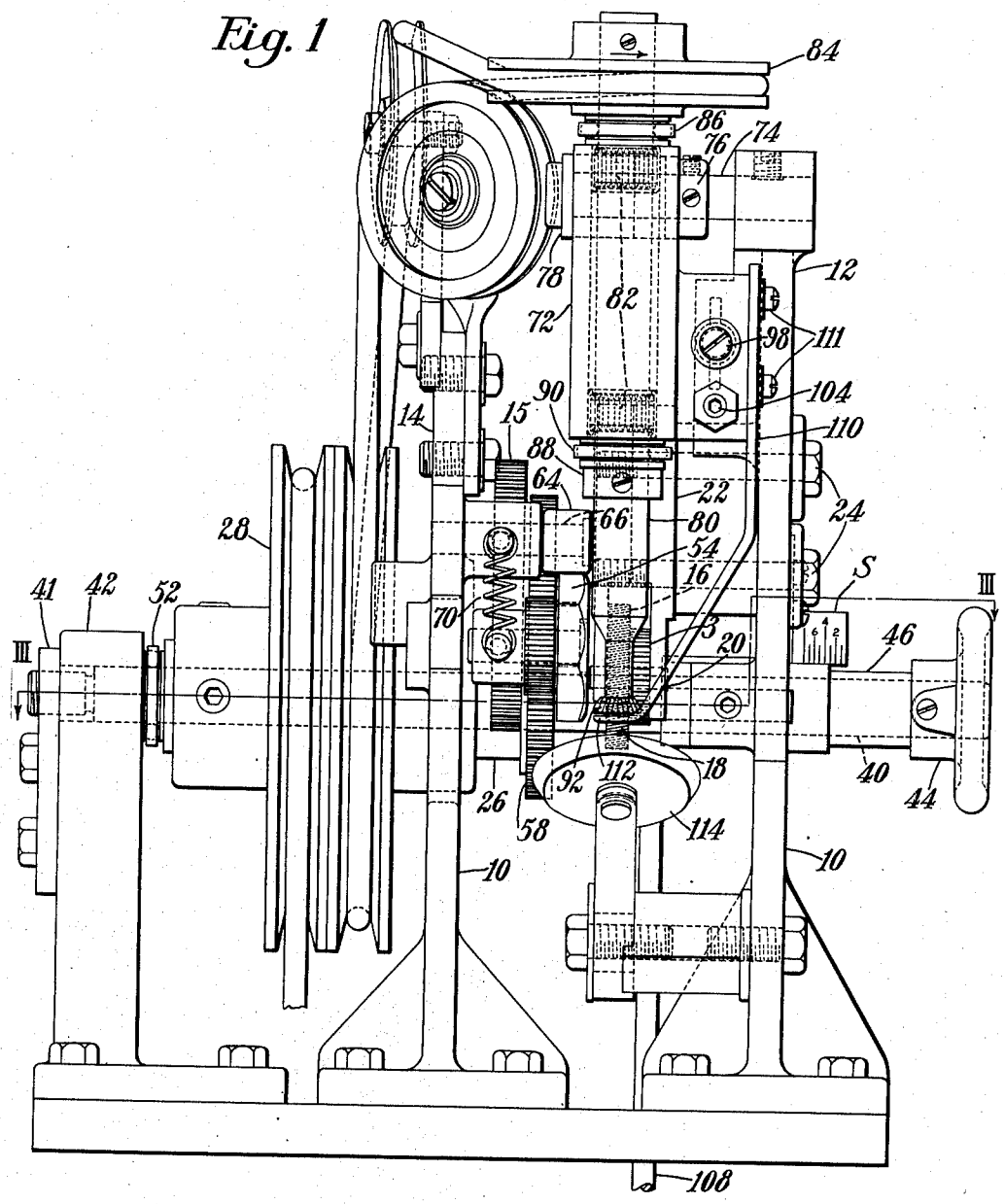
June 10, 1952 N. H. KNOWLTON 2,599,645

LASTING MACHINE

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Fig. 1



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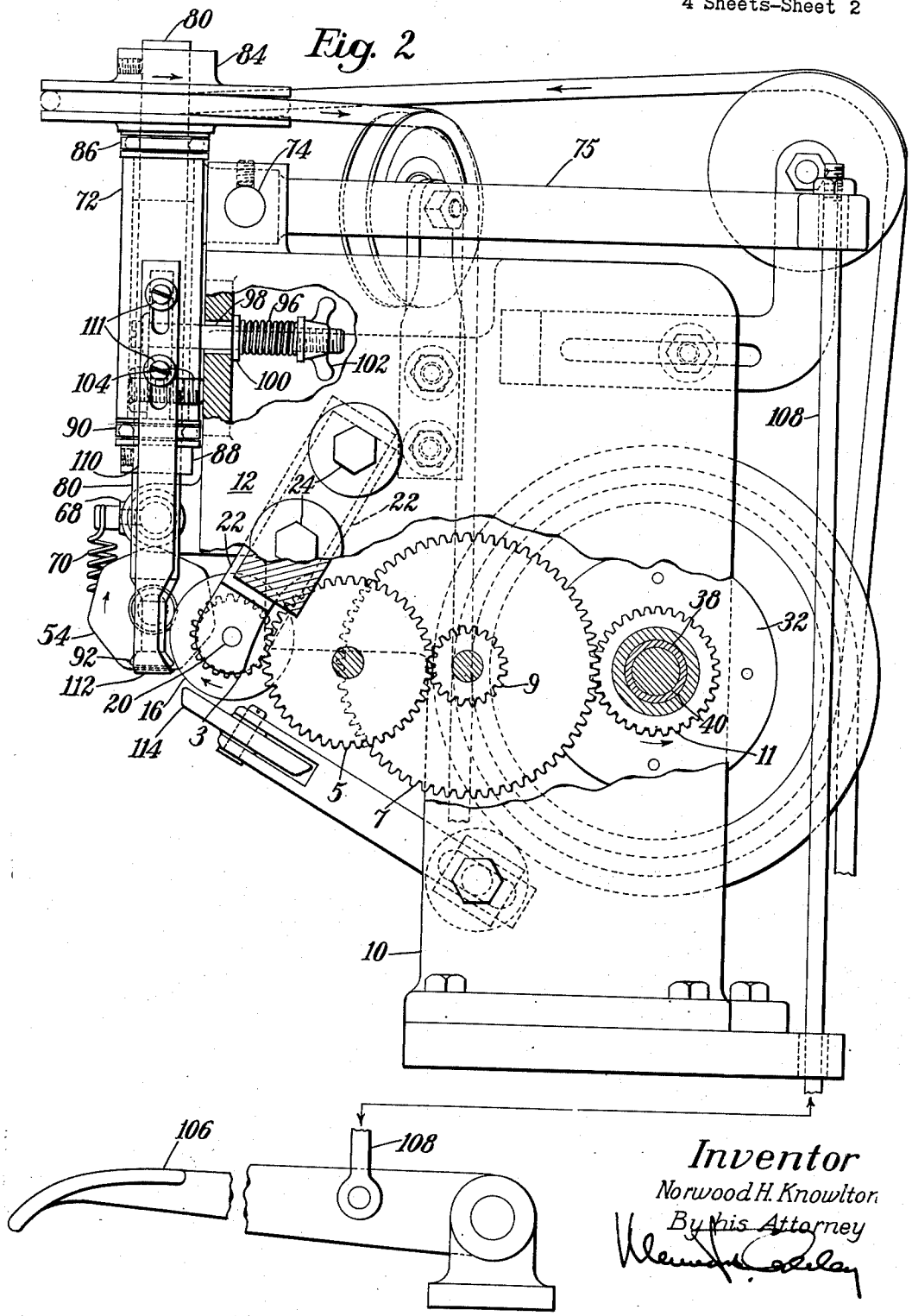
