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LASTING MACHINE.  
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1,400,816.

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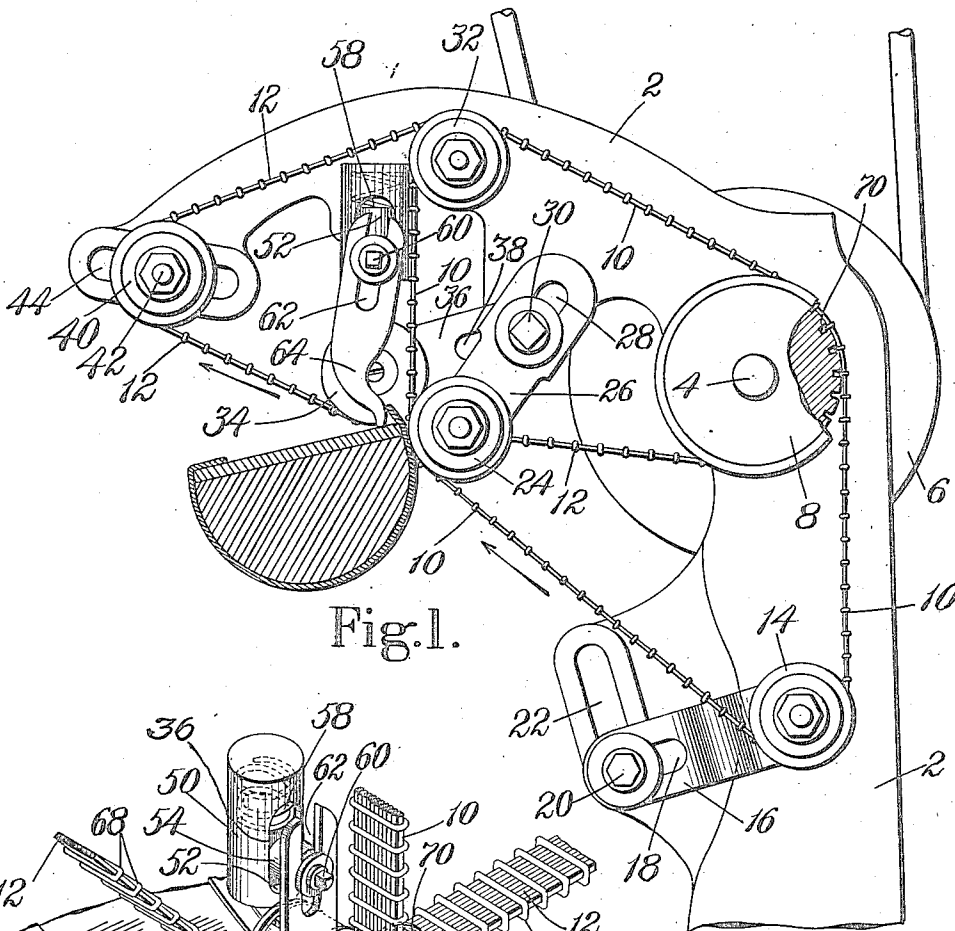


Fig. 1.

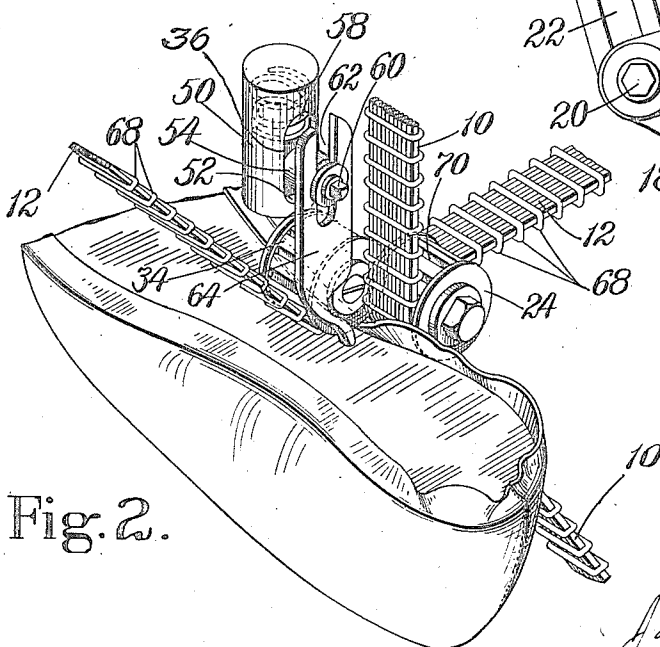


Fig. 2.

