

May 24, 1949.

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2,471,397

SOLE-CEMENTING MACHINE

Filed Oct. 16, 1946

3 Sheets-Sheet 1

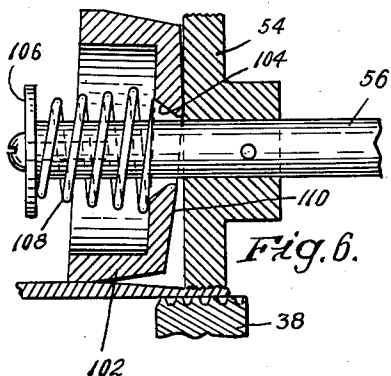
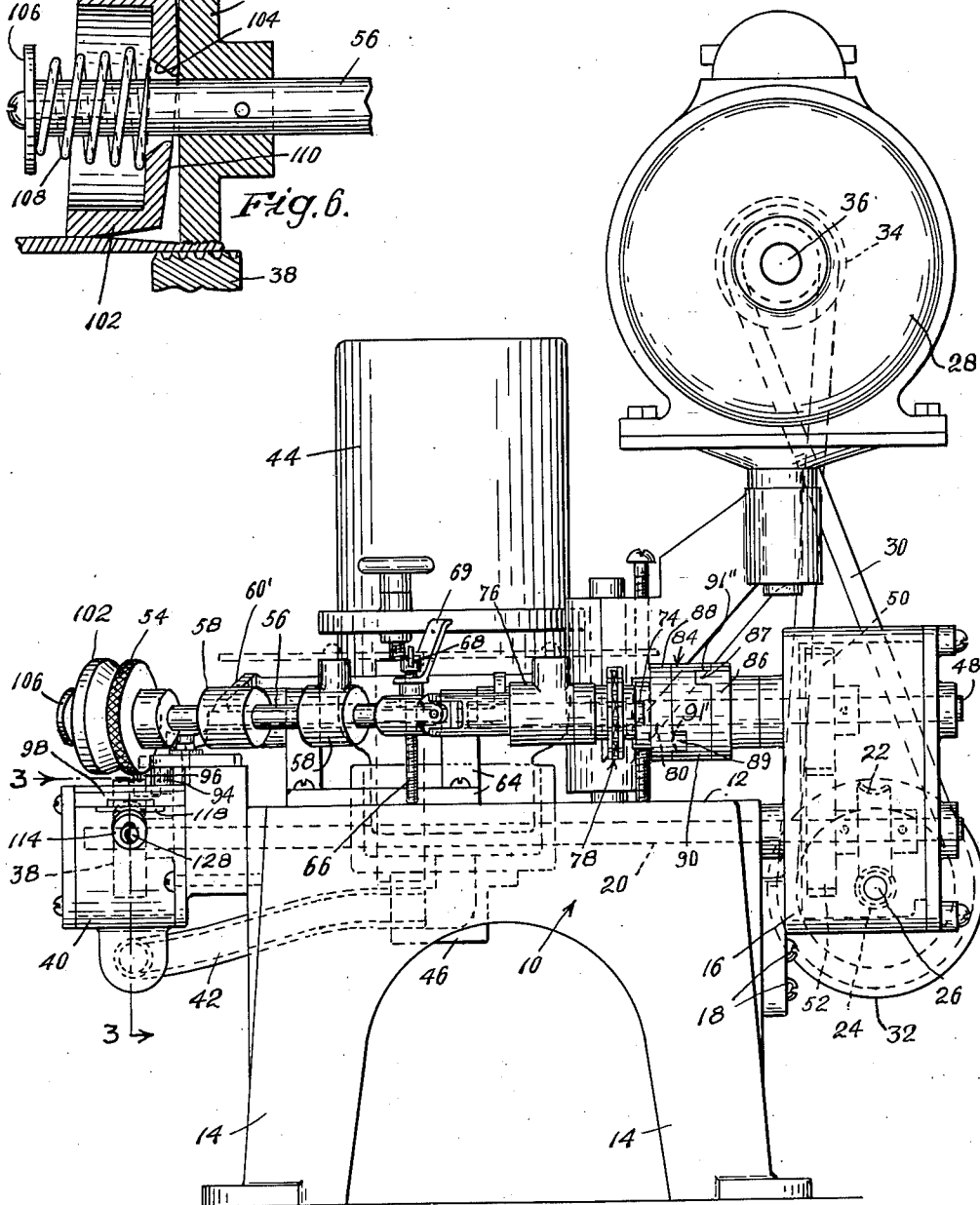


Fig. 1.

