May 23, 1961 M. MAESER 2,984,847

MACHINES FOR ATTACHING INSOLES TO LASTS

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Fig. 1

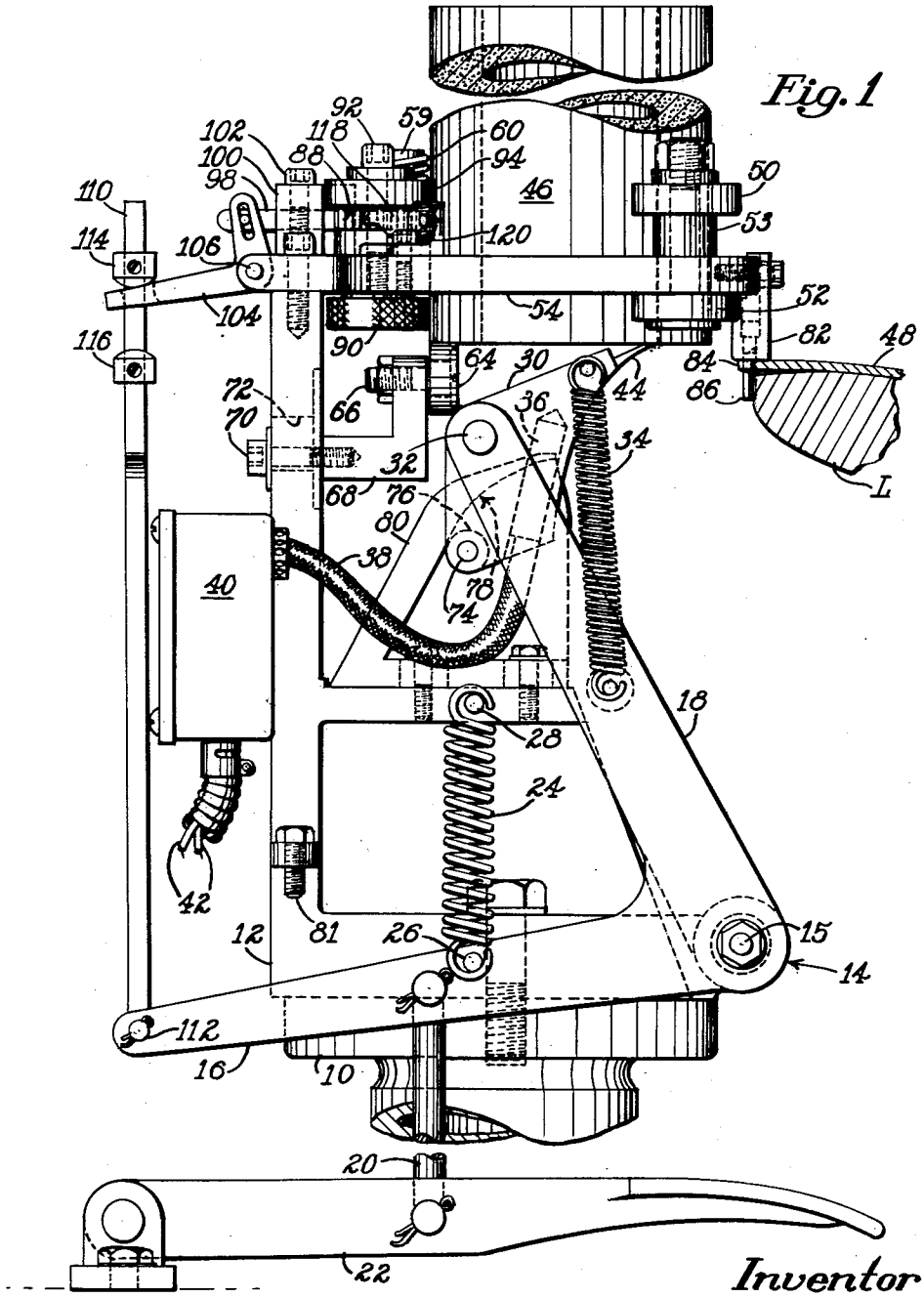