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# UNITED STATES PATENT OFFICE.

JOHN B. HADAWAY, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## LASTING-MACHINE.

1,400,816.

Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed June 13, 1918. Serial No. 239,760.

*To all whom it may concern:*

Be it known that I, JOHN B. HADAWAY, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have 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 machines for use in lasting shoes and more particularly to machines for lasting shoes in which the upper is secured to the bottom portion of the shoe in the lasting operation by the use of cement as, for example, in the manufacture of fabric shoes which are to have rubber outsoles vulcanized to them.

In the manufacture of shoes having vulcanized soles, the innersole, in accordance with the usual practice, is formed of a rubber compound known generally as "rag stock". This innersole is relatively thin and pliable and its outer surface is rendered "tacky" by the application of a suitable rubber compound. The upper of the shoe, when prepared for lasting, has the inner face of its margin coated with rubber cement which, when brought in contact with the tacky surface of the innersole, adheres firmly thereto. Heretofore, shoes of this kind have been lasted almost entirely by hand, the upper being merely bent over the edge of the last against the innersole by a rocking or wiping motion of the hand, particularly of the thumb. This hand work is exceedingly laborious and, by reason of the consequent fatigue of the operator and the general unreliability of the hand operation, uniform results in the course of a day's work are difficult to obtain. As a consequence, the manufacturer finds in his product a large number of "reject" shoes which have to be disposed of, if at all, at a greatly reduced profit or at a loss. Furthermore, it is practically impossible for an operator to apply with his fingers any substantial tension to the upper to shape it to the contour of the last since the effort required for the mere working over of the upper properly upon the innersole taxes the endurance of a person of ordinary strength when kept up continuously in the day's work. An object of this invention is to provide a machine for doing the work more rapidly than

it can be done by hand and for performing the stretching and overlaying of the upper more reliably and effectually than is possible by human agency alone.

A feature of the invention consists in an organization including wiping means for overlaying the margin of a shoe upper upon the bottom of the sole, which means has continuous pressing engagement with the overlaid upper margin throughout its width, and means for moving the wiping means continuously in a direction inwardly of and over the shoe bottom. As shown herein, the continuously pressing or wiping means may be of fabric.

Another feature of the invention consists in an organization including continuously effective overwiping means and means which may also be continuously effective for upwiping the upper at the side of the shoe. As shown herein, the machine is organized for lasting the shoe progressively and the continuously effective upwiping means is arranged to act in advance of and also simultaneously with the continuously effective overwiping means. In the construction shown, two belts of similar construction are provided, one constituting the upwiping means, and the other the overwiping means. The upwiping belt is arranged in advance of and offset from the overwiping belt so that after a portion of the upper is wiped upwardly against the side of the last, the margin of that portion is immediately thereafter engaged by the overwiping belt and laid against the bottom of the shoe. The belts are preferably arranged to be actuated positively and at the same speed.

An upper can be more effectively worked over a last by a varying or pulsating force than by a continuous pull or drag of sustained intensity. Accordingly a feature of the invention consists in means for imparting a varying or pulsating quality to the action of the wiping means during the operation of working the upper into lasted position. This result may be obtained, as in the construction shown, by wiping means which consists of a continuously moving means, for example, a belt upon which are arranged protuberances which successively engage the upper and impart the pulsating effect to the action of the belt in the conformation of the upper to the last. Between the protuberances or projections the belt itself acts upon

the upper and the upper is therefore treated alternately by a projection and by the intervening section of the belt.