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LASTING MACHINE

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Fig. 2



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Fig. 3

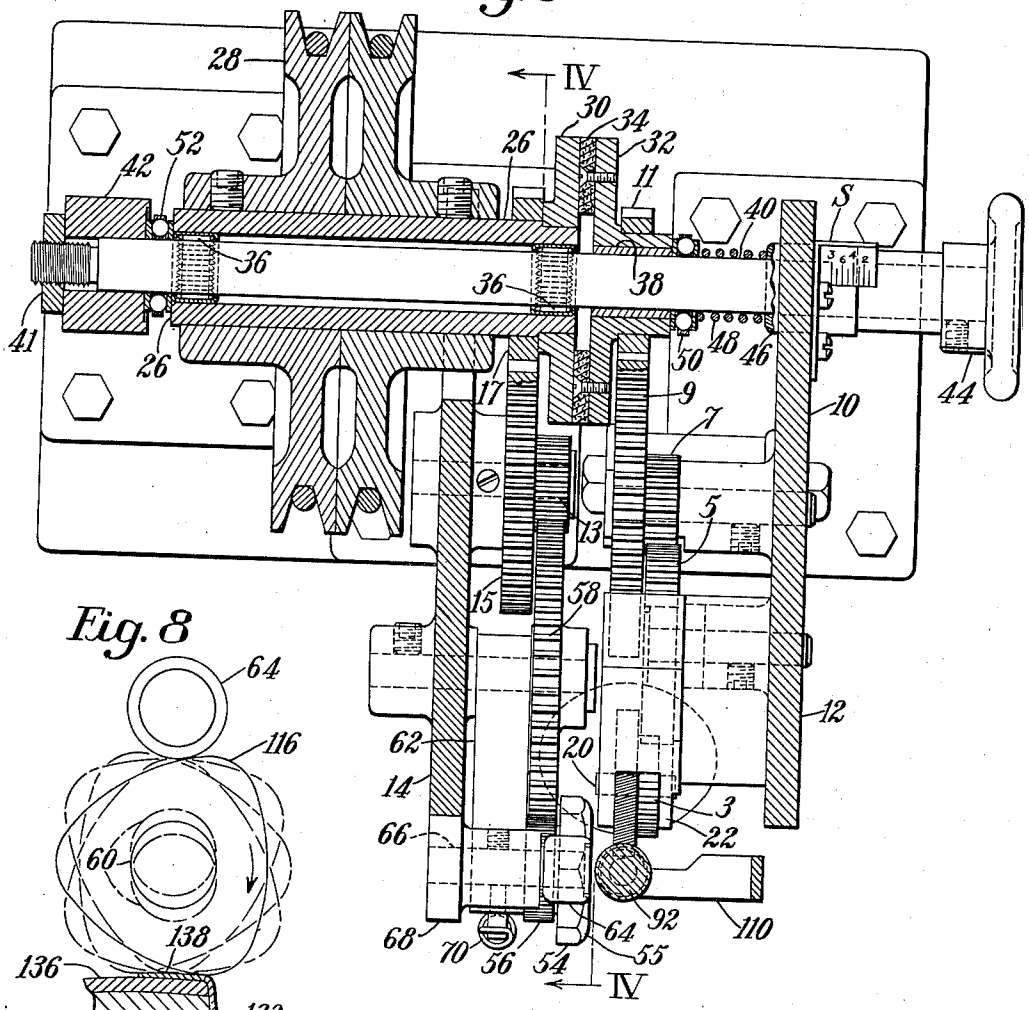
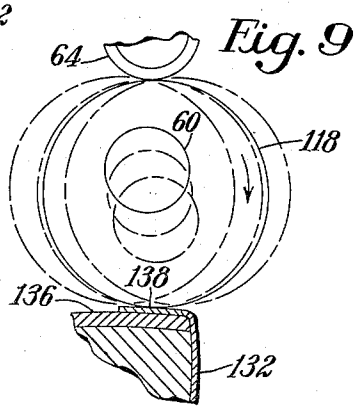