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Fig. 2

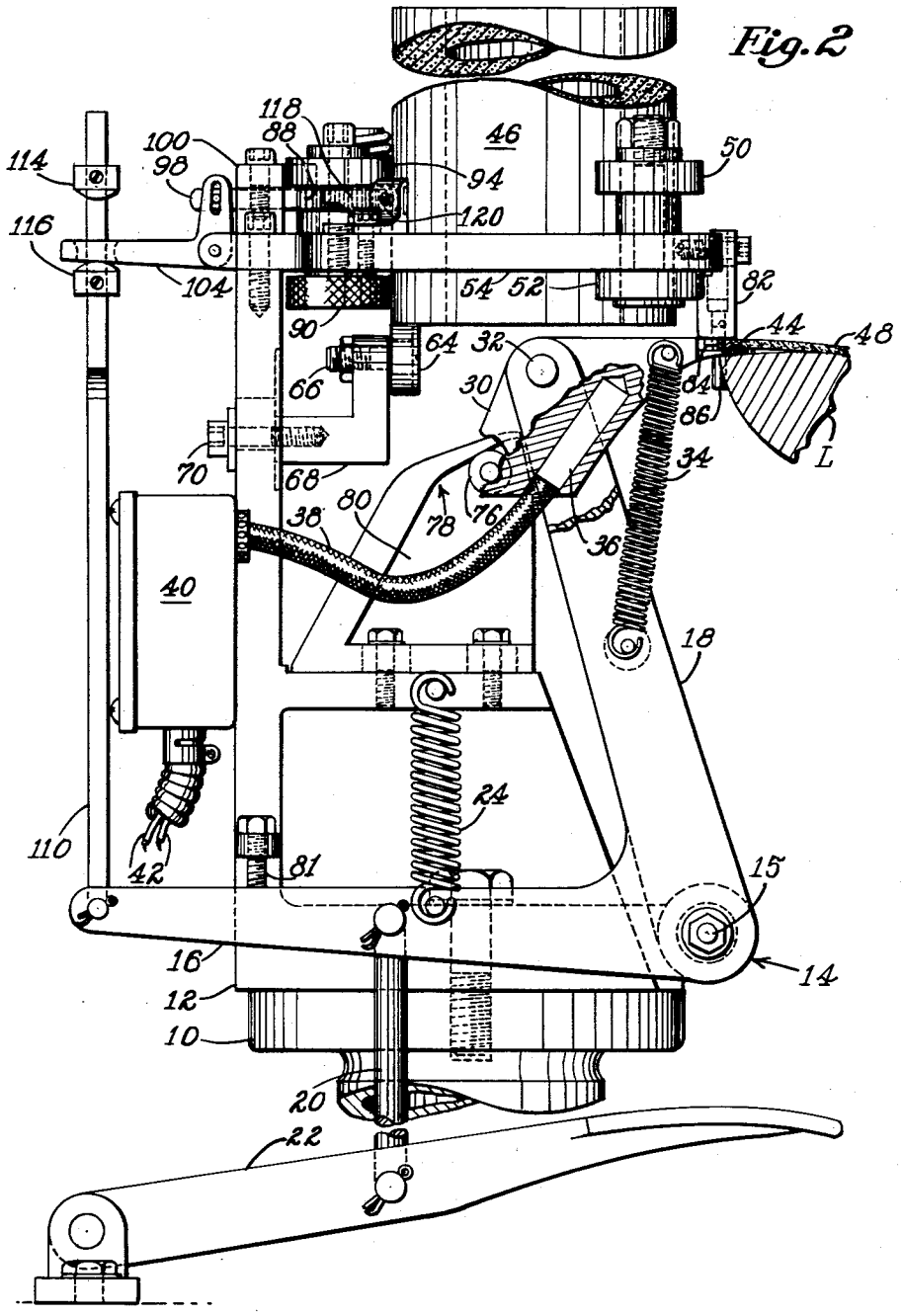

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Fig. 3

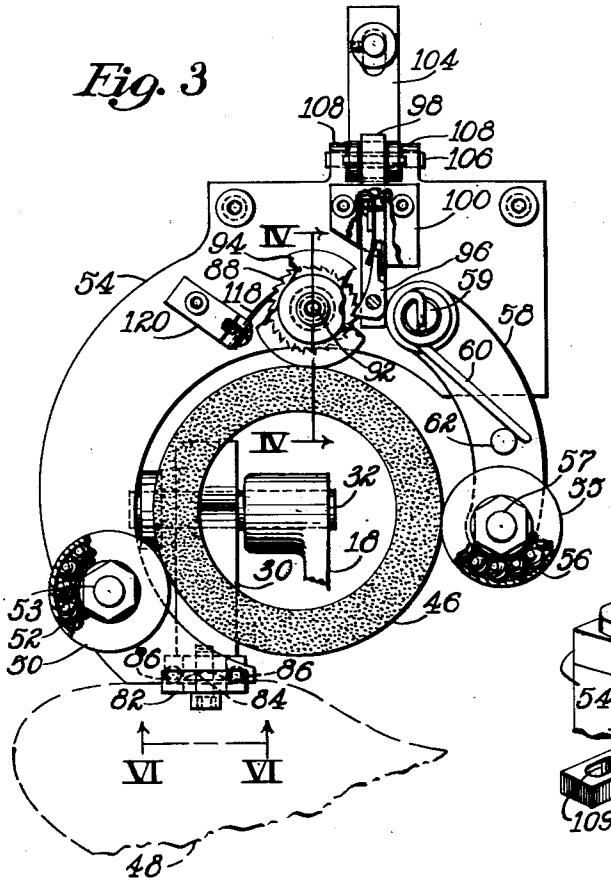


