## **United States Patent**

[72]	Inventors	Frank Hartshorn
		Wigston Fields;
		George Millar, Leicester, both of England
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[73]	Assignee	USM Corporation
		Boston, Mass.
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[33]		Great Britain
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## [54] SHOE LASTING MACHINES 6 Claims, 4 Drawing Figs.

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[51]	Int. Cl.	A43d 21/00

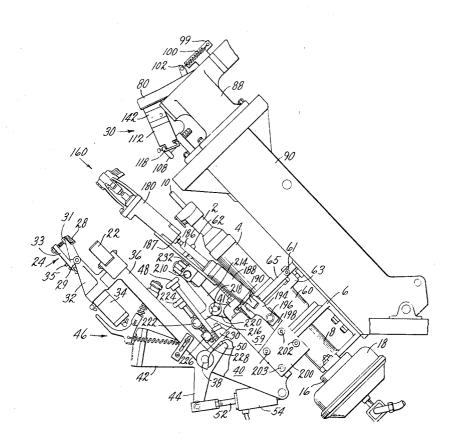
[50]	Field of Search	12/8.2,
	10.1	, 10.5, 14.5

[56]	<b>References</b> Cited	
	UNITED STATES PATENTS	

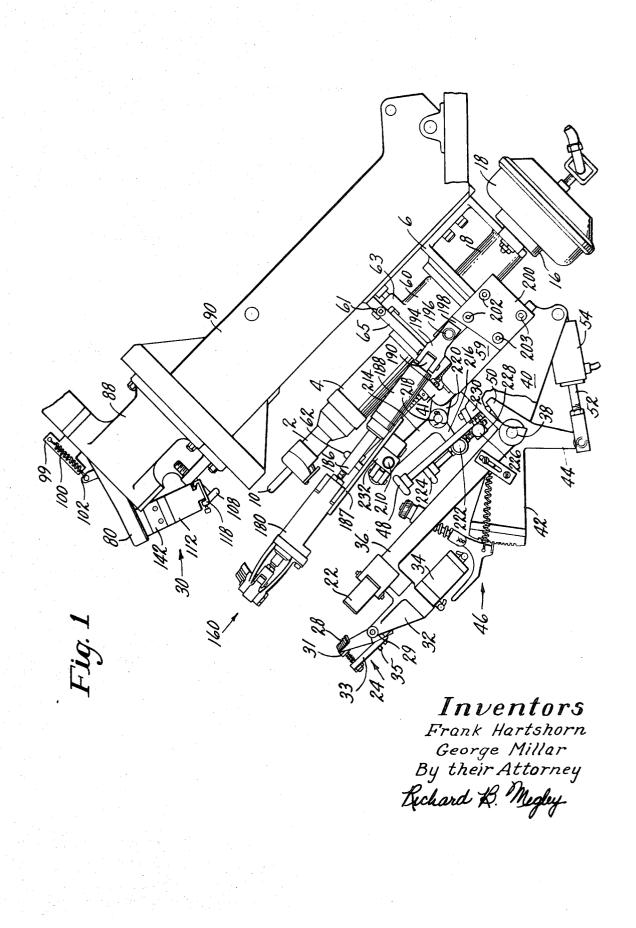
3,359,584	12/1967	Becka et al.	12/10.5
3,399,411	9/1968	Fisk	12/10.1

Primary Examiner—Patrick D. Lawson Attorneys—Richard A. Wise, Richard B. Megley and Vincent A. White

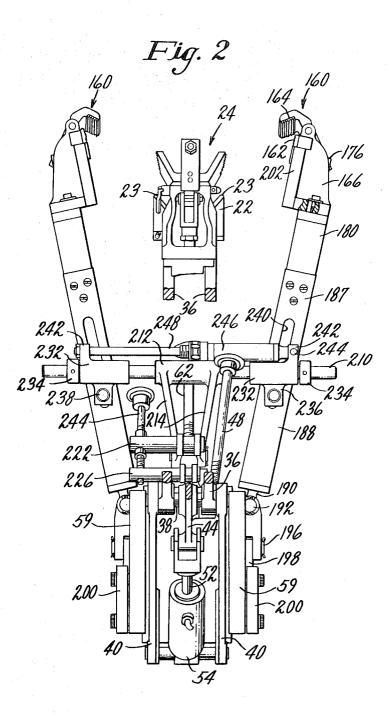
ABSTRACT: A shoe upper conforming machine having side grippers movable widthwise from spaced locations into engagement with the sides of a shoe to locate the grippers automatically with respect to the upstanding margin of a shoe upper.