Fig. 8

Fig. 9



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June 10, 1952 N. H. KNOWLTON 2,599,645

LASTING MACHINE

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Fig. 4

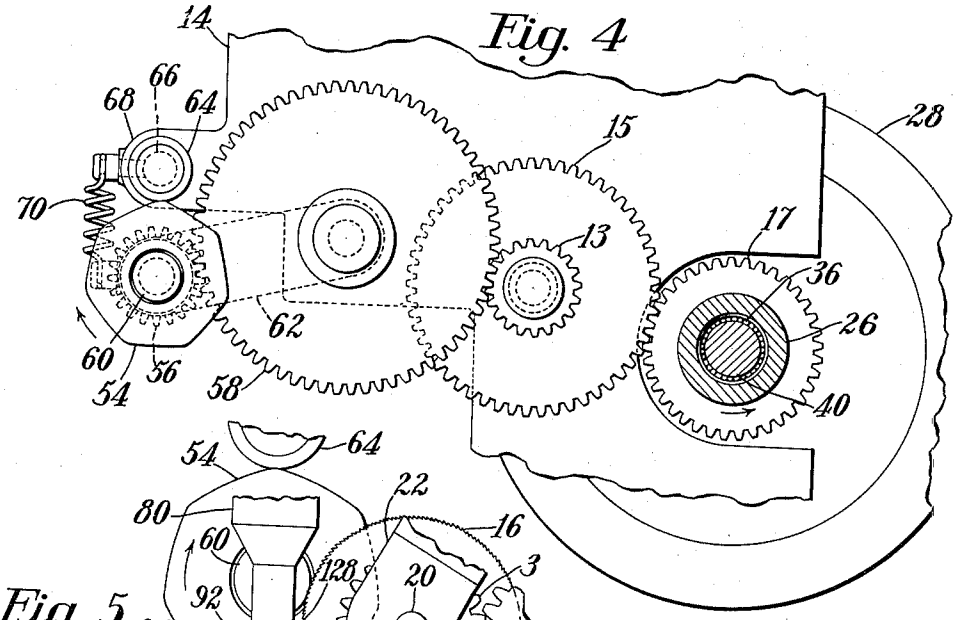


Fig. 5

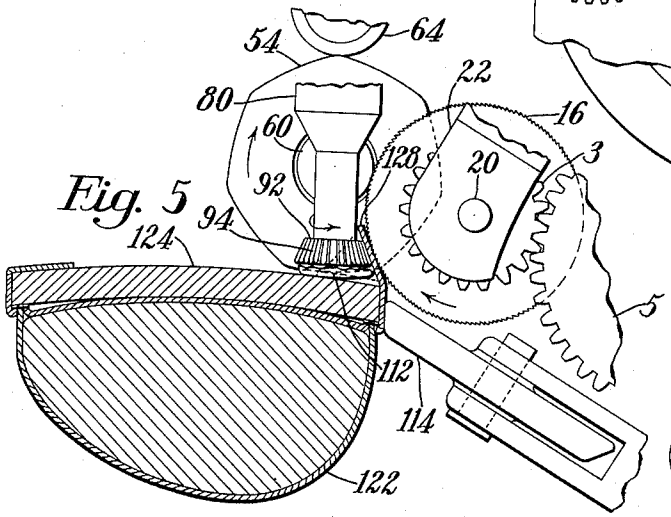


Fig. 6

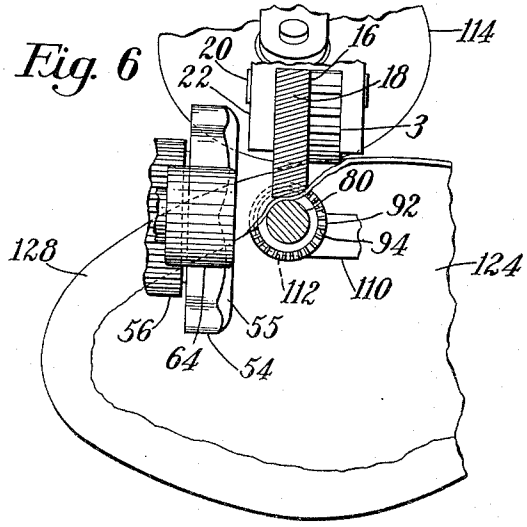
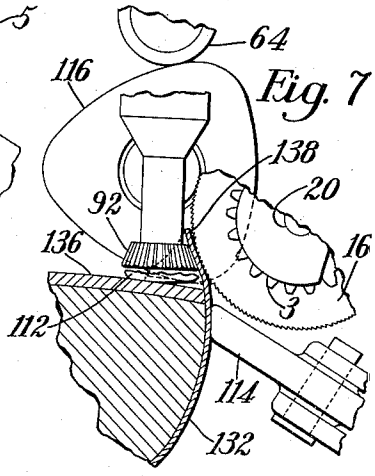


