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LASTING MACHINE

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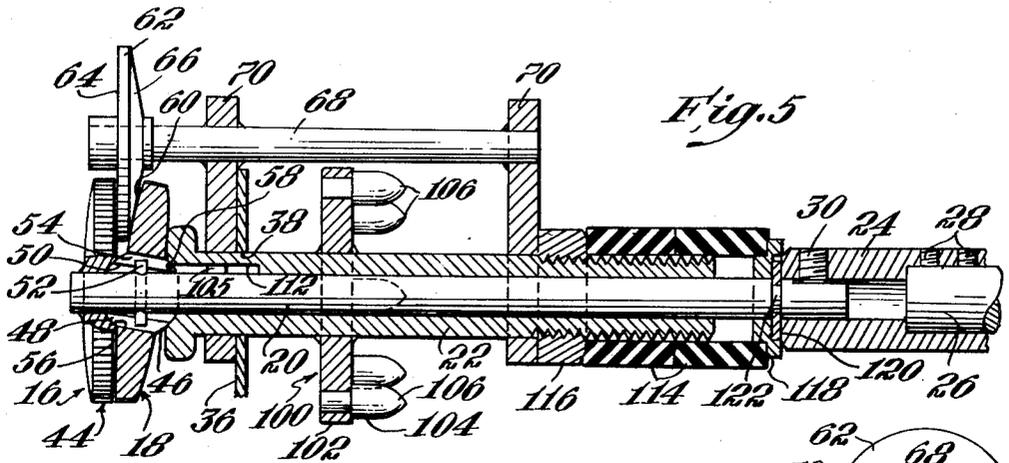


Fig. 5

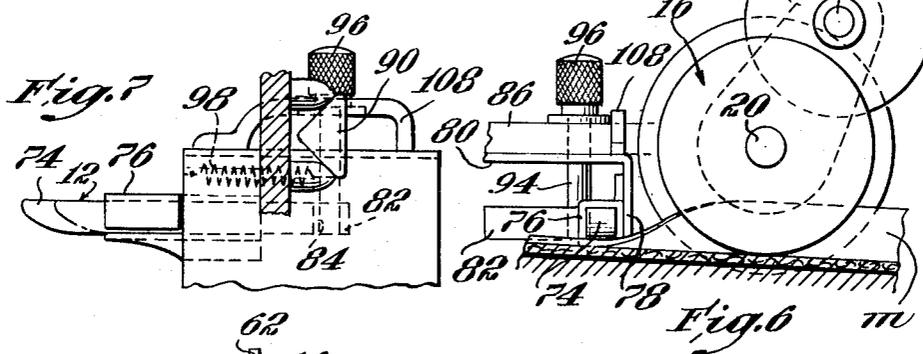


Fig. 7

Fig. 6

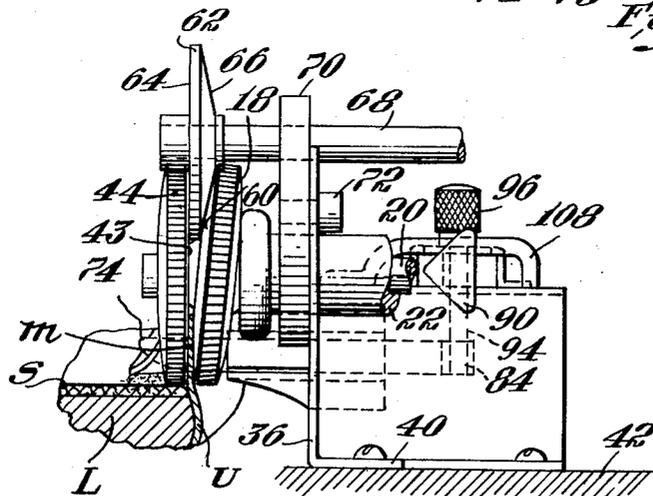


Fig. 4

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LASTING MACHINE

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13 Claims. (Cl. 12—8.3)

This invention relates to machines for use in making shoes and especially to lasting a part or the entire margin of the shoe, the present invention embodying in a different mechanism the principles of lasting, characteristic of my prior machines, to wit, a continuous lasting wherein successive narrow areas of the margin are uninterruptedly gripped, stretched in directions heightwise to the bottom, advanced toward wiping means and released for wiping. Concomitantly with the release of the tensioned areas to the wiper means new areas are gripped, tensioned and advanced toward the wiping means.

