the face of the insole, and

Fig. 14 is a sectional view of parts shown in Fig. 3.

Referring first to Figs. 1, 2 and 3, a standard is indicated at 15, and the frame of the

head is indicated as a whole by numeral 16. A shaft 17 is mounted in suitable bearings in the head and is provided with a tight pulley 18 which is driven through a belt 19 by suitable clutch mechanism of well-known construction (not shown), under the control of the operative. A brake-rod 20 connected to the clutch-controlling mechanism is arranged to act on pulley 19 to stop the latter when the gripper, hereinafter described, is in its extreme upward and extreme forward position.

The heelpart work-rest comprises two telescoping sections 21 and 22, and is mounted as a unit in a bracket 23 formed upon a carriage 24. This carriage is mounted to slide up and down on guides 25 formed upon a part of the head 16. The structural details of the work-rest are shown best by Fig. 5. The work-engaging portion of the work-rest includes a stem 26, the latter being arranged to slide in the section 22. The latter section is tubular and serves as a holder for the work-engaging section. Bracket 23 is bored to receive section 22, the latter being adapted to slide up and down in the bracket. A flange 22* is formed at the lower end of section 22 to prevent the latter from being withdrawn upwardly from the bracket, and serving to limit the upward movement of the tubular section relatively to the bracket by striking the bottom face of the latter. As shown by Fig. 1, the work-rest is in its lower position relatively to the carriage, but as shown by Fig. 5 it is in its upper or potential work-engaging position relatively to the carriage. Section 22 is provided with an external annular groove 27 to receive a detent 28 as shown by Figs. 5 and 7, the detent being carried by the carriage and connected to the latter by a pivot member 29. A spring hereinafter identified is provided for moving the detent into groove 27 when the latter is in registration with the detent.

The holder section of the work-rest is bored to provide a cavity 30 for the reception of stem 26 and a cushioning spring 31. This cavity extends to the top of the holder but does not extend to the bottom. The bottom is, however, bored and tapped for the reception of a screw 32 by which the applied stress of spring 31 may be regulated. This spring is compressed between the stem 26 and a head 33 carried by the inner end of the regulating screw. The work-engaging section of the work-rest is held in the holder section by a screw 34, said screw being fixed in stem 26 and extending radially therefrom through a slot 35 in the holder section. The purpose of the slot is to enable the work-engaging section to yield relatively to the holder section when the carriage 24 is moved toward the wiper.

The carriage 24 is moved up and down by

a reciprocatory rack 36. The rack is actuated periodically by a cam hereinafter described. The connection between the rack and the carriage provides for adjustment of the latter relatively to the rack to take care of lasts of different depth. For this purpose a rod 37 is affixed to the carriage, and a sleeve 38 is mounted on the rod and adapted to be rotated. This sleeve is provided with spur teeth 39 at one end, said teeth being in mesh with the teeth of rack 36. A hand-wheel 40 is fixed to the other end of the sleeve, and by turning the hand-wheel the carriage may be adjusted up and down relatively to the rack. In order to maintain the adjustment provision is made for locking the sleeve against rotation, such provision comprising a stationary disk 41 fixed to rod 37. This disk is partly enclosed within the rim of the hand-wheel, and the confronting faces of the disk and hand-wheel are provided with locking teeth 42 represented by dotted lines in Fig. 1. Referring now to Fig. 14, the sleeve is capable of moving endwise to connect and disconnect the locking teeth, but such movement does not disconnect the teeth 39 from the teeth of the rack. When the hand-wheel 40 is moved to the right the locking teeth are engaged with each other in locking relation, but when it is moved to the left the teeth are disengaged and the sleeve is unlocked so that it may be rotated to adjust the carriage up and down.

A link 43 connects the rack 36 with an operating lever 44 of bell-crank form. The fulcrum stud of this lever is indicated at 45. A cam roll 46 carried by the lever rides on the face of a cam 47 carried by shaft 17. The effect of the cam is to lift carriage 24, the force of gravity being sufficient to move the carriage in the opposite direction and to keep the cam roll seated on the cam.

The margin *a* of the upper *b* of an unlashed shoe is bent over the edge of the insole *c* by a wiper, the latter comprising, in the present instance, two component sections 48, 48. These wiper sections are arranged side by side as shown best by Figs. 4 and 6. They are mounted upon a pivot stud 49 that is carried by a reciprocatory bar 50. This bar is moved positively in opposite directions by a cam 51 carried by shaft 17. Operating connection from the cam to the bar is formed by lever 52. The lower end of the lever is connected to the bar by pivot pin 53, and the fulcrum pin, indicated at 54, is fixed to the lever and has sliding connection with a part of the head 16. For this purpose the head is provided with a slot 55 in which the fulcrum stud moves.