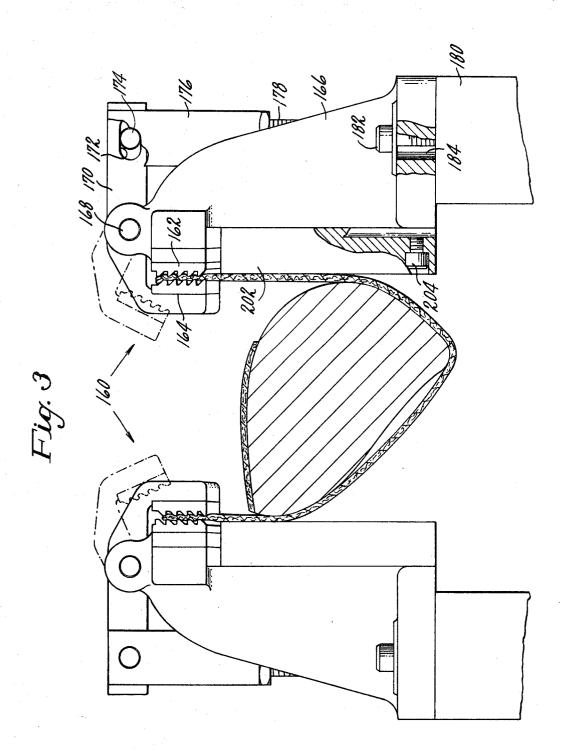
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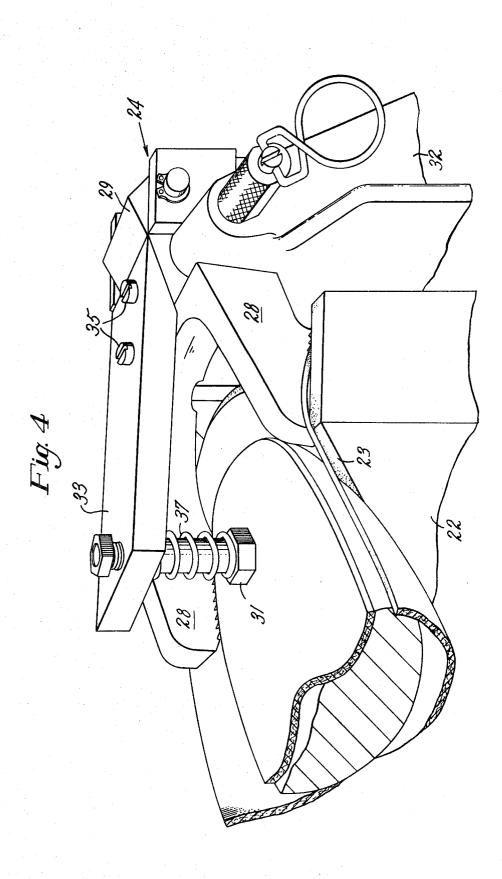
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## SHOE LASTING MACHINES

## BACKGROUND OF THE INVENTION

The invention relates to machines for shaping the heel end of a shoe upper about a last. In machines of this type the upper is usually pulled lengthwise to tension the upper about the heel end of the last before a heel band is applied to conform the upper about the heel end of the last and the margin of the upper is wiped inwardly over and secured to the shoe bottom. Such initial lengthwise tensioning is usually sufficient to provide a smooth heel end shape for shoes having relatively light upper material. However, it has been found necessary when making shoes of heavier upper material to provide additional means for tensioning the upper heightwise at the sides of the shoe. For this reason, side grippers have been provided in such machines but such grippers usually interfere with placement of the shoe and require that the grippers be manually adjusted for shoe size and that the upper margin be guided into the open jaws.

Accordingly, it is an object of the invention to provide an improved shoe upper conforming machine having side grippers which do not interfere with placement of the shoe to be operated upon, which are automatically located properly to grip the upper without manual adjustment or insertion. To this 25 end, side grippers are provided which initially occupy positions spaced from the sides of the shoe so as not to interfere with the shoe placement. The grippers, while in open condition, are moved toward the shoe from their initially spaced locations until abutment portions of the grippers engage the 30 sides of the shoe to align the grippers with the margin of the shoe upper. The grippers are then moved heightwise of the shoe into engagement with the shoe bottom with the upper margin automatically being inserted between the open grippers. Thereafter, the grippers are closed on the upper margin and moved heightwise to tension the upper about the last.