Objects of the present invention are to provide a machine for effecting lasting in accordance with the foregoing principles, wherein the gripping and tensioning means imparts the greatest stress just ahead of the point of release of the lasting margin to the wiper, wherein the gripping action on the lasting margin increases progressively from the place of initial engagement of the grippers with the margin to approximately the point of complete release of the margin, and wherein a substantial area of the margin is held supported perpendicular to the bottom during the tensioning thereof even though only narrow areas at any given time are tensioned. Other objects are to provide a machine in which the tensioning means assists in guiding, supporting and advancing the shoe during lasting, which is of extremely simple design, inexpensive construction and yet durable and efficient in operation.

As herein illustrated the machine has a reciprocable wiper and a pair of grippers arranged progressively to engage successive portions of the lasting margin, pull them heightwise substantially perpendicularly to the bottom and then to release them close to the wiper. The grippers consist of a pair of rotatable members which turn in unison and have opposed surfaces, one of which is so arranged that portions thereof alternately approach and recede from the other during rotation, alternately to grip a narrow area of the margin close to the bottom of the shoe, pull it heightwise with respect to the bottom and then to release it. The point of closest approach at which the margins are gripped is substantially at the lowermost point of rotation of the members and the point of release is situated forwardly of the lowermost point in the direction of rotation of the members close to the wipers. The members are in the form of disks, one of which is inclined with respect to the other and a wedge situated above the axis of rotation between the opposed surfaces of the members holds the one disk at an angle to the other disk so that their surfaces approach most closely in the third quarter of their rotation when the disks are considered as turning clockwise, the disks being held well spaced in the second quarter of their rotation so as to permit the lasting margin to be introduced therebetween with ease. The disk engaging the inner side of the margin has peripheral contact with the bottom and thus serves as a rest against which the bottom is held. In addition the edge may be knurled to assist in advancing the shoe toward the wiper. The wiper is in the form of a rapidly oscillating finger or blade arranged to advance over the edge of the bottom substantially in a plane thereof and substantially at right angles to the edge of the shoe.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

Fig. 1 is a plan view of the machine as seen from the top;

Fig. 2 is an elevation of the machine as seen from one

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side looking along the axis of the drive shaft toward the motor;

Fig. 3 is an elevation of the inner side of one of the grippers;

Fig. 4 is an elevation to larger scale of the grippers as seen from the right-hand side of Fig. 2 with the motor omitted;

Fig. 5 is an elevation of the grippers and drive therefor, partly in section;

Fig. 6 is a fragmentary portion in elevation as seen in Fig. 2 to larger scale showing the relation of the shoe and lasting margin to the operating instrumentalities; and

Fig. 7 is a fragmentary elevation of the wiper means.

Referring to the drawings, Fig. 1, the machine comprises essentially continuously rotating gripper elements 10 arranged to engage the lasting margin of an upper on a last, wiping means 12 for wiping the tensioned margin inwardly over the bottom of the last, a motor M for driving the gripper elements and the wiper and means 14 for drivably connecting the foregoing operating instrumentalities to the motor.

The gripper members 10 for engaging the lasting margin and imparting tension therein perpendicular to the bottom of the last and advancing it toward the wiper comprise as shown in Figs. 4 and 5 disks 16 and 18 mounted on a common horizontal shaft 20 for rotation therewith, the shaft 20 being arranged to turn in a sleeve 22 which forms a bearing therefor. The shaft 20 extends rearwardly through the sleeve 22 into the forward end of a sleeve 24, the rear end of which fits over the motor shaft 26 and is secured thereto by set screws 28. A set screw 30 fixes the rear end of the shaft 20 in a forward end of the sleeve 24. The forward end of the sleeve 22 is supported by a bracket having a vertical leg 36, Fig. 4, in which there is a hole 38 through which the sleeve passes and a horizontal flange 40 at its lower end bolted or otherwise attached to a suitable base 42.