The wiper sections bear normally on a rotary anti-friction bushing 56 mounted on a pin 57. This pin is supported by a part of the head 16. The wiper sections are mov-

able up and down relatively to and independently of each other so that each of them may take a position according to the thickness of the stock engaged by it without regard to the position taken by the other section. Both sections are normally pressed downwardly by spring stress, each section having, in the present instance, a helical compression spring 58. Followers 59, 59 are interposed between the springs and wiper sections. Provision is made for regulating the applied stress of the springs, and for this purpose a single regulating screw 60 is arranged to regulate both springs. As shown best by Fig. 6, screw 60 is screwed into the bar 50 from the upper side, the bar being bored and tapped for that purpose. The lower end of the screw bears on a follower 61, and the latter, in turn, bears on the upper end of one of the springs 58. A collar 62 formed on the head of the screw bears on a follower 63, and the latter bears on the other spring 58.

Although the wiper sections are normally pressed downwardly by the springs 58, they are adapted to be pressed upwardly by the work when the latter is lifted by the slide 24. In this connection it may be stated that the applied stress of spring 31 of the work-rest is greater than the aggregate stress of springs 58, and that the wiper sections, rather than the work-rest, yield until the upward movement of the wiper sections is arrested positively by a stop face 64 of bar 50. Fig. 13 shows the wiper sections as being pressed against said stop face in consequence of upward movement of the work-rest, the wiped-over portion of the upper being subjected to the applied force of spring 31 and being pressed against the face of the insole with a pressure of corresponding degree.

Cams 47 and 51 are timed in such relation that the work-rest occupies a lower position whenever the wiper is retracted from the work as shown by Figs. 1, 8 and 11. On the other hand, when the wiper is advanced to the position shown by Fig. 13 cam 47 acts to lift the work-rest, the shoe being thereby pressed against the wiper after the latter has reached a position where it may bring the spring 31 into play to apply supplemental pressure to the bent-over margin of the upper. The primary pressure of the wiper is applied by springs 58.

Although the members 48, 48 are usable as a wiper, they are usable also as gripping members, their leading ends being formed and arranged to act conjointly with a gripper 65. The gripping portions of the members 48 are smooth, but that of gripper 65 is preferably roughened and may be so prepared by forming transverse grooves. The general contour of the gripping face of gripper 65 is preferably concave so that the lower extremity may underlie the wiper

sections sufficiently to lift the latter against the stress of springs 58. The gripper 65 is fixed to a bar 66, this bar extending through a guide-sleeve 66* and being adapted to slide up and down therein. The upper end of the bar is connected by a pivot pin 68 to an operating lever 67. In the present instance the fulcrum stud 45 of bell-crank lever 44 serves also as the fulcrum stud of lever 67. This lever is continuously under the stress of a spring 69 that tends normally to move the gripper downwardly, upward movement of the gripper being effected by a cam 70 carried by shaft 17. The cam acts upon a roll 71, and the latter is carried by a slide 72 arranged to slide up and down in suitable guides formed on the head 16. A rod 73 is fixed to the slide and extends upwardly through a stationary bracket 74. Spring 69, which is helical in form, surrounds rod 73 and is seated upon bracket 74. A collar 75 fastened to the upper end of the rod bears upon the upper end of the spring, the latter being compressed between the collar and the bracket. The stress of the spring is thus applied to lift the rod and the slide, and cam roll 71 is thereby held in contact with cam 70. The rear end of lever 67 is connected to rod 73 by a collar 76, the collar being loose relatively to the rod and being connected to the lever by trunnions 77. When the slide 72 is raised by the spring the upper end of the slide abuts against the lower face of collar 76 and thereby moves the lever to lower the gripper. When slide 72 is moved downwardly collar 76 is depressed by a collar 78, the latter being fixed upon rod 73 by a set screw 79.

The gripper is moved toward the front by a cam 80 carried by shaft 17. This cam acts upon a roll 81 mounted upon a rod 82. This rod is arranged to move endwise in suitable bearings in the head 16, and is under the stress of a helical torsion spring 83 that tends to move it always to the rear, or to the right, as shown by Fig. 1. Spring 83 is provided with a regulating device by which its applied stress may be varied. For this purpose the spring is connected to rod 82 by a lever 84, the rod having a projecting stud 85 against which the lever bears. The lever is arranged to oscillate upon a fixed stud 86, and is provided with a lug 87 against which one end of spring 83 bears. The other end of the spring is anchored to a regulating handle 88. This handle is arranged to turn upon the stud 86, and is provided with a pawl 89 that co-acts with a fixed ratchet 90. The ratchet is shown as being fixed to stud 86. The spring may be wound up to any desired degree of stress by moving the handle 88 in a clockwise direction about stud 86, pawl 89 serving to prevent rotation in the opposite direction.

Rod 82 carries a fork 91 at its forward

end, said fork straddling sleeve 66* and being connected to the sleeve by a pivot pin 92.