Fig. 4

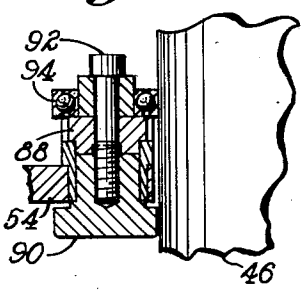


Fig. 5

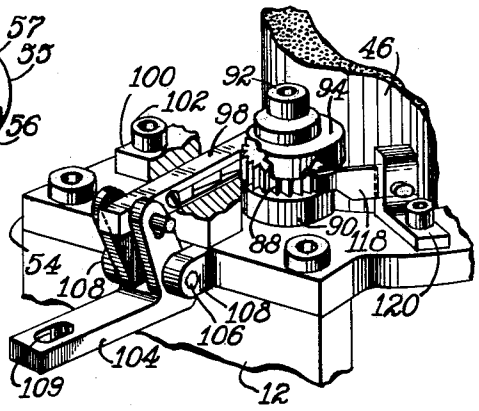


Fig. 7

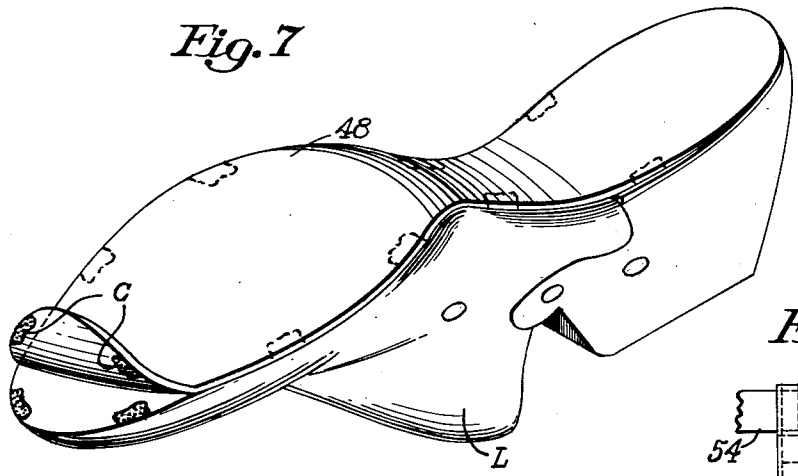
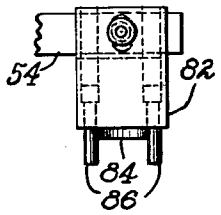