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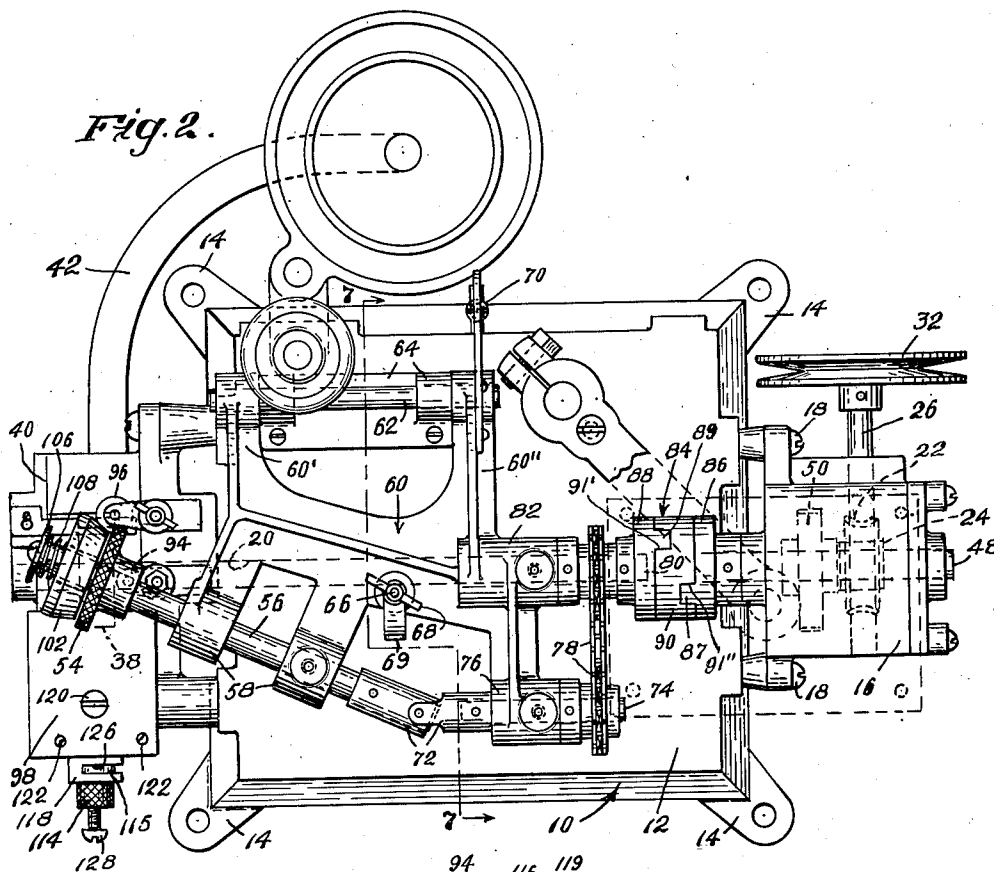
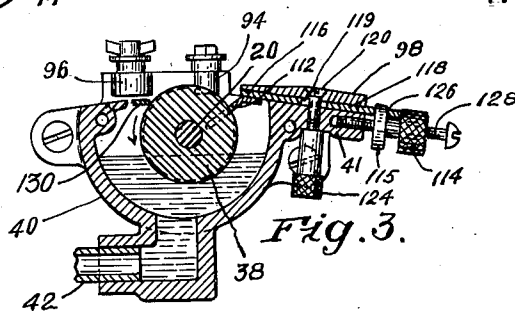
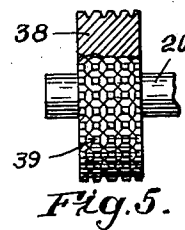
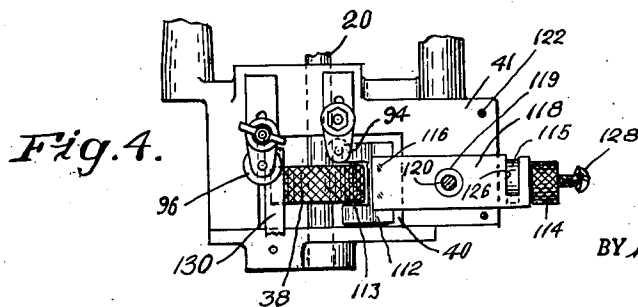
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SOLE-CEMENTING MACHINE