The disk 16 is keyed, pressed or otherwise fastened to the shaft 20 so as to rotate therewith and has a substantially flat inner surface 43 which is normal to the axis of rotation of the shaft and hence perpendicular to the base of the machine. The peripheral edge of the disk 16 is knurled or otherwise roughened at 44 for the purpose which will appear hereinafter. The disk 18 has at its center an enlarged hub 46 having at opposite sides thereof spherical surface portions 48 and through this enlarged hub there is formed a cylindrical hole 50 of substantially larger diameter than the shaft 20. The hub 46 is fixed to the shaft for rotation therewith by a pin 52 extending diametrically through the shaft with its ends projecting from opposite sides thereof into grooves 54 formed in the inner wall of the hole 50 diametrically opposite each other. As thus constructed the disk 18 is free to rock or tilt relative to the shaft 20 during rotation with the shaft 20. To prevent disengagement of the disk from the ends of the pin a spherical recess 56 is formed in the inner face of the disk 16 with which the inner spherical portion 48 of the hub of the disk 18 engages and a corresponding spherical recess 58 is formed in the forward end of the sleeve 22 with which the outer spherical portion 48 of the hub of disk 18 engages. The inner surface of the disk 18 has a frusto-conical surface 60 so that when the disk 18 is perpendicular to the shaft 20 the surface 60 diverges from the surface 43. The surface 60, Fig. 3, has cut or otherwise formed in it lenticular-shaped grooves 61 arranged concentrically about its center of rotation and inclined in the direction of rotation of the disk, thereby dividing the surface into a succession of uniformly spaced flats or lands between which are recesses. This formation aids in gripping the lasting margin.

The spacing of the disks 16 and 18 is controlled by the size of the hole 50 and the hub 46 so that when the disk 18 is tipped a maximum amount the surfaces 42 and 60 will be substantially parallel and spaced from each other by an amount somewhat less than the thickness of the upper material. The disk 18 is held tilted with respect to the disk 16 by an idle disk 62, Figs. 4, 5 and 6, which has flat and frusto-conical surfaces 64 and 66 arranged to engage respectively the surfaces 43 and 60 and is mounted for free rotation on a horizontal shaft 68 so as to enter between the disks 16 and 18 near

their top within the first quarter of rotation of these disks when considering their rotation to start at the top and proceed in a clockwise direction. The shaft 63 is supported in horizontal position parallel to the shaft 20 by a pair of spaced arms 70, Fig. 5, through the upper ends of which the shaft 63 is passed. The lower ends of the arms are mounted on the sleeve 22 which is free to rotate therein and one of the arms is fixed to the bracket 36 by means of a screw 72, Fig. 4. As thus situated the idle disk 62 holds the disk 18 at such an angle with respect to the disk 16 that the surfaces 42 and 60 come together most closely during the third quarter to one-half their travel in the third quarter. At their rotation of the disks and preferably about one-third entrance side, that is at the right as seen in Fig. 6, the disks are relatively widely spaced so that the operator can introduce the marginal edge of the upper between the disks easily for the beginning of the lasting operation. The initial grip on the lasting margin is applied approximately at the lowermost point of rotation of the disks at the beginning of the third quarter of rotation close to the bottom. As the disks continue to rotate their grip on the lasting margin progressively increases so that the lasting margin is pulled upwardly perpendicularly with reference to the bottom of the shoe which rests against the peripheral edge of the disk 16. Approximately one-third to one-half way of the third quarter of rotation the maximum pull is applied, this being nearly opposite the wiper means and just ahead of the point at which the disks release the margin to the wiper as shown in Fig. 6. During tensioning the bottom of the shoe is engaged by the peripheral edge of the disk 16 which holds the shoe at a fixed level while the margin is being tensioned, assists the operator in guiding and steadying the shoe and assists in moving the shoe smoothly and uniformly as it is turned for complete or partial lasting.