Fig. 7



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Patented June 10, 1952

2,599,645

UNITED STATES PATENT OFFICE

2,599,645

LASTING MACHINE

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Application December 24, 1948, Serial No. 67,227

14 Claims. (Cl. 12—1)

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This invention relates to lasting machines and more particularly to a machine for continuously and progressively operating upon the lasting margin of the stock to be lasted to grip, feed and tension it, then work it in over and permanently secure it in a lasted position to the bottom of a shoe. While the invention contemplates suitably securing this lasted-over margin by means of tacks or staples, it is herein illustrated as embodied in a machine especially adapted for attaching the entire margin by a suitable adhesive.

The adhesive method of fastening is extensively employed in the lasting of conventional shoes and also for securing platform covers, or bindings, to the bottoms of platform shoes, such as the so-called slip-lasted type, in which a thick sheet of felt or other relatively compressible material is employed as a shoe bottom member. In this type of shoe construction, the thickness and compressibility of the platform material necessitate a great degree of care in properly controlling the amount of lasting tension imparted to the material forming the platform cover. If the tensioning force is too great, it will crush and deform the edge of the platform causing an unsightly appearance and a finished shoe having an outsole with either an irregular adhesive bond, or a rounded and warped edge. Another factor, frequently producing unslightly appearance in platform coverings, is that the material is stretched obliquely, in a lengthwise direction along the platform edge, instead of directly heightwise of the shoe bottom. Such oblique tensioning, due to the thickness of the platform, will produce a noticeable distortion or tendency for the coverings to become pleated or corrugated.

An object of the present invention is to provide an improved lasting machine having a novel arrangement of rotary tensioning and feeding members which will automatically and uniformly apply a predetermined degree of tensioning stress, in a direction heightwise of the shoe, while freely permitting the progressive longitudinal movement of the shoe in response to a work feeding force applied in a direction lengthwise of the shoe and at right angles to the tensioning stress. To this end, and as a feature of the invention, the machine is provided with a frictional tensioning wheel having a peripheral arrangement of ribs for engaging the outer surface of a lasting margin. This wheel is rotated in a plane normal to the bottom of the shoe, so that when the lasting margin is pressed into operative contact against the ribs it will be tensioned directly heightwise. Preferably, the optimum

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force for driving the tensioning wheel is adjustably controlled through a variable torque clutch. In accordance with another feature of the invention, the margin is progressively fed longitudinally, and held in operative contact with the tensioning wheel, by a pressure feed roll rotating in a plane parallel, and adjacent to the bottom of the shoe. This roll is driven independently of the tensioning wheel, and the peripheral surface of the roll is yieldingly pressed against the inner surface of the lasting margin which is positioned by the operator between the roll and the tensioning wheel. The peripheral surface of the roll is provided with axially extending friction ribs each arranged so as to contact the margin along a line in the direction of lasting tension. These ribs not only facilitate the heightwise tensioning movement of the material as it is fed past the roll, but they also produce a more definite work feed.

A further object of the invention is to provide a novel rotary wiper construction for progressively wiping an extensive band-like area of the marginal material inwardly over the shoe bottom, with a positive pressure to effect a strong adhesive bond throughout a wide area. In accordance with features of the invention, this is accomplished by employing either one of two different types of symmetrical disk wipers. In the first type the peripheral contour of the wiper is that of an equilateral polygon having an odd number of smoothly merging sides, and the wiper is rotated about a concentric axis which is free to reciprocate heightwise of the shoe a sufficient amount to permit the successive portions of the periphery to contact the lasting margin during each cycle of rotation. The odd number of sides may be varied according to the peripheral size of the wiper in relation to the width of the area to be wiped; either increasing the size of the wiper, or decreasing the number of sides will result in extending the wiping area inwards from the edge of the shoe. In the second type, the wiper is in the form of a circular disk rotating about an eccentric axis reciprocable heightwise with respect to the bottom of the shoe to permit contact between the wiper periphery and the lasting margin throughout the entire cycle of rotation. With this type of wiper the wiping area may be extended inwardly by either increasing the peripheral size of the wiper or increasing the eccentricity of its axis.