Lever 67 and rod 82 are actuated in such timed relation as to impart a compound movement to the gripper, the latter being moved to the rear by spring 83 to grip the upper in consequence of spring stress rather than in consequence of any positive action. This enables the gripping stress to be regulated so that the upper may slip from the grippers after being drawn tightly about the last, and in practice it is desirable, for some purposes, to permit such slipping so that the stress of the wiper springs 58 may be utilized to press the pulled-over portion of the upper against the face of the insole in consequence of the escape of said portion from the gripper.

The gripper is shown by Fig. 1 as having descended on its way to grip the upper against the wiper sections. According to this figure the wiper is retracted to the right as far as it will go, in which position its leading end is behind the work-engaging portion of an edge-rest 93. The gripper proceeds from the position shown by Fig. 1 in a direction indicated by arrow *r*, such motion being imparted by spring 83. The margin of the upper is thereby gripped as shown by Fig. 8. The wiper-bar or carrier 50 is then moved positively toward the left, and at the same time gripper 65 is lifted by its cam 70 so that its lower end follows a path represented by arrow *s*. The motion from right to left draws the upper tightly about the last and pulls the margin of the upper over the edge of the insole, while the upward motion of the gripper keeps the pulled-over portion of the upper out of contact with the face of the insole. The overdraft of the upper is, therefore, free from all opposition from whatever adhesive substance may be on the face of the insole.

The wiper and gripper continue to move in the general direction of arrow *s* after having taken up the slack in the upper, in consequence of which the pulled-over portion of the upper slips relatively to the gripping members until it escapes from the gripper 65. Up to this time the wiper partakes of the upward motion of the gripper, the latter being held against the wiper with sufficient pressure to overcome the resistance of springs 58 to such upward movement. It follows, therefore, that the wiper escapes from the gripper 65 coincidentally with the escape of the upper, and the springs 58 assert themselves immediately to force the wiper sections downwardly and thereby press the pulled-over portion against the face of the insole. The result of this action is shown by Fig. 10. If the face of the insole is coated with adhesive substance the latter will hold the pulled-over portion so pressed against it. The gripper, as shown

by Fig. 10, is in its initial position, and remains there while the wiper is retracted to its initial position as shown by Fig. 1.

A sole-rest 94 for determining the plane of the work relatively to the gripping members is affixed adjustably to a sliding block 95. This block is arranged to slide up and down in suitable guides in a holder 96 which is affixed to a stationary bracket 97, the latter having a slot 98 through which a clamping screw 99 extends. The holder 96 is bored and tapped for the reception of screw 99, and the latter is adapted, when loosened, to move up and down in the slot according to the position taken by the holder. When the screw is tightened it clamps the holder firmly to the bracket. Block 95 is movable up and down relatively to the holder, but it may be locked relatively to the holder by a locking member 100. The block is formed with a notch 101 into which and from which the locking member may be moved. The locking member is provided with a stem 102 arranged to slide in a suitable bearing formed in holder 96. The range of movement of the sole-rest is limited by a pin 103, said pin being arranged in a hole bored through holder 96 and occupying an elongated notch 104 formed in the block. According to the structure shown notch 101 occupies a position in registration with locking member 100 when the block is as low as retaining pin 103 will permit. The locking member may then be inserted into the locking notch or withdrawn therefrom.

In practice the sole-rest may be locked when the heelseat work-rest is out of use, but when the latter is in use it is desirable to have the sole-rest unlocked so that the latter can yield to the upward movement of the shoe as caused by the heelseat work-rest. The block 95 is bored for the reception of a helical spring 105, and the latter may be put under compression by a regulating screw 106. This screw is held by a fixture 107, the latter being bored and tapped for the reception of said screw and being affixed to holder 96. A follower 108 is interposed between the screw and the spring. If, when using the sole-rest without the heelpart work-support, the locking member 100 be left in unlocking position, the spring 105 will serve to keep the sole-rest in the desired position unless excessive upward pressure be exerted on the shoe. Ordinarily, however, the spring would be sufficient for the purpose, but the locking member, in use, guards against the possibility of yielding, however great the upward pressure may be.

It has been stated that the gripper 65 may be held away from the wiper when it is desired to use the latter as a wiper and not as a gripping member. For this purpose lever 67 is provided with a stud 109, and a movable detent 110 is provided for support-

ing the stud in a raised position. As shown by Figs. 1 and 2, the gripper is in its lowest position, and the bottom face of stud 109 is a considerable distance below the upper face of detent 110. When the gripper is in its highest position the bottom face of stud 109 is as high, at least, as the upper face of the detent, so that the latter may be moved horizontally to a position under the stud. Detent 110 is fixed to a rock-shaft 111, and the latter is mounted in suitable fixed bearing members 112, 112, and in movable bearings 113, 113 carried by carriage 24. A helical torsion spring 114 is coiled about the rock-shaft, and its upper end is anchored to the adjacent bearing member 112, while its lower end is anchored to a collar 115. This collar is fixed to the rock-shaft by set screw 116. Spring 114 tends normally to turn the rock-shaft in a direction that will carry detent 110 to its holding position under stud 109, its normal direction of rotation being anti-clockwise in respect to Fig. 7.