Preferably the belt or wiping means has 5 rigid and yielding portions which act in turn upon the upper to treat the upper with varying degrees of intensity, for example, successively to hard and light wiping actions. As herein shown, the wiping means 10 comprises a continuously driven belt of yielding material which is provided on its acting face with hard protuberances which treat the upper to successive hard wiping actions. As shown herein, the protuberances 15 are formed by metallic bands encircling the belt and firmly clamped to it at regular intervals. Preferably the bands are arranged to co-act with grooves in the driving pulley which, therefore, effects a positive 20 actuation of the belt.

Another feature of the invention consists in means for holding in operative position those operating portions of the belts which act upon the upper. As herein shown, a 25 pulley is arranged at the side of the shoe to support the lower portion of the upwiping belt and another pulley is located over the margin of the shoe bottom to hold the overwiping belt in engagement with the upper. These pulleys are preferably grooved 30 to accommodate the protuberances upon the belts and are provided with means shown as flanges to prevent relative displacement of the belts and pulleys due to the drag of the shoe upon the belts as it is 35 fed in either direction. It will be observed that by this organization either belt constitutes a rest or work positioning means for locating the work with relation to the other belt, the pulley at the side of the 40 shoe supporting the belt for location of the work with relation to the overwiping belt and the pulley located over the margin of the bottom of the shoe supporting the overwiping belt for location of the shoe relatively to the upwiping belt. Preferably, 45 however, a shoe rest is provided in addition to the pulley and belt over the margin of the shoe bottom for positioning the shoe in proper relation to the wiping means and the rest may, as shown, be yieldingly mounted to allow varying intensities of overwiping effect to be secured by variation of the pressure with which the shoe is upheld 50 against the rest and hence against the overwiping means.

Another feature of the invention consists in means for relatively disposing the operating portion of the upwiping belt 60 which is leaving the pulley at the side of the shoe and the operating portion of the overwiping belt which is approaching the pulley over the bottom of the shoe at an angle which approximates the angle between 65 the side of the last and the bottom of the

last so that the operating portions of the upwiping belt will be held in engagement with the last at the side of the shoe adjacent to the bottom and the operating portions of the overwiping belt will engage 70 the upper throughout the width of the overwiped margin of the upper. Preferably the pulleys are arranged for vertical and lateral adjustment to enable the angle between the said portions to be varied. This 75 provision for adjustment of the pulleys also enables the field of action of the belts vertically at the side of the shoe and laterally over the shoe bottom to be varied and also enables the area of the upper treated by 80 the side wiping belt and the area treated by the overwiping belt to be increased or diminished. As herein shown, the operating portions of the belts are carried over idlers which are arranged for adjustment to maintain the belts tight when adjustments of the pulleys adjacent to the operating portions 85 of the belts are made.

These and other features of the invention will appear more fully from the following 90 detailed description when read in connection with the accompanying drawing, and will be pointed out in the appended claims.

In the drawing,—

Figure 1 is a side view of the machine 95 showing the shoe in section, and

Fig. 2 is a perspective view showing the operative parts of the machine in their relation to a shoe being operated upon.

Referring to Fig. 1 of the drawing, the 100 numeral 2 indicates the frame of the machine in which is journaled a shaft 4 having a pulley 6 to which power is applied. Fixed to the shaft 4 is a wide driving pulley 8 upon which are arranged two separate belts 105 10 and 12. The belt 10 passes from the pulley 8 downwardly to an idler 14 mounted on a bracket 16. The bracket is slotted at 18 and is secured to the frame by a bolt 20 which passes through the slot 18 and 110 through a slot 22 in the frame. By means of the bolt 20 and slots 18 and 22, the bracket 16 may be adjusted to tighten the belt 10. From the idler 14 the belt 10 passes to a pulley 24 located opposite the side of the shoe. 115 The pulley 24 is mounted on a bracket 26 slotted at 28 and held to the frame 2 by a bolt 30. From the pulley 24, the belt passes to a wide idler 32 and thence back to the driving pulley 8. The belt 10, as it passes 120 up over the pulley 24, acts against the upper at the side of the shoe to wipe it toward the shoe bottom.