Fig. 6



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2,984,847

MACHINES FOR ATTACHING INSOLES TO LASTS

Mieth Maeser, Beverly, Mass., assignor to United Shoe Machinery Corporation, Flemington, N.J., a corporation of New Jersey

Filed Oct. 8, 1959, Ser. No. 845,219

10 Claims. (Cl. 12—1)

This invention relates to machines for use in the manufacture of shoes, and is herein illustrated as embodied in a machine for adhesively attaching insoles to the bottoms of lasts.

In the manufacture of most shoes, other than those of the so-called slip-lasted or "California" type, it is customary, prior to assembling an upper on a last preliminarily to the pulling-over and lasting operations, to place a prepared insole on the bottom of the last and to fasten it thereto to hold it in place during the shoe manufacturing operations. According to usual practice, the insole is secured to the last bottom by driving several tacks through the insole and into the wood of the last. At some point in the shoe manufacturing cycle, usually after the completion of the lasting operations and before attaching an outsole, the tacks are pulled out and thrown away.

In addition to being costly, this method of fastening insoles to last bottoms is extremely undesirable both because the repeated driving of sharply pointed tacks into the last tends to shorten the life of the last, and because, however careful the operator may be in pulling the tacks, it frequently happens that some tacks are not pulled out at all, while others may break off and leave parts of tacks embedded in the insole, which may cause discomfort or injury to the wearer's foot.

Various methods and devices have heretofore been proposed for eliminating these disadvantages by securing insoles to lasts by means other than metallic fastenings. One such method, disclosed in United States Letters Patent No. 2,893,026, granted July 7, 1959, upon an application filed in the name of F. S. Sillars et al., contemplates the temporary fastening of insoles to last bottoms by means of thermoplastic adhesive projected in the form of minute jets and at high velocity so as to cause the adhesive to pierce the outer surface of the insole and after passing through the thickness of the insole spread at the interface between the insole and the bottom of the last, where it sets instantaneously to form a bond between them. An apparatus for practicing this method is also disclosed in the patent referred to.

It is an object of the present invention to provide a simple, inexpensive, yet efficient machine for temporarily securing insoles to lasts by means of adhesive.

In accordance with a feature of the invention, the herein illustrated machine is provided with means actuated to pick up small quantities of adhesive from a source of supply and to apply the same at a plurality of points along the margin of an insole placed on the bottom of a last to effect the temporary attachment of the insole to the last. Preferably, and as herein illustrated, the source of supply of adhesive consists of a hollow cylinder of solid thermoplastic cement, and the applying means comprises an electrically heated blade provided on an applicator member which is connected to a treadle-operated lever and actuated by depression of the treadle to move in one direction to a position in which the blade engages the lower end of the cylinder of cement

to melt and pick up a small quantity of cement therefrom, and actuated by release of the treadle to move in the opposite direction to a position in which it engages in the space between the insole and the bottom of the last to apply the cement at a selected point along the margin of the insole.

In accordance with another feature of the invention, there is provided sole-positioning or gaging means including a heightwise adjustable abutment member for determining the position of an insole on a last heightwise as well as transversely of the machine with relation to the path of movement of the heated blade to apply cement to the insole.

Means is further provided, in accordance with still another feature of the invention, which is actuated in timed relation to each movement of the cement applying blade toward the space between the insole and the last to index the cylinder of cement so as to insure that the blade will pick cement uniformly all around the lower end of the cylinder until the entire supply is used up.

These and other features of the invention will now be described in detail with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the drawings,

Fig. 1 is a left side elevation of a machine embodying the invention, this view showing a heated applicator blade of the machine in position to melt and pick up a quantity of thermoplastic cement when the operator depresses a treadle;

Fig. 2 is a view similar to Fig. 1, this view showing the applicator blade engaged between an insole and the bottom of a last to apply the cement to the margin of the insole;

Fig. 3 is a plan view of a hollow cylinder of solid thermoplastic cement and of mechanism for indexing the cylinder in each operating cycle of the machine;

Fig. 4 is a detail view, partly in section, taken along the line IV—IV of Fig. 3;

Fig. 5 is a perspective view of part of the mechanism for indexing the cylinder of cement;

Fig. 6 is a detail view in front elevation taken along the line VI—VI of Fig. 3; and

Fig. 7 is a perspective view of an insole fastened to a last in the machine of the present invention.