The rock-shaft 111 carries a second detent indicated at 117, the function of which is to hold the gripper in its forward position when the gripper is held in its elevated position by detent 110. For this purpose the fork 91 is provided with a plate 118 behind which a detent 117 is adapted to lie when detent 110 underlies stud 109. The oscillatory motion by which detent 110 is moved to release stud 109 is sufficient to release plate 118.

The machine is provided with connections from detent 28 of the heelseat work-rest to rock-shaft 111 for the purpose of releasing the gripper and the heelseat work-rest in unison by one operation. Detent 28 is extended to the left as shown by Figs. 1 and 7 to provide a suitable handle by which it may be moved from its holding position. The other end of the detent is extended to provide an arm 119, and the latter is connected by a link 120 to an arm 121. The hub 122 of the latter arm is arranged to slide on rock-shaft 111, and is located between bearing members 113 so as to be carried up and down with the carriage 24. The rock-shaft is provided with an elongated keyway 123, in which a sliding key carried by hub 122 serves to lock the hub to the rock-shaft in respect to oscillatory motion without interfering with the up-and-down motion of the hub relatively to the rock-shaft. In consequence of these connections spring 114 is utilized not only to move detents 110 and 117 to holding position, but is utilized also to move detent 28 to holding position, although the latter detent moves up and down with the carriage 24.

The clutch-controlling mechanism may be like that shown and described in Letters Patent No. 1,254,917 to stop the shaft 17

when the gripper 65 is in its extreme forward and extreme upward position. Detents 110 and 117 are, therefore, free to move to their holding positions in response to spring 114 in consequence of lifting the heelseat work-rest far enough to place groove 27 in registration with detent 28. The only effort required of the operative for this purpose is that of lifting the heelseat work-rest relatively to its carriage. When it is desired to discontinue the use of the heelseat work-rest and to bring the gripper into play, the only effort required is that of moving detent 28.

Carriage 24 is provided with a spring plunger 124 arranged to engage the under face 125 of the heelseat work-rest, to soften the blow of the latter when it is dropped relatively to the carriage. The carriage is bored for the reception of the plunger, and a cushioning spring 126 is arranged in the bottom of the hole so bored.

In the operation of the machine, for lasting the toe and sides of the shoe, the operator will move the detent 28 provided the last rest is in its upper position, which will allow the last rest to drop and move the detents 110, 117 so as to bring the gripper member 65 into operation. The shoe is then held up against the bottom rest 94 and laterally against the edge rest 93 with the margin of the upper behind the gripper and in front of the wipers 48. The machine is now started by depression of the treadle to throw in the clutch. The wipers 48 move forwardly, engaging the margin of the upper in a plane somewhat above the shoe bottom and force it against the yieldingly held gripper member 65. At first the wipers 48 are supported by the roll 56 but as their movement continues the gripper 65 is lifted by its cam and carries upwardly the ends of the wipers 48 and the gripped portion of the upper. This portion of the upper is first carried under tension upwardly and inwardly of the shoe, as shown in Fig. 9, the margin of the upper being held out of contact with the margin of the innersole. Finally the resistance of the upper overcomes the frictional drag of the upper upon the gripper 65, causing the upper to be left behind as the gripper 65 rises and the frictional hold of the upper on the wipers 48 will cause them to be freed from the gripper so that they will be impelled downwardly by their springs 58 to deliver a blow or blows upon the upper and force it against the margin of the innersole, as shown in Fig. 10. In the treatment of cemented parts a blow is very effective for securing firm adhesion between the parts forced into contact by the blow. The operation described is repeated as often as necessary about the periphery of the toe and sides of the shoe to last all parts of the upper.

At the heel it is not desirable to tension the upper but to lay it in contact with the heel seat by an action which begins at the edge of the sole and extends inwardly to lay the margin of the upper against the heel seat progressively from the edge inwardly. Accordingly, when the heel seat is reached the operator will lift the last support 21 until the detent 28 snaps into the groove 27. Movement of the detent 28 will cause the detents 110, 117 to arrest action of the gripper member 65, the wipers, of course, being in operation. The work, with the crown of the last resting on the head 21 of the support, is then adjusted, if necessary, as shown in Fig. 11 by pushing the handle 40 and turning it in the required direction. The wipers 48 then advance as shown in Fig. 12, to wipe in the margin of the upper about the heel seat, and for each wiping movement the rack 36 is operated to effect upward movement of the last support and cause the overlaid margin of the upper to be pressed forcibly against the wipers 38, the upward movement of which is limited by the surface 64 (Fig. 13).