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3 Sheets-Sheet 2



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SOLE-CEMENTING MACHINE

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3 Sheets-Sheet 3

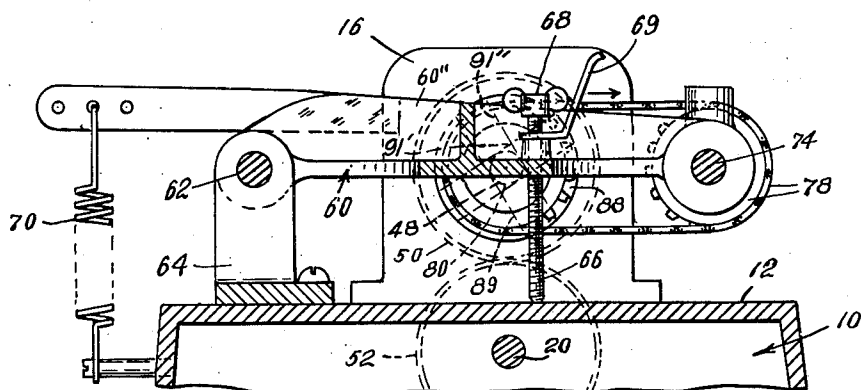


Fig. 7.

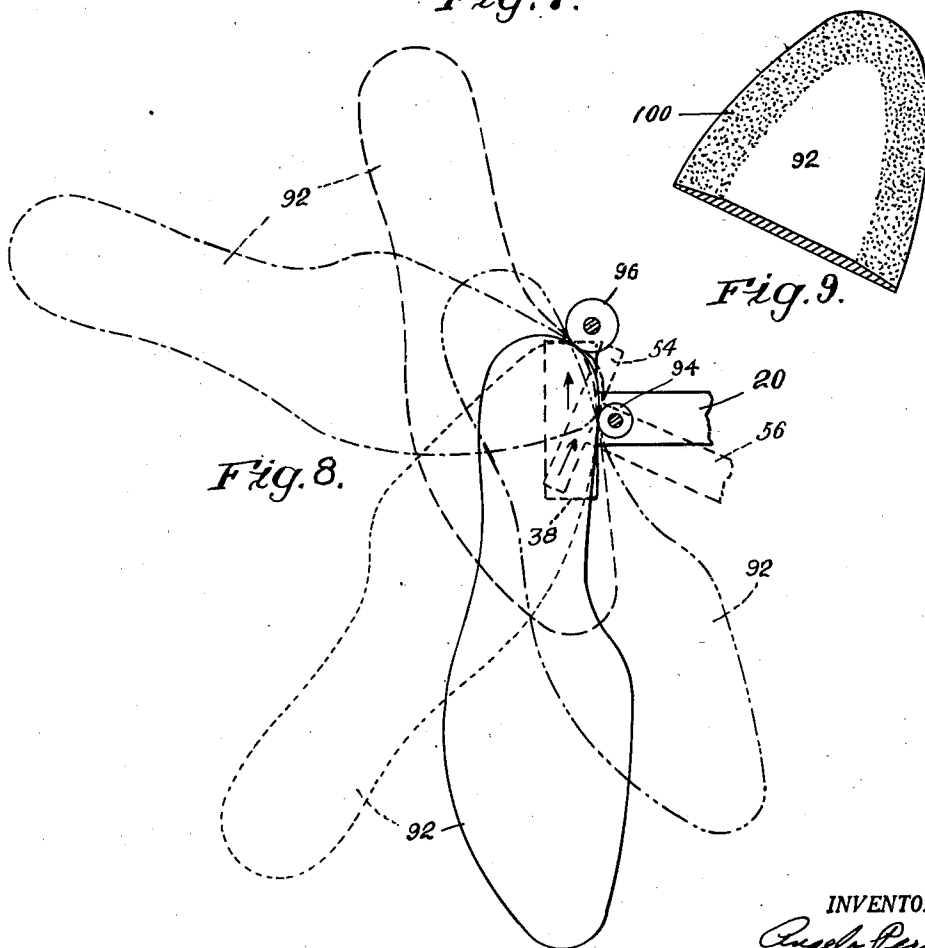


Fig. 9.