The machine is provided with a base or column **10** (Figs. 1 and 2) to the top of which is bolted a frame **12**. A bell crank lever **14** is pivoted at **15** on the frame and has a rearwardly extending horizontal arm **16** and an upwardly and rearwardly extending forked arm **18**. The horizontal arm **16** of the bell crank is connected by a rod **20** to a treadle **22** pivoted on the base of the machine. A spring **24** is attached at one end to a pin **26** on the lever arm **16** and at its other end to a pin **28** in the frame **12**.

An applicator member **30** is pivotally mounted on a pin **32** extending through the upper end of the forked lever arm **18**, a tension spring **34** being stretched between the applicator member and the lever arm **18**. In the applicator member is mounted a heating unit **36** connected by a flexible cable **38** to a junction box **40** from which wires **42** lead to a source of electricity. The applicator member **30** has a forwardly projecting blade **44** which, when the treadle **22** is depressed, is moved in one direction to the position shown in Fig. 1, in which it engages the lower end of a hollow cylinder **46** of solid thermoplastic cement to melt and pick up a small quantity of cement, and which is movable in the opposite direction, when the treadle is released, to the position shown in Fig. 2, in which it engages in the space between the insole **43** and the bottom of a last L to deposit the cement on the margin of the attaching face of the insole.

The cylinder 46 of thermoplastic cement is held yieldingly clampd, with provision for rotation about a vertical axis, between a pair of rolls 50, 52 mounted on a stud 53 in the forward end of an arcuate plate or bracket 54 bolted to the top of the frame, a pair of rolls 55, 56 (Fig. 3) mounted on a stud 57 on the forward end of an arm 58 pivotally connected by a pin 59 to the bracket 54, and additional rolls forming part of a cylinder indexing mechanism to be described. A torsion spring 60 mounted on the pin 59 and bearing at its free end against a pin 62 on the arm 58 tends to urge the rolls 55, 56 carried thereby toward the cement cylinder 46 to clamp it yieldingly between them and the rolls 50, 52 carried by the bracket 54.

The lower end of the cement cylinder 46 rests upon a roll 64 (Figs. 1 and 2) mounted on a stud 66 extending through a bracket 68 secured in adjustable heightwise position by a bolt 70 extending through a vertical slot 72 provided in the rear of the frame 12. The roll 64 maintains the cylinder 46 spaced from the heated applicator member 30 so as to prevent melting of the cement by contact therewith while the machine is not being operated as well as while the blade 44 is in its forward position between the insole and the last. Heightwise adjustment of the bracket 68 and hence of the roll 64, varies the heightwise position of the cement cylinder relative to the applicator member 30. A pin 74, extending through the lower rear end of the applicator member 30, carries a roll 76 which engages a cam track 78 formed on a cam member 80 bolted to the frame 12. The cam member 80 is adjustable forwardly or rearwardly of the machine, so as to cause the blade 44 of the applicator member 30 to engage the cement cylinder at variable angles, thereby to determine the quantity of cement picked up by it for application to the margin of the insole. The extent of forward movement of the blade 44 is variably determined by engagement of the rear end of the horizontal arm 16 of the bell crank lever 14, upon release of the treadle, with an adjustable stop screw 81 (Figs. 1 and 2) mounted in the frame 12.