With each type of wiper, a pressure idle roll, having a fixed axis of rotation is mounted directly above the wiper, and a tension spring, exerting a yieldable upward force upon the re-

ciprocating wiper mounting, maintains a cam-like contact between this roll and the upper periphery of the rotating wiper. These novel wiper constructions cause the point of engagement of the edge of the wiper with the work progressively to vary in distance inwardly from the edge of the shoe, while continuously rubbing in an inward direction from the edge of the shoe, to effect the progressive wiping by successive points throughout an area extending substantially across the lasting margin. In the case of the polygonal wipers, successive portions of the edge of the wiper will initially engage with the work at a point adjacent the edge of the shoe and remain in contact with the margin throughout a rubbing stroke extending in a direction inwards from the edge of the shoe. With the circular wiper operating on an eccentric axis, the points of engagement of the wiper with the work progressively advance inwardly over the shoe bottom and then recede towards the edge of the shoe, once during each cycle of the wiper, while continuously rubbing in an inward direction.

Further objects and advantageous features of the invention will be apparent from the following detailed description, by reference to the accompanying drawings and as pointed out in the claims.

In the drawings:

Fig. 1 is a view in front elevation of a machine embodying the present invention;

Fig. 2 is a side elevation of the machine partly broken away and in section;

Fig. 3 is a horizontal section on the line III—III of Fig. 1, and looking in the direction of the arrows:

Fig. 4 is a vertical section substantially on the line IV—IV of Fig. 3 and looking in the direction of the arrows, showing an embodiment of the wiper assembly;

Fig. 5 is an enlarged fragmentary view in side elevation of operating parts of the machine and of a shoe being lasted, the latter being in section and of the slip lasted platform type;

Fig. 6 is a fragmentary plan view, on an enlarged scale and partly in section, of elements similar to those of Fig. 5;

Fig. 7 is a fragmentary view in side elevation corresponding to Fig. 5, but showing a modified wiper operating upon a conventional insole type of shoe;

Fig. 8 is a view in side elevation diagrammatically showing various operational phases of the wiper element of Fig. 7; and

Fig. 9 shows diagrammatically corresponding phases in the cycle of a second modified wiper element.

The machine is illustrated, Figs. 1 through 6, as assembled upon a rigid framework having a base 10 adapted to be mounted on a bench or other suitable support. The framework extends upwardly forming two projecting housing members 12 and 14 on the forward side of the machine. The member 12 provides a mounting for the tensioning and feeding instrumentalities. A disk-like tensioning wheel 16, having a series of diagonally arranged peripheral ribs 18 and an axle 20, is rotatably mounted upon a yoke block 22 which is adjustably attached to the housing 12 by bolts 24 (Fig. 2). The wheel 16 is driven in the direction of the arrow by a suitable train of gears 3, 5, 7, 9 and 11 (Fig. 3) connecting it to a variable torque clutch, comprising a hollow drive shaft 26 driven by a power pulley 28, a driving plate 30 secured on the shaft and a driven plate 32 having an annular friction surface 34 for normally contacting the driving face of the plate 30 to deliver the desired driving torque to the tensioning wheel. The drive and clutch assembly is mounted, by needle bearings 36, 36 and a bushing 38, on a shaft 40 which is carried at one end by a sleeve 46, journaled through the frame 10 of the machine, and threaded at the other end into an end plate 41 on a fixed support 42. A hand wheel 44, fixed to the other end of the shaft, engages against one end of the sleeve bushing 46 the other end of which bears against a compression spring 48 spaced apart from the plate 32 by a thrust bearing 50. Another thrust bearing 52 is positioned on the shaft 40 between the support 42 and the drive shaft 26. As will be apparent, the torque transmitted from the plate 30 to plate 32, and hence to the wheel 16, may be regulated by turning the handwheel 44 to vary the pressure exerted by the spring 48.

The housing member 14 serves as a support for the wiper assembly which comprises a disk wiper 54 having a smoothly rounded leading edge 55 and a gear surface 56 driven in the direction of the arrow by a driving gear 58 which in turn is driven through a train of gears 13, 15, 17 by the drive shaft 26 (Figs. 3 and 4). The wiper 54 is rotatably mounted upon an axle 60 set on the forward end of a reciprocating arm 62 pivotally attached at its rearward end about the axis of the driving gear 58. A pressure idle roll 64, peripherally adjacent the wiper, is rotatably mounted upon an axle 66 set in a boss 68 extending forwardly from the member 14. A tension spring 70, attached at its upper end to the boss 68 and at its lower end to the reciprocating arm 62, holds the surface of the wiper against the roll 64 for a purpose that will be explained.

On the forwardmost part of the machine a feed roll shaft housing 72 is pivotally mounted adjacent its upper end on a stud 74 set in the frame member 12 and journaled through a rearwardly extending pivot arm 75 (Figs. 1 and 2). The housing is held in horizontal position on the stud between a set collar 76 and a lug cap 78. A shaft 80 is rotatably mounted within the housing by needle bearings 82, 82 and is vertically positioned by a drive pulley 84 and thrust bearing 86 secured adjacent its upper end and by a set collar 88 and thrust bearing 90 below. On the lower extremity of the shaft a pressure feed roll 92, having a series of peripheral ribs 94, is yieldably urged rearward towards the tensioning wheel 16 by a helical compression spring 96 (Fig. 2) positioned longitudinally about a stud 98 extending from the housing 72 rearwardly through the framework, a thrust washer 100, and through the spring, the force of which may be adjusted by a wing nut 102 threaded on the end of the stud. A set screw 104, threaded through a portion of the housing, bears against the framework 12 for adjustably limiting the rearward pivot action of the pressure feed roll assembly. The forward movement of the assembly is controlled by the foot treadle 106 and link rod 108 connected at its upper end to the rearward extremity of the pivot arm 75. A downwardly extending leg 110 is attached for vertical adjustment to the feed roll assembly by the screws 111. This leg terminates in a holddown foot 112 positioned immediately beneath the base of the roll 92. A work guide wheel 114 is rotatably mounted adjacent the holddown foot so as to be engageable with the

edge of the shoe to keep the lasting margin in proper position for the lasting operations.