Fig. 8.

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SOLE-CEMENTING MACHINE

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8 Claims. (Cl. 91—51)

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This invention relates to improvements in machines for applying cement, or other adhesive, to the marginal regions of articles having curved edges. More particularly it provides improved mechanism for applying cement to the marginal region of one side of shoe sole elements, whereby a marginal region of predetermined width may be coated with cement more effectively, economically and quickly than has been possible with the prior cementing machines of which the applicant is aware.

It is among the objects of the invention to provide a cementing mechanism having means for engaging the margin of an element which has a curved edge contour providing continuity of margin all around the element, said means applying cement to a marginal surface and simultaneously feeding the element on a course to bring the total extent of the continuous margin into the action of the cement applying means, whereby a work element may be initially manually introduced into the mechanism, and then will be automatically fed until a marginal region extending all around the element has been coated with cement.

Another object is to provide a cementing mechanism wherein a pair of work-feeding rotary members on angularly related axes coact with spaced edge-guides to feed a work element on a course to bring every point on its edge progressively into contact with said edge-guides, whereby said rotary members engage every portion of the margin of the element progressively throughout the extent of said margin, and one of said rotary members applying cement to said margin simultaneously with the feed of the element.

Yet another object is to provide a cementing mechanism having angularly related work-engaging rotary work-feeding members of which one also constitutes a cement applicator, the other one of said members being yieldable in direction away from the applicator member, to accommodate variations in the thickness of work engaged between said members.

A further object is to provide a cementing mechanism having coacting work-feeding rotary members of which one constitutes also a cement-applying member and the other has its axis angularly related to the axis of the cement-applying member, whereby a major component of the force advancing a work element between said members is in general direction at right angles to the axis of the cement-applying member, and another component of said work-advancing force is in direction at an acute angle to the first men-

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tioned component, there being edge-guiding means against which the edge of the feeding work is urged by said angularly directed component of the work-feeding force.

It is, moreover, my purpose and object generally to improve the structure, operation and efficiency of cementing mechanisms and more especially such mechanisms designed to coat the margin of a work element having continuity of edge contour at least some substantial portions of which are curved.

In the accompanying drawings:

Fig. 1 is a front elevation of a cementing machine embodying features of my invention;

Fig. 2 is a top plan view of the machine of Fig. 1;

Fig. 3 is a cross-sectional view on line 3—3 of Fig. 1;

Fig. 4 is a top plan view of the mechanism of Fig. 3, with the work-supporting plate removed;

Fig. 5 is a detail view, partly in cross-section, of the cement-applying wheel;

Fig. 6 is a fragmentary cross-sectional view in a medial vertical plane through the angularly disposed wheel-carrying shaft;

Fig. 7 is a cross-sectional view on line 7—7 of Fig. 2;

Fig. 8 is a diagrammatic representation of the work in successive positions of marginal cement application; and

Fig. 9 is a perspective of the toe portion of a shoe sole element having its margin coated in accordance with the present disclosure.

Referring to the drawings, the base 10 may be of any suitable form capable of supporting the operative mechanisms of the machine. As illustrated, base 10 comprises a generally rectangular top 12 which is supported generally in a horizontal plane by the legs 14.

A gear housing 16 is mounted on one side of the base, secured in any suitable manner, as by the screws or bolts 18. One end portion of a power shaft 20 extends through housing 16, with bearings in opposite walls of the housing, and a worm gear 22, fixed on shaft 20 within the housing, meshes with worm pinion 24 on a shaft 26 which extends out of the housing and which is driven by electric motor 28 through the medium of belt 30 trained over pulleys 32, 34 respectively on the said shaft 26 and on motor shaft 36.