To effect the attachment of an insole to a last in the machine as above described, the operator places the insole on the bottom of the last held in inverted position and presents the combined insole and last to the machine, causing the upper surface of the insole to engage the lower end of an abutment plate 82 (Figs. 1, 2, 3 and 6), which is secured in adjustable heightwise position to the forward end of the bracket 54, to locate the insole and last in the desired heightwise position with relation to the path of forward movement of the applicator blade 44 to apply cement at selected points along the margin of the attaching face of the insole. The abutment plate 82 is provided with a downwardly projecting curved member 84 adapted to be engaged by the toe end of the insole when the last and insole are first presented to the machine, to determine the position of the assembly transversely of the machine with relation to the applicator blade. By variably adjusting the heightwise position of the abutment plate 82, the heightwise position of the member 84 may be varied in accordance with the thicknesses of different insoles. Also projecting downwardly from the abutment plate 82 at either side of the member 84 is a pair of pins 86 which, by engagement with the edge face of the insole and the side of the last, aid in registering the insole and last relative to each other, the pins being rotatable in the abutment plate to enable the work to be freely turned for application of cement to different portions of the insole margin, while maintaining the insole and last in registered relationship.

With the work positioned as just described, when the operator depresses the treadle 22, the bell crank lever 14 swings in a counterclockwise direction, as seen in Fig. 1. During the first part of the swinging movement of the lever, the applicator member 30 moves with it in the same direction until the roll 76 carried by it engages a high portion of the cam track 78, whereupon the applicator member is caused to swing counterclockwise about its pivotal connection 32 to the lever arm 18, against the tension of the spring 34, to locate the heated blade 44 in engagement with the lower end of the cement cylinder 46. When, thereafter, the operator releases the treadle, the bell crank lever 14 and the applicator member 30 are swung in a clockwise direction, as seen in Fig. 2, and the blade 44 is moved forwardly of the machine (or to the right of Fig. 2) into the space between the attaching surface of the insole 48 and the bottom of the last to apply a blob of cement C (Fig. 7) picked up by it to a first selected spot along the margin of the insole, for example at the toe end. The blade thus moves forwardly between the pins 86, which are spaced from each other a sufficient distance to permit passage of the blade, and without interference from the sole positioning member 84 on the abutment plate 82, which is positioned at a height sufficient to provide clearance for the blade, as shown in Fig. 2.

The operator will next depress the treadle to cause the applying blade to be withdrawn from between the insole and the last and moved back into the position shown in Fig. 1 to pick another blob of cement for application to another selected spot on the margin of the insole. As soon as the blade has been moved away from between the insole and the last, the operator will press the part of the insole to which cement has been applied upwardly against the abutment plate 82 to cause that part to be bonded to the last. The cement will cool and harden almost instantaneously upon contact with the wooden last, and the operator may at once turn the last and insole and operate the treadle to cause the blade to apply cement to another portion of the insole, repeating this sequence of operations until cement has been applied at a sufficient number of localities to hold the insole firmly on the last during the subsequent shoe manufacuring operations. At some stage in the manufacture of the shoe, for example, prior to attachment of an outsole, the last may be freed from the shoe to permit its withdrawal by subjecting the bonded portions of the insole to hammer blows, without damaging either the shoe or the last.

To insure that the blade 44 will pick off cement uniformly around the lower end of the cement cylinder 46, an indexing mechanism is provided which is operated in timed relation to the movement of the blade into cement applying position to cause the cement cylinder to be rotated about a vertical axis so as to locate it in position for a succeeding operation of the blade to pick up cement for application at another spot on the margin of an insole. Referring more particularly to Figs. 3 and 5, the indexing mechanism comprises a ratchet wheel 88 that is connected by a tongue-and-groove joint, as shown in Fig. 4, to a knurled roll 90 adapted to engage the outer surface of the cement cylinder and having a hub portion rotatably mounted in the bracket 54. The wheel 88 and the roll 90 are assembled together by a stud 92 on which is also mounted, above the ratchet wheel 88, a roll 94 also adapted to engage the cement cylinder. Co-operating with the ratchet wheel is a pawl 96 carried by a bar 98, which is slidable in a horizontal groove provided in a block 100 secured by a cap screw 102 to the rear end of the bracket 54. The rear end of the bar 98 has a pin-and-slot connection to the upper bifurcated end of one arm of a bell crank lever 104 which is pivoted on a pin 106 extending through lugs 108 projecting rearwardly from the bracket 54. In the rear end of the other arm of the bell crank lever 104 there is provided a slot 109 through which extends the upper end of a vertical rod 110 (Figs. 1 and 2), the lower end of which is pivotally connected by a pin 112 to the rear end of the arm 16 of the bell crank lever 14. Above and below the bell crank lever 104, the rod 110 has pinned thereto a pair of