The wiper 12, Figs. 1 and 7, is constituted by a blade or finger 74 situated close to the discharge side of the disks 16 and 18 with its lower surface substantially horizontal for reciprocation in a plane slightly above the lowermost point of the disk and parallel to the bottom of the shoe held against the support. The wiper blade 74 is slidably mounted in a sleeve 76 fastened to the inside of one of a pair of vertical legs 78 of a substantially rectangular bracket 80 fastened to the base 42. The rear end of the blade 74 has a right-angular extension 82 (Fig. 1) in which there is a slot 84. An arm 86 is mounted on the top of the bracket 80 with one end 88 pivoted thereto for oscillation in the plane of the top. The opposite end of the arm has on it a wedge-shaped cam block 90. The arm 86 has a slot 92 extending lengthwise thereof and through this slot there extends a pin 94, the lower end of which enters the slot 84 in the extension 82. The pin has a reduced neck for passage through the slot 92 thereby affording a shoulder for engagement with the underside of the arm 86 and a threaded nut 96 for engagement with the portion projecting upwardly through the slot 92 which may be screwed down hard against the top of the arm 86 to fix the pin at any given point along the slot 92. By adjustment of the pin 94 along the slot 92 the stroke of the wiper may be adjusted. A spring 98, Figs. 2 and 7, connected to the pin 94 and to the forward edge of the leg 78 yieldably urges the wiper to a forward position. To effect reciprocation of the wiper there is mounted on the sleeve 22, Figs. 1 and 5, a cam 100 which is in the form of a flat disk 102 from the rear side of which projects a plurality of pins 104 having conical ends 106 arranged intermittently to engage the wedge-shaped cam 90 to force the arm 86 rearwardly and then release it for forward movement by means of a spring 98. Eight pins 104 are used as illustrated so that the arm is reciprocated once for each 45° of movement of the gripper disks. The number of pins used may of course be varied within limits to decrease or increase the number of vibrations per rotation of the cam plate. A keeper bar 108 overlies the forward portion of the arm 86 and holds it against vertical displacement.

Rotation of the sleeve 22 is effected by a pin 105, Fig. 5, fixed in the shaft 20 which extends into a groove 112 formed on the inside of the sleeve 22. Axial displacement of the sleeve 22 is opposed by yieldable means in the form of a pair of rubber sleeves 114 mounted on the rear end of the sleeve between a nut 116 threaded

on the sleeve against the arm 70 and a washer 118 surrounding the shaft 20, the shaft being held in a fixed position by a lock washer 120 set into a groove 122 formed in a peripheral surface of the shaft 20.

In operation a last L having an upper assembly U and insole S or equivalent bottom element thereon is placed with the bottom structure against the peripheral edge of the disk 16 with the lasting margin *m* between the diverging disks at the entrance side thereto and is then moved forwardly under the combined feeding action of the disks and the movement imparted thereto by the operator whereupon successive portions of the lasting margin are initially gripped substantially at the point of tangency of the last with the bottom of the disks 16 and 18, concomitantly stretched in a direction heightwise to the bottom of the last and advanced toward the wiper as the disks turn and then released to the wiper whereupon the latter wipes them in over the bottom of the shoe. This action takes place progressively, that is, simultaneously with the gripping of new portions of the lasting margin and stretching thereof heightwise of the bottom of the last, previously stretched portions of the lasting margin are released close to the wiper and are wiped inwardly over the bottom by the wiper. This progressive stretching and wiping of the lasting margin takes place uninterruptedly throughout the entire peripheral edge of the shoe or so long as the operator wishes to hold the shoe in a position to continue such stretching and wiping. In any case, whether the entire peripheral edge of the shoe or only a portion thereof is lasted, the operation is continuous as distinguished from the intermittent gripping and releasing of successive spaced portions of the margin as in most conventional lasting machines.

In further contrast to prior machines the flat inner surface of the disk 16 tends to hold a substantial portion of the lasting margin erect during the tensioning which keeps the margin flat so that when wiped over the bottom it will lie smoothly.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. In a machine for shaping uppers over lasts, a bottom rest against which the bottom structure of a shoe assembled on a last may be placed, gripping means consisting of a pair of disks arranged to turn in unison about an axis substantially parallel to the plane of the bottom when the shoe is held against said rest, said disks having opposed surfaces, portions of which are substantially parallel for gripping the lasting margin and being rotatable in a direction to assist in advancing the margin forwardly for progressively and increasingly stretching it substantially heightwise to the bottom and means for effecting rotation of the disks, the disk engaging the inner side of the lasting margin constituting said bottom rest.