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

1. A machine of the character described comprising means to determine the working position of an unlasted shoe, gripping means arranged to grip the margin of the shoe upper, means arranged to operate said gripping means to pull the margin over the edge of the sole without touching the margin to the sole, and means arranged to cause relative movement of the shoe and an element of said gripping means after release of the grippers to press the pulled-over margin against the face of the sole.

2. A machine of the character described comprising means to determine the working position of an unlasted shoe, gripping means arranged to grip the margin of the shoe upper, said gripping means being movable to pull the margin over the edge of the sole without touching the margin to the sole, means to operate said gripping means as stated, an element of said gripping means being movable after the gripping means releases the upper to act by impact to force the pulled-over margin against the face of the sole, and means to move said element as stated.

3. A machine of the character described comprising means to determine the working position of an unlasted shoe, gripping means arranged to grip the margin of the shoe upper, said gripping means being movable to pull the margin over the edge of the sole without touching the margin to the sole, means to operate said gripping means as stated, an element of said gripping means being movable to press the pulled-over mar-

gin against the face of the sole, and automatic means arranged to move said element as stated in consequence of completion of the pulling-over action.

4. A machine of the character described comprising means to determine the working position of an unlatched shoe, co-operative grippers arranged to grip the margin of the shoe upper, said grippers being movable to pull the upper over the edge of the insole, one of said grippers being arranged to wipe the upper over said edge during the first stage of the pulling-over action, the other one of said grippers being movable to draw the pulled-over portion away from the bottom face of the insole, said wiping gripper being movable to press the pulled-over portion against said face, and means to cause said grippers to operate as specified.

5. A machine of the character described comprising means to determine the working position of an unlatched shoe, co-operative grippers arranged to grip the margin of the shoe upper, said grippers being movable to pull the upper over the edge of the insole without touching the pulled over portion to the bottom face of the insole, one of said grippers being movable after the grippers release the upper to press the pulled-over portion against said face, and means to cause said grippers to operate as specified.

6. A machine of the character described comprising means to determine the working position of an unlatched shoe, co-operative grippers arranged to grip the margin of the shoe upper, said grippers being movable to pull the upper over the edge of the insole at an angle to the bottom face of the insole, means arranged to cause said grippers to operate as specified, one of said grippers being movable relatively to the other to press the pulled-over portion against said face, and means arranged to cause such pressing in consequence of the escape of the upper from the grip of the grippers.

7. A machine of the character described comprising means to determine the working position of an unlatched shoe, a pusher arranged to push the margin of the shoe upper over the edge of the insole, said pusher having a smooth upper-engaging surface, a spring-stressed clamp having a rough surface arranged to coact with said smooth surface to clamp the margin of the shoe upper during the pushing action of the pusher, means to cause said pusher and said clamp to operate as specified, said pusher being movable relatively to said clamp to press the margin of the upper against the bottom face of the insole in consequence of the escape of the upper from said clamp, and a spring arranged to cause such pressing action of the pusher.

8. A machine of the character described comprising cooperative grippers for grip-

ping the marginal portion of the upper of an unlatched shoe, means arranged to move said grippers to pull said marginal portion upwardly and over the edge of the sole, and means arranged to move one only of said grippers toward the shoe bottom to press the pulled-over portion of the upper against the sole.

9. A machine of the character described comprising cooperative grippers for gripping the marginal portion of the upper of an unlatched shoe, means arranged to move said grippers to pull said marginal portion over the edge of the insole, means acting to retract one of said grippers from the shoe bottom during the pulling-over operation, and means arranged to move the other one of said grippers toward the shoe bottom to press the pulled-over portion of the upper against the margin of the insole.

10. A machine of the character described comprising cooperative grippers for gripping the marginal portion of the upper of an unlatched shoe, means arranged to move said grippers to pull said marginal portion over the edge of the insole, means acting to retract one of said grippers from the shoe bottom during the pulling-over operation, and a spring arranged to act on the other one of said grippers to press the pulled-over portion of the upper against the margin of the insole.

11. A machine of the character described comprising an inner gripper and an outer gripper arranged to grip the inner face and the outer face, respectively, of the margin of the upper of an unlatched shoe, a spring arranged to move said outer gripper toward the shoe bottom, means arranged to cause relative movement of said grippers to grip the upper, means arranged to impart pulling-over movement to said grippers, and means acting to retract said inner gripper from the shoe bottom during said pulling-over movement to keep the pulled-over portion of the upper out of contact with the face of the insole during the pulling-over action.

12. A machine of the character described comprising an inner gripper and an outer gripper arranged to grip the inner face and the outer face, respectively, of the margin of the upper of an unlatched shoe, a spring arranged to move said outer gripper toward the shoe bottom, the gripping portion of said inner gripper being arranged to act through the gripped element to sustain the outer gripper against the stress of said spring, means arranged to cause relative gripping movement of said grippers to grip the upper, means arranged to impart pulling-over movement to said grippers, and means arranged to retract said inner gripper from the shoe bottom during the pulling-over operation to keep the

pulled-over portion of the upper temporarily out of contact with the face of the insole.