Referring particularly to Figs. 4, 5 and 6, the operation of the machine is substantially as follows, it being assumed that a suitable source of power is driving the pulley 28 to actuate the driven elements. The operator first depresses the treadle 106 thereby pivoting the pressure feed roll assembly forwardly to separate the pressure feed roll 92 from the tensioning wheel 16. He then introduces the upstanding margin portion of the material to be lasted, for example, the cover 128 of a platform shoe having an upper 122 and platform 124 between the roll 92 and the wheel 16 until the holddown 112 rests upon the bottom of the shoe to prevent the shoe from rising in response to the heightwise tensioning force. When thus positioned, the edge of the shoe engages the guide wheel 114. Next, the operator releases the treadle 106 to allow the spring 96 forcefully to draw the roll 92 towards the wheel 16 and into operating contact with the margin portion of the upper. Now, as the wheel 16 rotates, it exerts a frictional drag on the outside surface of the marginal portion of the cover 128, held against it by the roll 92, tending to move the marginal portion in a heightwise direction relatively to the surface of the roll, thus applying a tensioning force to the cover. At the same time, the roll 92, which is rotating in a plane parallel to the shoe bottom, exerts a frictional drag on the inside surface of the cover in a direction to feed the shoe. The ribs 94 on the roll 92 extend generally axially thereof and thus not only facilitate upward movement of the cover, in response to the action of the wheel 16, but also augment the feeding action of the roll. Similarly the peripheral ribs 18 on the wheel 16 increase the frictional drag imparted by the wheel 16. Preferably, these ribs are slanted downwards in the direction of feed in order to eliminate any "fight" which might be caused by their heightwise movement as the point of engagement with the margin is drawn along them by the feed. The diagonal ribs 18 frictionally engage the outer surface of the margin at a point above the bottom of the shoe so that any chafing of the surface, incidental to the frictional tensioning, will not be noticeable in the finished shoe. The operator, by turning the hand wheel 44, can control the maximum degree of tensioning force that may be applied by the wheel 16 by regulating the torque applied thereto. A clockwise rotation of the hand wheel will screw the threaded shaft 40 farther into the support 42, causing the shaft to move longitudinally to compress the spring 48 thereby increasing the pressure between the clutch plate members 30 and 32 and correspondingly increasing the torque deliverable to the tensioning wheel. Conversely, the degree of tension may be decreased by turning the hand wheel in a counterclockwise direction. The setting for any desired tensioning force may be conveniently gaged by a calibrated scale S adjacent the hand wheel.

As the successive portions of the tensioned margin are released from between the wheel 16 and roll 92, they are presented to the rounded leading edge 55 of the rotary wiper 54 which wipes them in over, and presses them against, the bottom of the shoe. This edge exerts an uninterrupted frictional drag which is progressive both as its contacting surface moves inwardly of the shoe, and as it engages successive portions of the margin as presented by the feed roll. Also the edge 55 directs the margin under the principal peripheral operative surfaces of the wiper where it is vigorously rubbed inwardly by a series of strokes extending a considerable distance in from the edge of the shoe. The wiper 54 is adapted to wipe in successive areas of the margin with a wiping action which extends progressively inwardly from the edge of the shoe bottom substantially across the entire width of the lasting margin. This action is obtained by forming the wiper with a polygonal outline comprising an odd number of smoothly merging sides and mounting the wiper for rotation on the axle 60 which is vertically movable, by the spring 70, under the control of the idle roll 64 which engages the surface of the wiper at a point opposite to its engagement with the margin. It will be noted that the wiper progressively increases in width from its center of rotation to its peripheral edges throughout portions of its operative edges comprising half the length of its periphery, and decreases in width throughout the portions comprising the other half of its peripheral length. Thus it will be apparent, when the wiper is rotated about the vertically movable axle 60, it will be elevated and lowered by the spring 70 and the roll 64 in such a way that each successive high point, where two adjacent sides of the polygon smoothly merge, will move inwardly over the margin, in a substantially straight line, from an initial point of contact near the edge of the shoe to a point located inwardly from the edge of the shoe. Thus, the action of the wiper is extended over substantially the entire width of the margin.

Instead of employing the seven-sided wiper disk, as shown in Figs. 1–6 a disk having a different odd number of sides, such, for example, as a three-sided wiper may be used without departing from the spirit of this invention or necessitating other structural changes in the illustrated machine. Such an arrangement is shown in Figs. 7 and 8, in which the three-sided wiper, indicated by the reference numeral 116, is mounted on the axle 60, the machine being illustrated as operating to last the margin 130 of the upper 132 of a conventional shoe having an insole 136. Fig. 8 shows, in full and broken lines, successive positions assumed by the three-sided wiper 116, as it rotates and moves bodily, and illustrates the manner in which the action of the wiper is extended over the entire margin. A similar action is, of course, obtained with the seven-sided wiper. As will be apparent, the actual width of the area over which the wiper is effective may be varied by changing the diameter of the wiper or by providing a different odd number of sides.