2. In a machine for shaping uppers over lasts, a bottom rest against which the bottom structure of a shoe assembled on a last can be placed, gripper means consisting of a pair of disks arranged to turn in unison about a substantially horizontal axis parallel to the bottom of the shoe when the latter is held against the rest with portions of their surfaces substantially perpendicular to the bottom, parallel to each other and closely spaced for gripping engagement with the lasting margin, and means for effecting rotation of the disks in a direction to advance the margin forwardly and for progressively increasingly stretching it substantially heightwise to the bottom and then releasing it, said stretching taking place throughout an appreciable angular distance of rotation of said disks.

3. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe to be lasted, reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against the support, gripper means consisting of a pair of disks arranged side by side, with portions of their opposed surfaces parallel and substantially perpendicular to the bottom of a shoe, the opposed parallel portions of said disks being adapted to engage the opposite sides of the lasting margin with a portion of the peripheral edge of the disk at the inner side of the margin engaged with the bottom affording said support therefor, means for effecting rotation of the disks in a direction to advance the margin toward the wiper, and simultaneously progres-

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sively to pull the margin heightwise with respect to the bottom to apply a substantial degree of tension thereto and finally to release the margin close to the wiper and means for effecting reciprocation of the wiper to wipe the released margin inwardly over the bottom structure.

4. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe, reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against said support, gripper means consisting of a pair of discs arranged side by side for rotation in unison about a common axis parallel to the bottom of the shoe, one of said disks having a flat side surface and being constrained to move in a plane normal to the axis of rotation thereof and the other having a surface inclined to the axis of rotation and being free to tilt with reference to its axis to bring a portion of its inclined surface substantially parallel to the surface of said one disk, said disks when parallel being adapted to grip the lasting margin, means holding said other disk tilted away from said one disk in such manner as to bring their surfaces into parallel gripping relation with the margin at that portion of their rotation extending from a point perpendicular to the bottom to near the wiper and means for effecting reciprocation of the wiper.

5. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe, reciprocable wiper means arranged to move inwardly over the bottom of the shoe as held against said support, grippers consisting of disks arranged side by side for rotation in unison about a common axis parallel to the bottom of the shoe held against the support, one of said disks being fixed to turn in a plane normal to its axis and the other arranged to tilt relative to said one disk, means for effecting rotation of the disks, means for controlling the tiltable disk so that the latter approaches said one disk most closely at that side of its axis of rotation closest to the wiper starting at a point nearly perpendicular to the bottom and continuing to near the wiper and means for effecting reciprocation of the wiper.

6. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe, reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against the support, gripper means consisting of a pair of disks arranged side by side for rotation in unison about a common axis parallel to the bottom of the shoe held against the support, one of said disks being fixed to turn in a plane normal to its axis and the other arranged to be tilted relative to said one disk, means for holding the tiltable disk during rotation thereof at an angle to said one disk which converges toward the wiper so as initially to grip a narrow area of the lasting margin substantially perpendicular to the bottom and concomitantly to advance it and pull it heightwise relative to the bottom and then to release it close to the wiper and means for effecting reciprocation of the wiper.

7. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe, reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against its support, gripper means consisting of a pair of disks arranged side by side for rotation in unison, with one disk at an angle with respect to the other so that corresponding points of the opposed surfaces alternately approach each other to grip successive portions of the lasting margin and concomitantly advance them toward the wiper, pull them heightwise relative to the bottom and then to release them, once each 360° of rotation, means for holding said one disk so that it approaches said other disk most closely at substantially the lower left hand quarter of rotation of the disks at the wiper side thereof and means for effecting reciprocation of the wipers.

8. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe, reciprocable wiper means, gripping means consisting of a pair of disks arranged side by side on a common shaft for rotation in unison, means for effecting rotation of said disks in a clockwise direction, one of said disks being tiltable on said shaft relative to the other disk, means interposed between the disks in the first quarter of rotation for holding said one disk inclined with respect to said other disk with portions thereof in their third quarter of rotation closest together so as initially to grip a narrow area of the lasting margin substantially heightwise to the

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bottom and concomitantly pull it upwardly relative to the bottom and advance it toward the wiper and then to release it, said wiper means being situated near the third quarter of rotation of said disks and movable in a direction perpendicular to the plane of rotation of said other disk and means for effecting reciprocation of the wiper.

9. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe, reciprocable wiper means arranged to move inwardly over the bottom of the shoe when the latter is held against its support, gripper means consisting of a pair of disks arranged side by side on a common shaft for rotation in unison, one of said disks being tiltable on the shaft relative to the other, a wedge shaped member arranged between the disks at their upper first quarter of rotation for holding the opposed surfaces of the disks at the lower third quarter of rotation closest together, means for effecting clockwise rotation of the disks concomitantly to advance the lasting margin introduced therebetween toward the wiper means and to pull it heightwise relative to the bottom and then to release it and means for effecting reciprocation of the wiper means to wipe the released margin over the bottom.

10. In a machine for shaping uppers over lasts, a support against which the bottom of a shoe may be placed, reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against the support, gripper means consisting of a pair of disks so arranged that portions of their surfaces progressively move together to grip the lasting margin near the end of the lower right hand second quarter of rotation and to move apart near the lower left hand third quarter of rotation to release the lasting margin, means for effecting rotation of the disks to grip successive portions of the margin introduced therebetween and means for effecting vibration of the wiper at a rate of eight strokes per revolution of the disks in a plane parallel to the bottom substantially at right angles to the edge of the shoe.

11. In a machine for shaping uppers over a last, a support against which may be placed the bottom of a shoe, a reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against the support, and means for supplying narrow areas of the lasting margin to the wiper means said means consisting of a pair of disks arranged side by side, a shaft to which the disks are fixed for rotation one of said disks being tiltable on said shaft, means interposed between the disks at a position to hold the lower left hand quarter of the disks at the wiper side close together, means for effecting rotation of the disks initially to grip the margin introduced therebetween, pull it heightwise relative to the bottom, advance it toward the wiper and then to release it, a sleeve on the shaft, means operably connecting the sleeve to said shaft for rotation thereby, cam means carried by the sleeve rotatable therewith and means operably connecting said cam means with the wiper for effecting oscillation of the wiper a predetermined number of times for each revolution of the disks to wipe the tensioned margin released thereto inwardly over the bottom.

12. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe, reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against the support, and means for supplying successive narrow areas of the lasting margin to the wiper means, said means consisting of a pair of disks arranged side by side, a shaft to which the disks are fixed for rotation, one of said disks being tiltable on said shaft, means interposed between the disks at a position to hold the lower left hand quarter of the disks at the wiper side thereof close together, means for effecting rotation of the disks initially to grip the margin introduced thereto close to the bottom, pull it heightwise relative to the bottom, advance it toward the wiper and then to release it, a sleeve on said shaft, means operably connecting the sleeve to the shaft for rotation thereby, cam means carried by the sleeve rotatable therewith, and a driving arm connected to the wiper and operable by the cam to effect oscillation of the wiper, to wipe successive portions of the tensioned margin released thereto inwardly over the bottom, the effective length of the arm being adjustable to vary the stroke of the wiper.

13. In a machine for shaping uppers over lasts, a support against which may be placed the bottom of a shoe,

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reciprocable wiper means arranged to move inwardly over the bottom of the shoe when held against said support, grippers consisting of a pair of disks having opposed surfaces, a shaft supporting said disks for rotation in unison so that any given point on one disk approaches and recedes from a corresponding point on the other disk during each rotation of said disks, and so that at the point of closest approach the lasting allowance initially will be gripped between the corresponding points of the disks along a narrow area substantially perpendicular to the bottom, will be pulled heightwise perpendicular to the bottom, advanced toward the wiper and then released at a point forwardly thereof in a direction of rotation near the wipers as said corresponding points of the disks begin to recede from each

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other, means for effecting rotation of said shaft, and means for effecting reciprocation of the wiper means to wipe successive portions of the tensioned margin released thereto inwardly over the bottom.

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