The belt 12 passes from the driving pulley 8 to a pulley 34 located over the shoe bottom 125 and adjacent to its edge. The pulley 34 is mounted on a bracket 36 having a slot 38 through which the bolt 30 passes and holds the bracket 36 as well as the bracket 26 adjustably to the machine frame. From the 130

pulley 34 the belt 12 passes to an idler 40 adjustably held by its pivot bolt 42 in a slot 44 formed in an overhanging portion of the frame 2. Thence the belt 12 passes over the  
 5 wide idler 32 back to the driving pulley 8 by the side of the belt 10. The pulleys 24 and 34 are provided with flanges, as shown, to prevent lateral movement of the belts in response to the drag of the upper as it is  
 10 moved past the belts during the lasting operation.

Fixed to the frame 2 above the shoe is a guide 50 in which is a sliding block 52 having a lug 54 which extends through a slot 56  
 15 in the guide 50. A compression spring 58 between the bottom of the guide and the sliding block 52 normally holds the lug 54 against the lower end of the slot 56. A cap screw 60 is threaded into the lug 54 and is  
 20 embraced by an open slot 62 in a shoe rest member 64. This member may be adjusted vertically or laterally of the shoe and held rigidly to the lug 54 by tightening the screw 60. The member 64, however, may yield  
 25 vertically against the spring 58. The lower end of the member 64 is formed, as shown, to engage the bottom or sole of the shoe locally at a point substantially beneath the axis of the pulley 34. The member 64 is cut away  
 30 on its inner edge to avoid the possibility of its interfering with the overlaying of the upper margin against the shoe bottom.

The belts are preferably composed of textile material and may, as shown herein, be  
 35 made of a plurality of strands of cord arranged side by side. While the use of fabric or cord belts alone is contemplated, it is perhaps preferable to employ belts which are provided at short intervals with protuberances, for example, metallic bands or  
 40 clips 68. These clips are firmly fixed to the belts by being compressed into the material of the belts and are arranged at regular intervals. To accommodate the clips, the  
 45 driving pulley and preferably all the pulleys, are provided with grooves 70 which the clips engage as they pass over the pulleys. The clips and grooves provide, of course, means for actuating the belts positively from the driving pulley without slip-  
 50 page.

The pulleys 24 and 34 may, by loosening the bolt 30, be adjusted to vary the angle between the operative portions of the belts  
 55 10 and 12, for example, to cause the angle between them to approximate the angle between the side and bottom of the last. The pulleys 24 and 34 may also be adjusted to vary the length of the operative portions of the belts, that is, the length of the belt 10 from the pulley 24 to the point where it crosses the other belt or the length of the belt 12 from the point of crossing to the pulley 34. In this way the length of the wiping operation of either or both belts may be  
 60 65

varied. The slots 22 and 44 enable the slack of the belts to be taken up whatever the adjusted position of the rolls 24 and 34 may be.

In the operation of the machine, a shoe prepared for lasting is held against the rest  
 70 64 with its side against the belt 10 which acts to wipe and draw the upper upwardly at the side of the shoe toward the last bottom. The shoe is now pressed upwardly, the rest 64 yielding to allow the belt 12 to  
 75 come into wiping contact with the upwardly extending margin of the upper and wipe it into contact with the margin of the innersole where it is held by the cemented surfaces. The shoe is then moved transversely of the  
 80 belts to cause successive portions of the upper to be treated first to an upwiping action by the belt 10 and then to an overwiping action by the belt 12. When these operations have been performed about the periphery of the shoe, it is ready for the application of an outsole.

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

1. A lasting machine having, in combination, wiping means for overlaying the margin of a shoe upper upon the bottom of the sole, said wiping means being constructed and arranged for engagement with the overlaid margin throughout its width, and means  
 95 for moving said wiping means uninterruptedly in a direction inwardly of and over the shoe bottom.

2. In a machine for progressively lasting  
 100 a shoe upper, the combination of continuously and uninterruptedly operated means for upwiping a shoe upper at the side of the shoe, and continuously and uninterruptedly operated means for overwiping the shoe  
 105 upper on to the shoe bottom.