collars or blocks **114**, **116**, the arrangement being such that when the treadle **22** is depressed to cause the blade **44** to pick up cement from the cylinder **46** and the bell crank lever **14** is swung counterclockwise, as seen in Fig. 1, the rod **110** is moved downwardly until the block **114** located above the lever **104** engages this lever and causes it to swing counterclockwise, moving the bar **98** rearwardly of the machine, or to the left of Figs. 1 and 5, the pawl **96** at this time riding over the teeth of the ratchet wheel **88** without producing any rotation of the wheel. When the treadle is released to cause the blade **44** to be moved to the position shown in Fig. 2, to apply the cement to the insole, and the bell crank lever **14** swings clockwise, as seen in Fig. 2, the rod **110** is moved upwardly until the block **116** located below the lever **104** engages this lever and causes it to swing clockwise, thereby moving the bar **98** forwardly of the machine, or to the right of Fig. 2, and causing the pawl **96** to rotate the ratchet wheel **88** clockwise, whereby the rolls **90** and **94** are rotated to index the cement cylinder **46**. Counterclockwise rotation of the ratchet wheel **88** is prevented by a detent **118** mounted in a block **120** secured to the top of the bracket **54**. As the height of the cylinder of cement is progressively diminished by repeated operation of the blade **44**, the cylinder may be pushed down so as to maintain it at a constant level as determined by the roll **64**.

Having 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 adhesively attaching insoles to lasts, an applying member movable in one direction into engagement with a source of supply of adhesive to pick a quantity of adhesive therefrom and in the opposite direction to apply the adhesive to a selected point along the margin of an insole supported on the bottom of a last, means for imparting movement to said applying member, and a fixed member against which the insole may be pressed to cause its coated portion to adhere to the bottom of the last.

2. In a machine for adhesively attaching an insole to the bottom of a last to maintain it thereagainst during the manufacture of a shoe, means supporting a source of supply of solid thermoplastic adhesive, a heated applying member movable first in one direction into engagement with the solid adhesive to melt and pick up a quantity of adhesive and thereafter in the opposite direction to apply the adhesive at a selected locality along the margin of the insole, operator controlled means for imparting movement to said heated applying member, and an abutment against which the insole may be pressed to cause its successively coated portions to adhere to the bottom of the last.

3. In a machine for adhesively attaching an insole to the bottom of a last to maintain it thereagainst during the manufacture of a shoe, means supporting a source of supply of solid thermoplastic adhesive, a heated applying member movable in each cycle of operation of the machine first in one direction into engagement with the solid adhesive to melt and pick up a quantity of adhesive and thereafter in the opposite direction to apply the adhesive at a selected locality along the margin of the insole, operator controlled means for imparting movement to said heated applying member, and an adjustable abutment for variably determining the heightwise position of the insole relative to the applying member and against which the insole may be pressed to cause the successive coated portions thereof to adhere to the bottom of the last.

4. In a machine for adhesively attaching an insole to the bottom of a last to maintain it thereagainst during the manufacture of a shoe, means supporting a source of supply of solid thermoplastic adhesive, a heated applying member movable first in one direction into engagement with the solid adhesive to melt and pick up a quantity of adhesive and thereafter in the opposite direction to apply the adhesive at a selected locality along the margin of the insole, operator controlled means for imparting movement to said heated applying member, an adjustable abutment for variably determining the heightwise position of the insole relative to the applying member and against which the insole may be pressed to cause the coated portion thereof to adhere to the bottom of the last, and means on said abutment for determining the position of the insole on the last transversely of the machine relative to the path of movement of the applying member into adhesive applying position.