13. A machine of the character described comprising co-operative grippers arranged to grip the margin of the upper of an unlasted shoe, said grippers being movable, while gripping, to pull the upper over the edge of the insole without touching the pulled-over portion to the face of the insole, one of said grippers being movable toward the shoe-bottom without the other to press the pulled-over portion against the face of the insole, and means arranged to actuate the latter said gripper for the purpose specified.

14. A machine of the character described comprising co-operative grippers, a spring arranged to press one of said grippers against the other to grip the marginal portion of the upper of an unlasted shoe, means arranged to move said grippers, while gripping the upper, to pull the latter over the edge of the insole and away from the bottom face of the insole, one of said grippers being movable, relatively to the other, toward the shoe bottom, and a spring arranged to move said relatively movable gripper toward the shoe-bottom in consequence of the escape of the pulled-over portion from the grip of the grippers, whereby the relatively movable gripper is caused to spank the pulled-over portion against the face of the insole.

15. A machine of the character described comprising co-operative grippers arranged to grip the margin of the upper of an unlasted shoe, means arranged to close said grippers, means arranged to move the grippers to pull the upper over the edge of the insole, means arranged to move one of said grippers to draw the pulled-over portion and the other gripper away from the face of the insole, and automatic means arranged to move said other gripper to press the pulled-over portion against the face of the sole in consequence of the escape of said portion from the grip of the grippers.

16. A machine of the character described comprising a single gripper jaw having a movement upwardly and inwardly relatively to a shoe bottom, a member cooperating with the gripper jaw in seizing an upper, and having a limited movement in the direction of upward movement of the gripper jaw, means for actuating the jaw and member relatively in timed relation to cause the upper to be pulled and released, and means for actuating the member after the release of the upper to lay the upper against the shoe bottom.

17. A machine of the class described comprising a gripper member arranged for vertical endwise movement over a shoe bottom, a cooperating member arranged for endwise

movement substantially parallel to the shoe bottom and cooperating with the gripper member to seize an upper, means for holding the gripper member yieldingly toward the cooperating member, the cooperating member being mounted so as to partake of the endwise movement of the gripper member to cause the upper to be tensioned, and means to limit said movement of the cooperating member while movement of the gripper member continues to cause the upper to be released.

18. A machine of the character described comprising a wiper movable to wipe the margin of the shoe-upper over the insole, means arranged to operate said wiper as stated, said wiper being arranged to yield in a direction transverse to its wiping movement, and automatic means arranged to move the shoe in said direction to press the face of the insole against the wiped-over portion while the wiper is upon the latter.

19. A machine of the character described comprising a movable shoe-support, a wiper movable to wipe the margin of the shoe-upper over the insole, means arranged to operate the wiper as stated, said wiper being arranged to yield in a direction transverse to its wiping movement, a stop to limit such yielding movement of the wiper, and automatic means arranged to move said shoe-support in said direction to press the face of the insole against the wiped-over portion while the wiper is upon the latter.

20. A machine of the character described comprising a yielding wiper arranged to wipe the margin of the shoe-upper over the insole, a stop to limit movement of the wiper perpendicularly to the shoe bottom, and automatic pressure-applying means arranged to engage the crown of the last to raise the wiper against the stop and to cause supplemental pressure of the shoe against the wiper subsequently to the wiping action of the wiper.

21. A machine of the character described comprising a wiper having a limited upward yield arranged to wipe the margin of the shoe-upper over the insole with preliminary light pressure, a shoe-rest arranged to engage the crown of the last and to sustain the shoe against the preliminary pressure of the wiper upon the wiped-over portion, and automatic pressure-applying means arranged to act on said shoe-rest to take up the yield of the wiper and increase the pressure of the shoe against the wiper while the latter is upon the wiped-over portion.

22. A machine of the character described comprising a wiper arranged to wipe the margin of the shoe-upper over the insole, a shoe-rest for engaging the crown of the last and a sustaining spring therefor arranged to sustain the shoe against the pressure of the wiper upon the wiped-over portion, and

automatic means arranged to increase and then maintain unchanged the stress of said spring upon the shoe-rest while the wiper is upon the wiped-over portion.

5 23. A machine of the character described comprising a wiper arranged to wipe the margin of the shoe-upper over the insole about the heel seat of a shoe, a shoe-rest to engage the last and a movable holder there-
10 for, said shoe-rest being movable relatively to the holder, a cushioning spring between said shoe-rest and the holder to sustain the shoe against the pressure of the wiper upon the wiped-over portion, and automatic
15 means arranged to move said holder to increase and then maintain the applied stress of said spring unchanged while the wiper is upon the wiped-over portion.