In changing the number of sides, the three-sided wiper of Figs. 7 and 8 represents one extreme while at the other extreme is a wiper with an infinite number of sides, i. e. a wiper of circular shape. Such a wiper is illustrated, in Fig. 9, as a circular disk 118, which is eccentrically mounted on the axle 60, so that the distance will progressively vary from its center of rotation to successive portions along its operative wiping periphery. It will be noted that, as was the case with the polygonal wipers, the width from the operative edge to the wiper's axis gradually increases throughout half the periphery and decreases throughout the rest of the periphery. Thus when this wiper is rotated on the axle 60, the axle will move up and down, as was the case with the polygonal wipers just described, and the wiper will assume successive positions as illustrated by the solid and

broken lines. Thus the point of contact of the wiper with the margin will move inwardly and outwardly across the margin while the wiper continuously wipes the margin in a direction inwardly from the edge of the shoe bottom.

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

1. In a machine for lasting shoes, the combination with a wiper for wiping the marginal portion of an upper inwardly over the bottom of a shoe, of a pair of upper gripping members rotatable about different axes so related angularly to each other and to the plane of the shoe bottom as to cause one member to tension the upper heightwise of the shoe and the other member to feed the shoe continuously past said wiper.

2. In a machine for lasting shoes, the combination with a wiper for wiping the marginal portion of an upper inwardly over the bottom of a shoe, of an upper tensioning member engageable with said marginal portion and rotated in a direction whereby the member imparts a tensioning stress to the upper in a direction heightwise of the shoe, and a second rotary member constructed and arranged to press the marginal portion of the upper against the tensioning member and to rotate in a direction as to cause said second member independently to feed the shoe continuously past said wiper and upper tensioning member.

3. In a machine for lasting shoes, the combination with a wiper for wiping the marginal portion of an upper inwardly over the bottom of a shoe, of a rotary upper tensioning member operable to tension the upper in a direction heightwise of the shoe, and a second member constructed and arranged to press the marginal portion of the upper against the tensioning member and to rotate in a direction to feed the shoe continuously past said wiper, said second member having formed on its upper engaging face ribs extending in directions to render it more effective thus to feed the shoe while permitting the marginal portion of the upper independently to be tensioned heightwise by said first-named member.

4. A shoe-lasting machine having, in combination, a tensioning member for engaging successive portions of the outside of the lasting margin of stock to be lasted and arranged to impart thereto a frictional stress in a direction substantially heightwise of a shoe, a feed member adapted to engage the opposite side of the lasting margin and hold the lasting margin against the tensioning member, said feed member being arranged to impart a frictional stress on the lasting margin in a direction lengthwise of the shoe for advancing successive portions of the lasting margin towards and into operative engagement with the tensioning member, and means for wiping the lasting margin of the tensioned stock inwardly over and into contact with the bottom of the shoe.

5. A shoe-lasting machine having, in combination, a tensioning member for engaging successive portions of the outside of the lasting margin of stock to be lasted and arranged to impart thereto a frictional stress in a direction substantially heightwise of a shoe, a feed member adapted to engage the opposite side of the lasting margin and hold the lasting margin against the tensioning member, said feed member being rotated in a plane parallel to the bottom of the shoe and arranged to impart a frictional stress on the lasting margin in a direction lengthwise of the shoe for advancing successive portions of the lasting margin towards and into operative engagement with the tensioning member, and means for wiping the lasting margin of the tensioned stock inwardly over and into contact with the bottom of the shoe.

6. A shoe-lasting machine having, in combination, a member for engaging successive portions of the outside of the lasting margin of stock to be lasted and rotated in a plane perpendicular and transverse to the bottom of the shoe to impart to said stock a frictional tensioning stress in a direction substantially heightwise of a shoe, a second member adapted to engage the opposite side of the lasting margin and to hold the lasting margin against the first-mentioned member, said second-named member being also arranged to impart a frictional stress on the lasting margin in a direction lengthwise of the shoe for advancing successive portions of the lasting margin towards and into operative engagement with said first-named member, and means for wiping the lasting margin of the tensioned stock inwardly over and into contact with the bottom of the shoe.

7. A shoe-lasting machine having, in combination, a member for engaging successive portions of the outside of the lasting margin of stock to be lasted and rotated in a plane perpendicular and transverse to the bottom of the shoe to impart to said stock a frictional tensioning stress in a direction substantially heightwise of a shoe, a second member adapted to engage the opposite side of the lasting margin and to hold the lasting margin against the first-mentioned member, said second-named member being rotated in a plane parallel to the bottom of the shoe and arranged to impart a frictional stress on the lasting margin in a direction lengthwise of the shoe for advancing successive portions of the lasting margin towards and into operative engagement with said first-named member, and means for wiping the lasting margin of the tensioned stock inwardly over and into contact with the bottom of the shoe.

8. A shoe-lasting machine having, in combination, a tension wheel rotating in a plane normal to the bottom of the shoe for frictionally engaging successive longitudinal portions of the outside of the lasting margin of stock to be lasted to impart thereto a tensioning stress in a direction heightwise of the shoe, a pressure feed roll so positioned adjacent the periphery of the tensioning wheel as to operatively bear against the corresponding portions of the inside of the lasting margin directly opposite from the tensioning wheel and independently rotatable to impart a work feeding movement at right angles to the direction of tensioning for advancing successive portions of the lasting margin towards and into operative engagement with the tensioning wheel, and wiping means adjacent to but spaced apart from the tensioning wheel in the direction of feed so that the lasting margin is engaged by the wiper as it is released by the tensioning means.