5. In a machine for adhesively attaching an insole to a last in which there is provided a source of supply of adhesive consisting of a cylinder of solid thermoplastic cement, means supporting said cylinder for stepwise rotation, a heated applying member, operator controlled means for imparting to said member in each machine cycle movement in one direction into engagement with said cylinder of thermoplastic cement to melt and pick up a quantity of cement therefrom and in the opposite direction to apply the cement at a selected locality along the margin of the insole, and adjustable means for maintaining the cylinder of thermoplastic cement spaced a predetermined distance from the applying member while the latter is in its cement applying position and also while the machine is not being operated, to prevent melting of the cement by contact with the applying member.

6. In a machine for adhesively attaching an insole to a last in which there is provided a source of supply of adhesive consisting of a cylinder of solid thermoplastic cement, means supporting said cylinder for stepwise rotation, a heated applying member movable in one direction into engagement with said cylinder of thermoplastic cement to melt and pick up a quantity of cement therefrom and in the opposite direction to apply the cement at a selected locality along the margin of the insole, operator controlled means for imparting movement to said applying member, adjustable means for maintaining the cylinder of thermoplastic cement spaced a predetermined distance from the applying member, and means for indexing said cylinder in each cycle of operation of the machine to cause the applying member to pick cement uniformly around the periphery of the cylinder.

7. In a machine for adhesively attaching an insole to a last in which there is provided a source of supply of adhesive consisting of a cylinder of solid thermoplastic cement, means supporting said cylinder for stepwise rotation, a heated applying member, operator controlled means for imparting to said member in each machine cycle movement in one direction into engagement with said cylinder of thermoplastic cement to melt and pick up a quantity of cement therefrom and in the opposite direction to apply the cement at a selected locality along the margin of the insole, adjustable means for maintaining the cylinder of thermoplastic cement spaced a predetermined distance from the applying member, and means operated in timed relation to the movement of the applying member into cement applying position to index the cylinder of cement to cause the applying member to pick cement uniformly around the periphery of the cylinder.

8. In a machine for adhesively attaching insoles to lasts, means supporting a cylinder of solid thermoplastic adhesive, a heated applying member movable in an arcuate path in one direction into engagement with said cylinder to melt and pick up a quantity of adhesive therefrom and in the opposite direction to engage the surface of an insole adjacent to the bottom of a last and apply the adhesive at a selected point along the marginal portion thereof, and adjustable means controlling the movement of said applying member in said one direction so as to determine the amount of cement picked up by it for application to the margin of the insole.

9. In a machine for adhesively attaching insoles to lasts, means supporting a cylinder of solid thermoplastic adhesive, a heated applying member movable in one direc-

tion into engagement with said cylinder to melt and pick up a quantity of adhesive therefrom and in the opposite direction to engage the surface of an insole adjacent to the bottom of a last and apply the adhesive at a selected point along the marginal portion of the insole, means for imparting said movements to the applying member, an adjustable cam, and a cam follower carried by the applying member and actuated by said cam to cause the applying member to engage the cylinder of adhesive at a variably predetermined angle to vary the amount of adhesive picked up by it for application to the margin of the insole.

10. In a machine for adhesively attaching an insole to the bottom of a last to maintain it thereon during the manufacture of a shoe, means supporting a cylinder of solid thermoplastic cement, a treadle, a lever connected to and operable by said treadle, a heated cement applying member pivotally mounted on said lever and movable therewith in one direction upon depression of said treadle

into engagement with the cylinder of cement to melt and pick therefrom a quantity of cement and movable in the opposite direction upon release of the treadle to apply the cement to a selected point along the margin of the insole, adjustable cam means for controlling the swinging movement of the applying member into engagement with the cylinder of cement, stop means for limiting movement of said lever and applying member in said opposite direction, means operated in timed relation to the movement of said applying member into cement applying position to index the cement cylinder, and an abutment member against which the insole may be pressed to cause its successively coated portions to adhere to the last.

References Cited in the file of this patent

UNITED STATES PATENTS

2,383,539 Fossa ---------- Aug. 28, 1945