Power shaft 20 extends from housing 16 to the opposite side of base 10 where it has fixed near its end the wheel or roll 38 which rotates in a cement-holding well or chamber 40 in which liquid cement is maintained at a predetermined

level by gravity flow through conduit 42 from a suitable supply container which conveniently may be an inverted bottle 44. Conduit 42 is connected to a nipple 46 which opens through the bottom of chamber 40, and the lower portion of wheel 38 is immersed in the cement in chamber 40, so that cement is carried upward on the periphery of wheel 38 as it rotates, the periphery of the wheel, preferably, being formed with the multiple applicating surfaces as indicated at 39 in Fig. 5.

Vertically above and parallel with power shaft 20, a shorter shaft 48 has one end portion extending through housing 16 and journaled in opposite side walls thereof. A spur gear 50 is fixed on shaft 48 within the housing 16, and meshes with a similar spur gear 52 on power shaft 20, so that shaft 48 rotates with shaft 20 but in opposite direction.

According to the invention, the wheel 38 on power shaft 20 is adapted for coaction with an angularly related wheel 54 for engaging and feeding work between the peripheries of the wheels, the wheel 38 simultaneously applying cement from its periphery to the margin of the under surface of the work, and the wheel 54, because of its angular setting, being adapted to urge the work relatively strongly in lateral direction simultaneously with the forward advance of the work between the wheels. Also, to accommodate variations in thickness of the work, the angularly set wheel 54 is mounted for operative yielding as may be required.

To these ends, wheel 54 is fixed on a shaft 56 which is angularly disposed, in a horizontal plane, with respect to power shaft 20, as best seen in Fig. 2. Shaft 56 is mounted in suitable bearings 58 on a pivoted frame 60 whose pivot shaft 62 may be supported in a bracket 64 secured to the top 12 of base 10, the frame having spaced arms 66', 66'' engaging opposite end portions of shaft 62. A generally vertically disposed screw 66 is adjustably mounted in frame 60, with its lower end resting on the top 12 of base 10 as best seen in Fig. 7. A wing nut 68 is fixed on the upper end of the screw, by which the screw may be rotated to adjust the frame 60 about its pivot shaft 62, thereby to vary the space between the wheels 38 and 54, a locking member 69 being provided for maintaining the screw in any adjusted setting. The weight of the frame tends to maintain the lower end of screw 66 in engagement with the top of base 10, but the frame can move in direction away from the base if any work or portion of work has thickness greater than the space as provided between wheels 38, 54 by the adjusting screw 66. A counter-balancing spring 70 acts in opposition to the considerable weight of frame 60, to facilitate yielding of the frame in response to varying thicknesses of work.

The angularly disposed shaft 56 has a universal connection at 72 to a relatively short shaft 74 which is mounted in bearing 76 of frame 60, in parallelism with power shaft 20 and driven shaft 48. Shaft 74 has sprocket and chain drive connection at 78 to another relatively short and parallel shaft 80 which is mounted in bearing 82 in frame 60, generally in alignment with shaft 48 to which it is slidably coupled as indicated generally at 84. Hence, shaft 48 drives shaft 80 which in turn drives shaft 74 and the universally connected angularly disposed shaft 56.

The coupling at 84 is such that adjustments and movements of frame 60 which carries shaft 80 do not interfere with the driving connection

between shafts 48 and 80. This is made possible by the three-part coupling mechanism illustrated, in which part 86 is fixed on shaft 48 and part 88 is fixed on shaft 80. Coupling part 86 has the diametrically disposed rib 87 on its face which is toward coupling part 88, and part 88 has a similar diametrically disposed rib 89 on its face which is toward part 86. Between the parts 86, 88 is the third coupling part 90 which has its opposite faces diametrically grooved at 91', 91'' for reception of the ribs 87, 89 of parts 86, 88 respectively, the grooves 91', 91'' being in right angular relation as indicated in Fig. 7. With this coupling construction, it will be apparent that coupling part 88 may move along the groove 91' of part 90 a considerable amount in either direction without reducing the effectiveness of the drive connection between shaft 48 and shaft 80. Or both of the coupling parts 88, 90 may move together in either direction along rib 87 of part 86 without affecting the drive connection.