9. A shoe-lasting machine having, in combination, a tensioning wheel rotating in a plane normal to the bottom of the shoe and having a peripheral edge for frictionally engaging one side of the lasting margin of stock to be lasted and for progressively tensioning successive portions of the margin in a direction heightwise of the shoe, a pressure roll so positioned adjacent the edge of the tensioning wheel as to be engageable

with the other side of the lasting margin for progressively pressing the successive margin portions into operative contact with the tensioning wheel and rotatable independently of said wheel in a plane substantially parallel to the bottom of the shoe, said pressure roll being designed and arranged to allow the shoe and lasting margin to move freely in response to a work feed stress, and means for wiping the margin of the tensioned stock inwardly over and into contact with the bottom of the shoe.

10. A shoe-lasting machine having, in combination, a tensioning wheel rotating in a plane normal to the bottom of the shoe and having a peripheral edge for frictionally contacting one side of the lasting margin of stock to be lasted and for progressively tensioning successive portions of the margin in a direction heightwise of the shoe, a plurality of ribs disposed about the edge of the tensioning wheel diagonally with respect to its peripheral length so as to permit the margin material to move freely in response to a work feeding stress while at the same time eliminating any tendency of said feeding stress to distort the heightwise tensioning movement of the material, a work feed roll so positioned adjacent the edge of the tensioning wheel as to be engageable with the other side of the lasting margin for progressively feeding and pressing the successive portions of the margin into operative contact with the tensioning wheel, and rotatable independently of the tensioning wheel in a plane substantially parallel to the bottom of the shoe, said feed roll being designed and arranged to allow the lasting margin to move freely in response to the action of the tensioning wheel, and means for wiping the margin of the tensioned stock inwardly over and into contact with the bottom of the shoe.

11. In a shoe-lasting machine, the combination with tensioning instrumentalities, of a symmetrical disk-like rotary wiper progressively increasing in width from its center of rotation to its peripheral edge throughout portions of its operative periphery and decreasing in width throughout other portions of its operating periphery, driving means rotating the wiper in a plane perpendicular and transverse to the bottom of the shoe, wiper mounting means so constructed and arranged with respect to said driving means as to permit the wiper's axis of rotation to reciprocate heightwise of the shoe, and pressure means associated with said wiper to limit the heightwise movement, said wiper, driving means, mounting means and pressure means being so related and disposed with respect to one another as to cause each point of engagement of the edge of the wiper with the work to progressively vary in distance inwardly from the edge of the shoe while continuously rubbing in an inward direction from the edge of the shoe.

12. In a shoe-lasting machine, the combination with tensioning instrumentalities, of a symmetrical disk-like rotary wiper progressively increasing in width from its center of rotation to its peripheral edge throughout portions of its operating periphery and decreasing in width throughout other portions of its peripheral length, driving means rotating the wiper in a plane perpendicular and transverse to the bottom of the shoe, wiper mounting means so constructed and arranged with respect to said driving means as to permit the wiper's axis of rotation to reciprocate heightwise of the shoe, and pressure means associated with said wiper to limit the heightwise movement, said wiper, driving means, mounting means and pressure means being so related and disposed with respect to one another as to cause successive portions of the edge of the wiper each to initially engage with the work at a point adjacent the edge of the shoe and to remain contiguous with the work throughout a rubbing stroke extending in a direction inwards from the edge of the shoe.

13. In a shoe-lasting machine, lasting instrumentalities and operating mechanism therefor, in combination with a symmetrical rotary wiper having a peripheral operating edge formed eccentrically with relation to the axis of rotation of the wiper and progressively increasing in width from its center of rotation to its peripheral edge throughout half the length of its periphery and decreasing in width throughout the other half of its peripheral length, driving means rotating the wiper in a plane normal to the bottom of the shoe, wiper mounting means so constructed and arranged with respect to said driving means as to permit the wiper's axis of rotation to reciprocate heightwise of the shoe, and pressure means associated with said wiper to limit the heightwise movement, said wiper, driving means, mounting means and pressure means being so related and disposed with respect to one another as to cause the point of engagement of the edge of the wiper with the work to progressively advance inwardly over the shoe bottom and then to recede towards the edge of the shoe automatically once during each cycle of the wiper while continuously rubbing in an inward direction from the edge of the shoe to effect the progressive wiping by successive points throughout an area extending substantially across the lasting margin.

14. A machine for progressively operating about the lasting margin of a shoe upper to tension and last the margin inwardly over the bottom of the shoe, comprising a rotary member progressively engageable with one side of successive marginal portions, means for mounting the member for rotation in a plane substantially perpendicular to said engaged portions and to the bottom of the shoe, drive means for rotating the member in a direction as to tension the upper heightwise of the shoe, a feed roll engageable with the opposite side of said portions adjacent said member and rotatable in a plane substantially parallel to the shoe bottom, and a rotary wiper adjacently positioned alongside the tensioning member for engaging the successive portions of the lasting margin as they are fed past the tensioning member and for wiping them inwardly over and into contact with the bottom of the shoe.

NORWOOD H. KNOWLTON.

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