Other features of the invention, together with various novel details of construction of one preferred embodiment of the invention, will not be described with particular reference to the accompanying drawings and thereafter defined in the claims.

In the drawings:

FIG. 1 is a right-hand side elevation of a shoe conforming machine showing a shoe support, a toe pincer arrangement, a side gripper arrangement, a hold down member and certain associated parts of an illustrative machine;

FIG. 2 is a view, looking in the direction of the arrow II in FIG. 1, of the side gripper arrangement, and parts associated with the toe pincer arrangement, some parts being broken away for the sake of clarity;

FIG. 3 is an enlarged view with parts broken away (also looking in the direction of the arrow II in FIG. 1) showing the side grippers pulling side marginal portions of a shoe upper mounted on a last, and

FIG. 4 is a perspective view showing parts of the toe pincer 55 arrangement in operation on the forepart of the shoe upper.

A typical machine in which the invention may be embodied is shown in FIG. 1 and includes a heel seat lasting and backpart molding station comprising a shoe support provided by a jack post 2 having a last pin 10 on which is placed a shoe 60 last with an upper and insole assembled thereon. The last post is slidable heightwise in a sleeve assembly 4 fixed to a supporting member 6 which includes a tubular portion 8. The lower end of the jack post 2 is yieldably carried on a piston rod (not shown) of a diaphragm-type pneumatic motor 18 secured to 65 the lower side of the member 6. The arrangement is such that a shoe carried by the jack is initially yieldably supported with the heel seat surface of the insole slightly above the plane of operation of heel seat wipers of any suitable type with which the upper inwardly across marginal portions of the insole.

A toe support comprising a V-shaped member 22 (FIGS. 1 and 2) is provided for supporting the toe end portion of the assembled upper and last, the V-shaped member also providing shaped member 22 is mounted for limited heightwise movement on its support, such movement taking place against the action of a spring (not shown). When a last with assembled upper and insole has been placed on the last pin 10 with the toe end portion resting in the V-shaped member 22, the operator depresses the forepart of the shoe and hence the V-shaped member, thereby closing an electric circuit which allows a cycle of operations of the machine to be initiated by depression of a treadle (not shown).

10 On depression of the treadle a hold down member 30 is advanced from a retracted position as seen in FIG. 1 to a position over the last pin 10 and is also moved heightwise of the last to engage the hold down with the heel seat portion of the shoe.

As it completes its heightwise movement, the hold down 15 moves the shoe downwardly against the action of the yieldable last post 2 to locate the insole at the proper level for the inwiping operation of the heel seat wipers of the machine. Release of the treadle then causes jaws 28 of the toe pincer arrangement to grip the upper at each side of the toe against the jaw 20 portions 23 of the V-shaped member 22 and simultaneously to apply a toe hold down member 31 against a toe end portion of the insole as best seen in FIG. 4. The toe pincer arrangement 24 is then moved lengthwise of the last in a direction extending away from the toe end of the last to pull the upper snugly about the heel end portion of the last. For closing movement, the jaws 28 are formed on a lever 29 pivoted on a bracket 32 and connected to the piston of a pneumatic cylinder 34. The toe hold down member 31 comprises a stud carried for yielding movement against a spring 37 in an arm 33 secured by screws 35, to the lever 29. Alternately, it may be desirable to provide for application of the hold down independently of the toe pincer closing and to this end a separate motor could be provided. The bracket 32 and support for the V-shaped 35 member 22 are secured to the upper end of an arm 36 which is pivoted at its lower end on a cross-shaft 38 mounted in a bracket 40. Also mounted on the cross-shaft 38 is a two-armed lever having an arm 42 adjustably connected with the arm 36 by a pawl and ratchet arrangement 46 to permit the operator 40 to adjust the lengthwise position of the toe pincer arrangement to suit shoes of different sizes. A stop screw 48 in the bracket 40 is arranged to engage a lug 50 extending from the lever to limit the pulling action of the toe pincer arrangement. The arm 44 of the lever is connected to a piston rod 52 of a pneu-45 matic cylinder 54 carried by the bracket 40 to effect the pulling action.