It is a feature of the invention that work, such as a shoe sole element 92 (Figs. 8 and 9), when fed between the wheels 38, 54, is engaged at its margin, with wheel 38 applying cement or other adhesive to the under side of the engaged margin, and with the two wheels coacting to feed the work edge against a pair of guide rolls 94, 96. The work rests on a suitable work support 98 as it is manually moved into wheel engagement. In Fig. 8, the sole element 92 is shown in full lines shortly after having been inserted between the wheels, and the successive broken-line representations of the sole element show various positions of said element as it moves generally counter-clockwise to receive a coating of cement all around its under margin. The general band-nature of the coating is indicated at 100 in Fig. 9.

The guide rolls 94, 96 are arranged in spaced relation in positions to engage the edge of the work as the work advances between the wheels, with the wheel 54 strongly urging the edge of the work against both rolls, so that the latter guide the work in such manner that the applicator wheel 38 coats the under margin all around the sole element.

Another feature is that the main body of the work, inward from the engaged margin, is effectively maintained generally in the plane of the engaged margin by a generally dish-shaped roll 102 which automatically adjusts itself to accommodate varying thicknesses of the work at the region of its engagement by roll 102. As best seen in Fig. 6, the dished roll 102 has a tapering axial hole 104 through which the end portion of shaft 56 loosely passes, with a washer 106 secured against its extreme end. A coil spring 108 engages between the washer and the dished roll 102 resiliently biasing roll 102 against the outer face of feed wheel 54. The surface of roll 102 which is thus urged against wheel 54 preferably is convex toward the wheel as at 110. The peripheral wall of the dished roll 102 is adapted to engage the main body of the work whose margin is gripped between the feed wheels 38, 54, and the roll 102 readily can adjust itself on shaft 56 to accommodate variations in the thickness of the work, yet always maintains the body of the work generally in the plane of its gripped margin. As the dished roll 102 is loose on shaft 56, and not driven thereby, it can follow along the body of the work, rotating as fast or as slow as may be required. Referring more particularly to Figs. 3-5, the wheel 38 being partially submerged in the supply of cement below it, the roughened surface 39

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of the wheel carries more or less cement upward on its periphery for application to the under marginal surface of the work. The amount of cement thus carried up may be regulated by adjusting the stripper plate 112 toward or from the wheel by means of the knurled finger nut 114.

The stripper plate 112 is shown cut out at 113 for fitting loosely around the peripheral portion of the wheel 38, the plate 112 being connected at 116 to a carrier plate 118 which is slidably mounted between the part 41 of cement container 40 and the work-supporting plate 98, which is removed in Fig. 4. Carrier plate 118 has a slot 119 therein through which a screw 120 extends for securing support plate 98 in place, along with the smaller screws 122 outward from the carrier plate. As shown in Fig. 3, the screw 120 extends loosely through the part 41 and has the finger nut 124 on its end for securing the screw and plate 98 in place.

Adjustment of the carrier plate 118 may be effected by the knurled nut 114 which has rigid with it a flange 115 engaging in a transverse slot 126 in the carrier plate. Nut 114 is threaded on a screw 128, and when the nut is turned on screw 128 the flange 115 urges the carrier plate toward or from the wheel 38 to reduce or enlarge the space between stripper plate 112 and the wheel.

At the opposite side of wheel 38, a fixed member 130 is set close against the periphery of the wheel to act as a dam for accumulating cement adjacent to the region of cement-application to the work.

It will be apparent from the foregoing description that I have provided effective mechanism for applying cement uniformly all along the margin of a sole element or the like which automatically advances to bring the entire extent of the margin, all around the sole element, into the action of the applicator. The angularly related wheel 54 rests by gravity against the work but is positively driven for effective feeding coaction with the applicator wheel 38, yet wheel 54 is readily yieldable in direction away from wheel 38 to accommodate varying thicknesses of work and to facilitate removal of the work after a cementing operation thereon has been completed.