3. In a machine for progressively lasting a shoe upper, the combination of means continuously operated and continuously effective for upwiping the shoe upper, and means  
 110 continuously operative and continuously effective for overwiping the shoe upper.

4. In a lasting machine, the combination of continuously effective and continuously operated means for upwiping an upper at  
 115 the side of the shoe, and continuously effective and continuously operated means for overwiping the shoe upper.

5. In a machine for progressively lasting shoe uppers, the combination of means for  
 120 upwiping a portion of a shoe upper, and continuously and uninterruptedly operated means adjacent to the upwiping means for overwiping a portion of the shoe upper.

6. In a machine for progressively lasting  
 125 shoe uppers, the combination of means for upwiping a portion of a shoe upper, and a belt adjacent to the upwiping means for overwiping the portion of the shoe upper previously upwiped.

7. In a lasting machine, the combination of means for upwiping an upper at the side of a shoe, means for overwiping the upper upon the shoe bottom, and means for operating each of said means uninterruptedly and continuously in a direction to do its work.
8. In a lasting machine, the combination of means for upwiping an upper at the side of a shoe, means for overwiping the upper upon the shoe bottom, means for operating the overwiping means continuously in the same direction, and means for operating the upwiping means to do its work.
9. In a lasting machine, the combination of means acting upon a substantial area of the shoe upper at the side of the shoe toward the shoe bottom, means acting from the edge of the last inwardly over the shoe bottom and arranged to treat the overlaid margin throughout its width, and means for operating said means for effecting a simultaneous operation of both of said means on the shoe upper.
10. In a lasting machine, the combination of means acting upon a substantial area of the shoe upper at the side of the shoe to wipe the upper toward the shoe bottom, means acting from the edge of the last inwardly over the shoe bottom and arranged to treat the overlaid margin throughout its width, and means for operating said means for effecting a simultaneous operation of both of said means, the machine being organized to effect operation upon the portion of upper at the side of the shoe adjacent to and in advance of the portion treated by the means acting from the last edge over the shoe bottom as the shoe is fed for progressively lasting the upper.
11. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, and a belt arranged to travel laterally of the shoe in offset relation to the side wiping belt.
12. A lasting machine having, in combination, means arranged to upwipe the upper at the side of a shoe, a belt arranged to travel transversely of the marginal edge of the shoe bottom, and means for operating the upwiping means and the belt.
13. A lasting machine having, in combination, a belt arranged to travel up the side of a shoe, a belt arranged to travel transversely of the shoe bottom, and pulleys offset in the direction of their axes for holding the belts in operative relation against the side and bottom of the shoe.
14. A lasting machine having, in combination, a belt arranged to travel up the side of a shoe, a belt arranged to travel transversely of the shoe bottom, pulleys offset in the direction of their axes for holding the belts in operative relation against the side and bottom of the shoe, and a rest for positioning the work in relation to the portions of the belts adjacent to the pulleys.
15. In a machine for progressively lasting a shoe upper, means acting continuously for upwiping a portion of the upper, and means operating uninterruptedly and continuously to overwipe the said portion of the upper on the shoe bottom.
16. A machine for progressively lasting a shoe upper, having, in combination, means for upwiping a portion of the shoe upper, and continuously acting means effective subsequently as the lasting progresses to wipe over the upwiped portion upon the shoe bottom.
17. A machine for progressively lasting a shoe upper having, in combination, a belt for upwiping a portion of the shoe upper, and a belt effective subsequently as the lasting progresses to wipe over the upwiped portion upon the shoe bottom.
18. A lasting machine having, in combination, side wiping means and a bottom wiping belt.
19. A lasting machine having, in combination, a side wiping belt and a bottom wiping belt.
20. A lasting machine having, in combination, a belt arranged to travel up the side of a shoe, a belt arranged to travel transversely of the marginal edge of the shoe bottom, and means for operating the belts at the same speed.
21. In a lasting machine, the combination of means for upwiping an upper at the side of a shoe, means for continuously operating said upwiping means, and means for imparting a pulsating quality to the action of the upwiping means.
22. In a lasting machine, the combination of means for overwiping an upper upon a shoe bottom, means for operating said overwiping means continuously, and means for imparting a pulsating quality to the action of said overwiping means.
23. In a lasting machine, the combination of a belt arranged to engage an upper and to work the upper into lasted position, means for actuating the belt, and means for imparting a pulsating quality to the action of the belt.
24. In a machine of the class described, the combination of shoe positioning means, and a belt having protuberances adapted to treat successively an upper to hard wiping actions.
25. A lasting machine having, in combination, a belt arranged to travel up the side of a shoe, a belt arranged to travel transversely of the shoe bottom, and means for holding the belts in operative relation against the side and bottom of the shoe.
26. A lasting machine having, in combination, a belt arranged to travel up the side of a shoe, a belt arranged to travel transversely of the shoe bottom, means for holding the