To provide for heightwise and swinging adjustment of the toe support, and pincer arrangement with respect to the toe end of a shoe positioned on the jack post 2, the bracket 40 is 50 slidably mounted in guideways provided in guide portions 59 of a supporting member 60 which is also adjustably mounted on the sleeve assembly 4 for rotation abut the axis of the jack post. Such adjustments set the toe gripper correctly in accordance with the so-called swing of the last of the shoe to be operated upon. Opposed setscrews (one of which is shown at 61 in FIG. 1) in a portion 65 of the machine engage an upstanding lug 63 on the supporting member 60 to determine the adjusted position of the supporting member about the axis of the jack post. The heightwise position of the toe support and pincer arrangement is determined by adjustment of a rod 62 threaded at its lower end into a lug formed on the supporting member 60 and held against axial movement by collars engaging opposite sides of an arm 41 secured to the bracket 40.

After the upper is tensioned about the last by the toe gripper, depression of the threadle a second time initiates a second stage of the cycle of operations of the machine during which a pair of side grippers 160 pulls the upper at opposite sides of the shoe heightwise about the last. The side grippers the machine may be provided for wiping marginal portions of 70 160 each comprise a fixed jaw 162 (FIGS. 2 and 3) secured on a bracket 166 and a movable jaw 164 which is pivoted on a pin 168 in the bracket. Each movable jaw 164 has an arm 170 with a slot 172 which receives a pin 174 in a block 176 adjustably secured to a piston rod 178 extending upwardly from outer jaw portions 23 of a toe pincer arrangement 24. The V- 75 a cylinder 180. The bracket 166 is adjustably secured to the

upper end of the cylinder 180 by screws 182 extending through slots 184 in a flange of the bracket. The arrangement is such that upward movement of the piston rod 178 swings the movable jaw about its pivot pin 168 in a direction to close the gripper jaws upon upper material located therebetween. As seen in FIG. 1 each cylinder 180 is secured to a piston rod 186 extending upwardly from a cylinder 188. The cylinder 180 is provided with a depending plate 187 which slidably engages a flat face of the cylinder 188 to prevent rotation of the gripper about the axis of the piston rod 186. The cylinder 188 10 has a lug 190 pivoted on a pin 192 (FIG. 2) extending lengthwise of the shoe and carried between bifurcated upper portions of a block 194. The block 194 is pivoted on a bracket 198 by a pin 196 which extends widthwise of the shoe, the bracket being secured to the guide portions 59 of the supporting member 60 by a plate 200 and screws 202, 203. By pivotal movement on the pins 196 the two grippers 160 may be adjusted lengthwise of the shoe and by swinging movement about the pins 192 the grippers may be moved widthwise of 20 the shoe from initial positions spaced apart from the shoe as seen in FIG. 2 to positions seen in FIG. 3 in which the open jaws of the grippers lie over upstanding marginal portions of the upper of the shoe. In a cycle of operations of the machine the grippers 160 are located automatically widthwise of the 25 shoe by engagement of abutment plates 202 secured to the brackets 166 by screws 204 with the opposite side portions of the shoe as shown in FIG. 3. The shoe engaging faces of the plates may be provided with a lining of material having a low coefficient of friction to avoid damage to the shoe upper 30 material. For adjusting the grippers lengthwise of the shoe about the pins 196, the plate 187 of each gripper is provided with a slot 240 (FIG. 2) which receives a headed stud 238 in a lug 236 of a member 232. The members 232 associated with both grippers are mounted for widthwise sliding movements 35 on a rod 210, adjustable collars 234 on opposite ends of the rod acting to limit the outermost positions of the grippers as seen in FIG. 2. The rod 210 at its central portion is carried by a sleeve 212 on upstanding arms 214 of a bell crank lever pivoted at 218 (FIG. 1) on a lug 220 of the bracket 40. Arms 40 216 of the bell crank lever carry a pin 222 in which an adjusting screw 224 is mounted for rotation and fixed against axial movement relative to the pin by collars. The lower end of the screw is threaded into a pin 226 carried in a lug 230 upstanding from the bracket 40 so that rotation of the adjusting screw swings the bell crank lever to swing the grippers in unison lengthwise of the shoe about the pins 196. Each slide member 232 has an upwardly extending lug 242. The lug 242 of the slide member associated with the right-hand gripper as seen in FIG. 2 carries a pin 224 on which is pivotally mounted one end of a cylinder 246. A piston rod 248 extending from the other end of the cylinder is secured to the upstanding lug 242 of the other slide member 232. Opposite ends of the cylinder 246 are connected to a pneumatic control circuit so that air under 55 pressure admitted to one end of the cylinder is effective to move the side grippers toward each other into engagement with opposite sides of the shoe as seen in FIG. 3 while air admitted to the other end of the cylinder is effective to move the side grippers apart to the positions limited by the collars  $234_{60}$ as seen in FIG. 2.