24. A machine of the character described
20 comprising a wiper for wiping the margin of a shoe-upper over the insole, a carrier movable toward and from the wiper in lines transverse to the path of wiping movement of the wiper, driven means arranged to advance the carrier periodically toward the
25 wiper, a holder carried by the carrier, a shoe-rest carried by the holder, said holder and said shoe-rest being movable relatively to each other in lines transverse to said path and being movable relatively to the carrier
30 in lines transverse to said path, a cushioning spring carried by the holder to sustain the shoe-rest in an advanced position relatively to the holder, and a member arranged
35 to lock the holder in an advanced position relatively to the carrier, said locking member being movable to permit said holder and said shoe-rest to recede collectively from the wiper and relatively to the carrier.

40 25. A machine of the character described comprising driven lasting mechanism including a work-engaging member arranged normally to partake of its intended actuation but being restrainable from executing
45 its active function, a movable detent arranged to restrain said member, a work-rest movable from one position to another, a movable detent arranged to restrain said work-rest in one position, and connections
50 from one of said detents to the other for releasing said work-engaging member and said work-rest collectively.

26. A machine of the character described comprising driven lasting mechanism including a work-engaging member arranged
55 normally to move from one position to another, a movable detent arranged to restrain said member in the first said position, a work-rest movable from one position to another, a movable detent arranged to
60 restrain said work-rest in one position, and connections from one of said detents to the other for releasing said work-engaging member and said work-rest collectively.

65 27. A machine of the character described

comprising driven mechanism including a member arranged to act on the work, a movable detent arranged to hold said member in one position, a work-rest movable to and from work-sustaining position, a movable detent arranged to hold said work-rest in said position, and connections from one of said detents to the other for releasing said member and said work-rest collectively.

28. A machine of the character described
75 comprising driven mechanism including a member arranged to move to and from work-engaging position in two directions, movable detents arranged to restrain said member from moving to said position, and connections from one of said detents to the other for releasing said detents collectively.

29. A machine of the character described comprising driven lasting mechanism including a gripping member for putting the margin of a shoe-upper over the edge of the insole, said mechanism including also a spring arranged to move said member toward the work, a detent arranged to hold
90 said member away from the work, a work-rest movable to and from potential work-sustaining position, a movable detent arranged to hold said work-rest in said position, connections from one of said detents to the other for releasing said member and
95 said work-rest collectively, said driven mechanism including a member arranged to operate upon the work while said work-rest and the first said member are held by the detents as aforesaid.

30. A machine of the character described comprising driven mechanism including a member for acting on one part of a shoe and a member for acting on another part of
105 the shoe, a movable detent arranged to hold one of said members away from the work, a work-rest and a carriage therefor, said work-rest being movable relatively to said carriage, a detent arranged to hold said
110 work-rest in one position relatively to said carriage, and connections from one of said detents to the other for retracting them in unison from their functioning positions.

31. A machine of the character described
115 comprising driven mechanism including a member for acting on one part of a shoe and a member for acting on another part of the shoe, a movable detent arranged to hold one of said members away from the work, a
120 work-rest and a carriage therefor, said work-rest being movable relatively to said carriage and the latter being movable relatively to the said detent, a detent arranged to hold said work-rest in one position relatively to
125 said carriage, and connections from one of said detents to the other for retracting them in unison from their functioning positions.

32. A machine of the character described comprising driven mechanism including a
130

wiper arranged to act on the upper of an unlasted shoe, a carriage movable toward and from said wiper, a shoe-rest carried by said carriage, driven means arranged to move said carriage to press the shoe against said wiper, said shoe-rest being movable relatively to said carriage, a detent carried by said carriage and arranged to hold said shoe-rest in one position relatively to the carriage, a spring-stressed member arranged to engage the work, a detent arranged to hold said member retracted from work-engaging position, and connections from one of said detents to the other for releasing said work-rest and said spring-stressed member collectively.

33. A machine of the character described comprising driven mechanism including two members arranged to act on the work conjointly for one function, one of said members being arranged to act on the work otherwise than in conjunction with the other said member, the other said member being arranged to be held from acting as aforesaid, a detent arranged to hold the other said member as stated, a work-rest movable toward and from said members, driven means arranged to move the work-rest to press the work against the first one of said members, a detent arranged to hold the work-rest in one position relatively to said driven means, and connections from one of said detents to the other for releasing, collectively, the elements said to be held by them respectively.

34. A machine of the character described comprising driven mechanism including a wiper and a spring-stressed gripper arranged to act conjointly to grip and draw the upper of an unlasted shoe, said wiper being arranged to function otherwise to wipe the upper, a detent arranged to hold said gripper from acting conjointly with said wiper, a work-rest movable toward and from said wiper, driven means arranged to move said work-rest to press the work against said wiper, said work-rest being movable relatively to said driven means, a detent arranged to hold said work-rest in one position relatively to said driven means, and connections from one of said detents to the other for releasing said work-rest and said gripper collectively.