belts in operative relation against the side and bottom of the shoe, and means for preventing lateral movement of the belts in response to the drag of the shoe as it is fed past said belts in the lasting operation.

27. In a machine of the class described, the combination of shoe positioning means, means for treating portions of an upper to successive hard wiping actions, and means to treat the same portion of the upper to light wiping actions.

28. In a machine of the class described, the combination of means acting continuously with different degrees of intensity to upwipe a shoe upper, and continuously acting means for overwiping a shoe upper.

29. In a lasting machine, the combination of means continuously acting to upwipe a shoe upper, and means continuously acting with different degrees of intensity for overwiping a shoe upper.

30. In a machine of the class described, the combination of shoe positioning means, and a fabric belt having metallic projections adapted to treat successively an upper to hard wiping actions.

31. In a machine of the class described, the combination of shoe positioning means and a wiping belt having thereon spaced metallic protuberances for treating an upper to successive hard wiping actions while the portions of the belt between the projections treat the upper to light wiping actions.

32. A lasting machine having, in combination, a side wiping belt, a bottom wiping belt, and means for positively driving the side wiping belt.

33. A lasting machine having, in combination, a side wiping belt, a bottom wiping belt, and means for positively driving the bottom wiping belt.

34. A lasting machine having, in combination, a side wiping belt, a bottom wiping belt, and means for driving both belts.

35. A machine of the class described having, in combination, a belt arranged to work an upper into lasted position against a shoe, projections on the inner face of the belt, and a driving pulley over which the belt passes provided with recesses to receive said projections and effect positive actuation of the belt.

36. A lasting machine having, in combination, a belt arranged to travel up the side of a shoe, a belt arranged to travel transversely of the shoe bottom, and means for holding the belts in operative relation to the shoe.

37. A lasting machine having, in combination, a belt having an operative portion arranged to travel upwardly at the side of a shoe in continuous engagement with the shoe upper, and a pulley arranged at the side of the shoe positively to support the lower end of the operative portion of the belt.

38. A lasting machine having, in combination, a belt having an operative portion arranged to travel laterally over a shoe bottom and to lay an upstanding portion of the upper margin into contact with the shoe bottom and remain in continuous pressing engagement therewith, and a pulley arranged over the shoe bottom in position to support the inner end of the operative portion of the belt.

39. A lasting machine having, in combination, a belt arranged to work an upper into lasted position against a shoe, projections on the inner and outer faces of said belt, the outer projections acting to treat the upper successively, and a pulley arranged adjacent to the shoe and over which the belt passes, said pulley having recesses to accommodate the projections on the inner face of the belt as they pass over the pulley in the lasting operation.

40. In a lasting machine, the combination of continuously effective means for overwiping a shoe upper on to the shoe bottom, and a yielding rest against which the shoe is held for the action of said means.

41. In a lasting machine, the combination of continuously and uninterruptedly operated means for overwiping a shoe upper, and a yielding rest against which the shoe is pressed to vary the intensity of the overwiping action.

42. In a machine of the class described, the combination of means acting to upwipe a shoe upper, continuously effective means to overwipe the shoe upper on to the shoe bottom, and a rest for the shoe arranged to yield to pressure of the shoe to increase the wiping action of the overwiping means.