The control circuit for the various piston and cylinder arrangements associated with the side grippers is such that, during a stage of a cycle of operations of the machine, air is admitted to the cylinder 246 so as to cause the side grippers to 65 swing inwardly toward the shoe from their outwardly positioned inoperative positions. When the shoe engaging plates 202 engage the opposite sides of the shoe, pressure built up in the circuit is effective to cause air under pressure to be admitted to upper ends of the cylinder 188, causing the grippers 70 160 to descend until the jaws 164 in open condition contact the insole of the shoe. The upstanding margin of the upper being previously tensioned by the action of the toe pincer is thus located between the open jaws of the grippers. Arresting the downward movement of the side grippers is effective to 75 cause the control circuit to supply air under pressure to the lower ends of the cylinders 180 to close the grippers on the margin of the upper. When the upper has been securely gripped, the control circuit reverses the supply of the pressured air to the cylinder 188, raising the grippers to tension the upper about the last.

When the upper has been so tensioned about the last the operator may release the treadle to initiaTe the third stage of a cycle of operations of the machine. At this time a wiper and heel band assembly (not shown but of any commonly known type) is advanced from retracted to operative position. The heel band is closed and clamped about the heel end of the shoe, a charge of adhesive is expelled, from a nozzle member 118 of the hold down 30, on to the marginal portions of the insole. Thereafter the wipers advance and close to wipe marginal portions of the upper inwardly across the insole. The hold down member 30 then is retracted and the jack post 2 is thrust upwardly, by action of the motor 18, to cause the mar-20 ginal portions of the upper to be bedded for a predetermined time against the wipers while the adhesive sets.

With the upper tensioning arrangement of the illustrative machine it will be understood that the upper is not only tensioned lengthwise of the last to pull the backpart of the upper closely against the last, but it also is pulled heightwise at opposite sides of the shoe to ensure that the upper is pulled well down to the last substantially as in a conventional pulling over operation. This is likely to ensure that the upper is well shaped to the last and is likely to be of particular benefit in operating on relatively heavy uppers such as in the case of men's shoes. However, it may well be of advantage in operating on certain types, at least, of women's shoes, particularly in the case of styles having relatively high heels.

It should be understood that the foregoing describes one preferred embodiment of the invention and that various parts and equivalent mechanisms could be substituted for those shown without departing from the scope of the invention defined by the following claims.

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

1. In a shoe upper conforming machine having a support for holding a shoe comprising an upper loosely assembled on a last with the margin of the upper upstanding beyond the last bottom along opposite sides of the shoe, the improvement comprising grippers arranged at opposite sides of the shoe on the support, means for moving the grippers widthwise of the shoe from initial positions spaced from the shoe to positions in which abutment portions of the grippers engage opposite sides

50 of the shoe to locate the grippers spaced heightwise from the shoe bottom and aligned with the upstanding margin of the upper, means for moving the located grippers heightwise toward the shoe bottom until one jaw of each gripper engages the shoe bottom with said margin disposed between said one jaw and another jaw of each gripper, means for closing said jaws on the upper margin after said engagement with the shoe bottom, and means for causing said heightwise gripper moving means to move the closed grippers away from the shoe bottom

2. A machine according to claim 1 in which said other jaw of each gripper is fixedly aligned with the abutment portion of each gripper and said one jaw engageable with the shoe bottom is movable from open condition during engagement with the shoe better to close the device of the shoe better to close the shoe according to the shoe better to close the shoe better to c

the shoe bottom to closed condition to grip the upper margin against said other jaw.

3. A machine according to claim 1 in which the jaws of said grippers are open and spaced heightwise from the shoe bottom and upstanding upper margin during the widthwise movement of the grippers.

4. A machine according to claim 1 in which said gripper abutment portions engageable with the sides of the shoe are provided with surfaces having a low coefficient of friction to avoid damage to the upper during heightwise movement of the grippers.

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5. A machine according to claim 1 in which said support comprises a post supporting the heel end of the last, a member cooperative with said post and engaging the bottom of the heel end of the shoe to hold the heel end of the shoe against heightwise movement, a forepart support carrying the forepart 5 of the shoe and a member cooperating with said forepart support and engageable with the bottom of the forepart of the shoe to hold the forepart of the shoe against heightwise move-

6. A machine according to claim 5 in which the forepart support includes first jaws engaging one surface of the forepart of the upper and the member cooperating with said forepart support is mounted on movable jaws which cooperate with the first jaws to grip the forepart of the upper margin.

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