35. A machine of the character described comprising driven mechanism including a wiper and a spring-stressed gripper arranged to act conjointly on an unlasted shoe, said wiper being arranged to act on the shoe otherwise than conjointly with said gripper, a detent arranged to hold said gripper from acting conjointly with said wiper, a work-rest and a support therefor, said work-rest being movable relatively to said support, a detent arranged to hold said work-rest in one position relatively to said support, and connections from one of said detents to the

other to release said gripper and the work-rest collectively.

36. A machine of the character described comprising a plurality of wipers arranged to move in unison to bend the upper of an unlasted shoe over the edge of the insole, said wipers being movable relatively to each other to press the bent-over portion against the face of the insole, a gripper arranged to act with said wipers to grip the upper conjointly with each of them and to pull it over the insole, and means arranged to cause said wipers and said gripper to execute the said conjoint action.

37. A machine of the character described comprising a plurality of members arranged to move in unison to bend the upper of an unlasted shoe over the edge of the insole, a gripper arranged to act with said members to grip the upper conjointly with each of them and to pull it over the insole, means arranged to cause said members and said gripper to execute the said conjoint action, said members being movable relatively to each other to press portions of the bent-over portion against the face of the insole and means arranged to cause relative movement of said members and the work to press the bent-over portion as stated.

38. A machine of the character described comprising a plurality of members arranged to move in unison to bend the upper of an unlasted shoe over the edge of the insole, a gripper arranged to act with said members to grip the upper conjointly with each of them and to pull it over the insole, means arranged to cause said members and said gripper to execute the said conjoint action, said members being movable relatively to each other to press portions of the bent-over portion against the face of the insole, and spring-stressing means arranged to act on said members to cause the pressing function ascribed to them.

39. A machine of the character described comprising a carrier, a plurality of work-engaging members arranged side by side and carried by said carrier to bend the upper of an unlasted shoe over the edge of the insole, said members being connected to said carrier so as to be movable independently of each other to press portions of the bent-over portion of the upper against the face of the insole, spring-stressing means arranged to act on said members to cause them to execute the pressing function ascribed to them, a gripper arranged to act with said members to grip the upper conjointly with each of them during the bending-over action, and means arranged to move said gripper away from the face of the insole during the gripping and bending-over period, to keep the bent-over portion of the upper out of contact with the face of the insole during said period.

40. The combination with means for operating upon a shoe, of a sole-rest for determining the plane of the shoe relatively to said means, and adjustable means to support the sole-rest, the latter being adjustable in lines substantially transverse to the intended plane of the sole and being movable, independently of such adjustability, along lines substantially parallel to the lines of adjustability.

41. The combination with means for operating upon a shoe, of a sole-rest for determining the plane of the shoe relatively to said means, a holder, and means for supporting said holder, said sole-rest being secured to said holder but being movable relatively to the latter along lines substantially transverse to the intended plane of the sole, said holder being adjustable in lines substantially parallel to the first said lines.

42. The combination with means for operating upon a shoe, of a sole-rest for determining the plane of the shoe relatively to said means, a holder, said sole-rest and said holder having co-operative guide portions connecting them and permitting relative movement of the sole-rest in lines substantially transverse to the intended plane of the sole, a stop arranged to limit relative movement of the sole-rest, a spring arranged to hold the sole-rest normally against said stop, and means to lock the sole-rest to said holder, said locking means including a member arranged to be moved manually to lock and unlock the sole-rest.

43. A machine of the character described comprising co-operating gripper members arranged for movement relatively to each other to grip the margin of the upper of an unlasted shoe, for movement while gripping to pull the upper and lay it over the margin of an innersole, and for movement again relatively to release the gripped stock and cause one gripper member to force the laid over upper against the last bottom,

and power operated mechanism for so actuating the gripper members to do their work.

44. A machine of the character described comprising co-operating grippers arranged to grip between them the margin of an unlasted shoe upper, said grippers being movable while gripping, the one bodily and the other pivotally and also the one pivotally and the other bodily, and means for operating the grippers to cause them to updraw a portion of the upper and to pull it over the edge of the last, one of said grippers being movable pivotally relatively to the other to press the pulled over portion against the face of the innersole when the upper is released by bodily movement of the other gripper.

45. A machine of the class described comprising a gripper member arranged substantially perpendicular to the bottom of a shoe to be lasted, means for uplifting the gripper member, means for yieldingly holding the gripper toward the inner face of the upper, a pivoted cooperating gripper member having its free end directed toward the gripping face of the gripper member, resilient means for urging the free end of the cooperating member toward the shoe bottom, means opposing said resilient means to confine movement of the cooperating member initially to a direction parallel with the shoe bottom to cause the upper to be gripped between it and the yieldingly held gripper member, and means for limiting movement of the cooperating member with the gripper member during the tensioning of the upper to cause the upper to be released by continued movement of the gripper member, the resilient means then reacting on the cooperating member to cause it to force the tensioned upper against the shoe bottom.

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

HANNAH ASHTON,
Executrix of the will of Orrell Ashton.