43. In a lasting machine, the combination of means acting to upwipe a shoe upper, means acting to overwipe the shoe upper on to the shoe bottom and a rest to engage the bottom of the shoe, said rest being mounted for yielding movement at right angles to the shoe bottom.

44. A lasting machine having, in combination, wiping means for overlaying the margin of a shoe upper upon the bottom of the sole, said wiping means being constructed and arranged for engagement with the overlaid margin throughout its width, means for moving said wiping means continuously in a direction inwardly of and over the shoe bottom, and a rest for the shoe sole arranged to yield to pressure of the shoe for varying the effect of the overlaying means upon the shoe upper.

45. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, a belt arranged to travel laterally of the shoe, said belts having their operating portions arranged at an angle to each other approximating the angle between the side and bottom of the shoe,

either belt constituting a rest for the work to locate the work with respect to the other belt.

46. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, a belt arranged to travel laterally of the shoe, and means for supporting the belts so that either will constitute a rest for positioning the work with respect to the other belt.

47. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, and a belt arranged to travel laterally of the shoe, each belt being arranged to constitute a rest for the work in its presentation to the other belt.

48. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, and a belt arranged to travel laterally of the shoe, said belts having their operative portions arranged at an angle to each other approximating the angle between the side and bottom of the shoe.

49. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, a belt arranged to travel laterally of the shoe, said belts having their operative portions arranged at an angle to each other approximating the angle between the side and bottom of the shoe, and means whereby the angle between the operative portions of the belts may be varied.

50. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, and a belt arranged to travel laterally of the shoe in offset relation to the side wiping belt, said belts having the faces of their operative portions arranged at an angle to each other approximating the angle between the side and bottom of the shoe.

51. In a lasting machine, the combination of means acting upon a substantial area of the shoe at the side of the shoe toward the shoe bottom, means acting on the edge of the last over the shoe bottom and arranged to treat the overlaid margin throughout its width, and means for operating said means for effecting unceasing operation of both of said means, the machine being organized to permit variation of the area treated by the means acting on the last edge over the shoe bottom.

52. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, and a belt arranged to travel laterally of the shoe, said belts having their operating portions arranged at an angle to each other approximating the angle between the side and bottom of the shoe and being constructed and arranged for relative adjustment to vary the angle between the operating portions of the belts.

53. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, a belt arranged to travel laterally of the shoe, said belts having their operating portions arranged at an angle to each other approximating the angle between the side and bottom of the shoe, and means whereby the length of the operating portions of the belts may be varied.

54. In a lasting machine, the combination of means acting upon a substantial area of the shoe upper at the side of the shoe toward the shoe bottom, means acting from the edge of the last over the shoe bottom and arranged to treat the overlaid margin throughout its width, and means for operating said means for effecting unceasing operation on both of said means, the machine being organized to permit variations in the angle between the plane of action of the means acting at the side of the shoe and the means acting upon the edge of the last over the shoe bottom.

55. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, a belt arranged to travel laterally of the shoe, and means whereby the field of action of the belt acting against the side of the shoe may be varied.

56. A lasting machine having, in combination, a belt arranged to travel upwardly against the side of a shoe, a belt arranged to travel laterally of the shoe, and means whereby the field of action of the laterally traveling belt may be varied.

57. In a lasting machine, the combination of means acting upon a substantial area of the shoe upper at the side of the shoe toward the shoe bottom, means acting from the edge of the last over the shoe bottom and arranged to treat the overlaid margin throughout its width, and means for operating said means for effecting uninterrupted operation of both of said means, the machine being organized to permit variation of the area treated by the means acting at the side of the shoe.

58. In a lasting machine, the combination of means acting upon a substantial area of the shoe upper at the side of the shoe toward the shoe bottom, means acting from the edge of the last inwardly over the shoe bottom and arranged to treat the overlaid margin throughout its width, and means for operating said means for effecting simultaneous operation of both of said means on the shoe upper, the machine being organized to permit feeding of the shoe to cause successive portions of the shoe upper to be progressively treated by said means.

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

JOHN B. HADAWAY.