I claim as my invention:

1. In a cementing mechanism, means for feeding a curved edge work element so that the margin of the element is progressively engaged by the feeding means all around the element, said means comprising a work engaging wheel rotatable on a fixed generally horizontal axis, and a second work engaging wheel rotatable on a generally horizontal axis which is movable in directions generally toward and away from said fixed axis, said movable axis being disposed in a vertical plane which is at an acute angle to the vertical plane of said fixed axis whereby said second wheel strongly urges the work element laterally of the direction of primary feed of the element between the wheels, and spaced edge guides at fixed locations laterally of the wheels against which the curved edge of the work element is constantly pressed and by which the course of the feeding work is determined, said second wheel being yieldable away from the first wheel to accommodate variations in the thickness of the work, and power means rotating said wheels in opposite directions.

2. In a cementing mechanism, means for feeding a curved edge work element so that the margin of the element is progressively engaged by the feeding means all around the element, said means

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comprising a work engaging wheel rotatable on a fixed generally horizontal axis, means below said wheel holding a supply of cement in which a peripheral portion of the wheel is submerged so that cement is carried upward on the periphery of the wheel and applied to the engaged portion of the work element, a second work engaging wheel rotatable on a generally horizontal axis which is movable in directions generally toward and from said fixed axis, said movable axis being disposed in a vertical plane which is at an acute angle to the vertical plane of said fixed axis, whereby said second wheel strongly urges the work element laterally of the direction of primary feed of the element between the wheels, power means driving said wheels in opposite directions, and a pair of spaced guide elements laterally of the wheels in positions to be engaged by the curved edge of the work element for guiding the course of the feeding work element, said second wheel being yieldable away from the first wheel to accommodate variations in thickness of the work and to facilitate removal of a work element.

3. Cementing mechanism comprising a work support, an applicator wheel rotatably mounted on a fixed generally horizontal axis with its periphery in position to engage the under side of a work element projected thereover from the work support, a member pivotally mounted for rocking movement in directions generally toward and from the plane of the work support, a second wheel rotatably mounted on said member in position for peripheral engagement of the upper surface of said projected work element and for coaction with said applicator wheel for feeding the work element between the wheels, said second wheel resting by gravity on the work element and having its axis in a generally horizontal plane and disposed at an acute angle to the vertical plane of the axis of the applicator wheel, means for driving the two said wheels in opposite directions thereby to feed the engaged work element between the wheels with said second wheel strongly urging the work in direction laterally of the direction in which the applicator wheel urges the work, relatively fixed means arranged to be engaged by the feeding work and adapted to determine the course of the feeding work, and means supplying cement to the periphery of the applicator wheel for application to the under side of the work element simultaneously with the feed thereof.

4. In a machine for applying cement to the margin of the under side of a shoe sole element all around the margin of the element, a pair of coating feed wheels for peripheral engagement of the margin of a said element at opposite sides thereof, the wheel engaging the under side of the work being rotatable on a fixed axis, means below the latter said wheel holding a supply of cement in which a peripheral portion of the wheel is submerged for carrying cement on its periphery and applying it to the engaged under margin of the work, said wheel engaging the upper surface of the work being rotatable on an axis angularly related to said fixed axis and disposed in a vertical plane which intersects the vertical plane in which said fixed axis is disposed, the latter said wheel being movable in general direction toward and from said fixed axis for accommodating variations in thickness of the work, power means rotating said wheels in opposite directions for advancing the work between the wheels with said angularly related

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wheel strongly urging the work laterally of the primary direction of feed of the element between the wheels, and spaced guides laterally beside the wheels for guiding the course of the work element so as to advance the margin thereof progressively between the wheels all around the element.

5. In a machine for applying adhesive to a work element, a pair of angularly related oppositely rotating wheels for engaging opposite sides of the work element to advance the work element between the wheels, relatively fixed guide means for guiding the course of the advancing work element, means supplying adhesive to the periphery of one wheel whereby said wheel applies it to the work simultaneously with the advance thereof, a pivoted support for one of the wheels gravity actuated to maintain its wheel yieldably in contact with the work element, the axes of said wheels being in different vertical planes which intersect each other whereby the wheels are angularly related, means for driving the wheels at substantially equal peripheral speeds in their said opposite directions, said driving means for the gravity-actuated wheel including a self-adjusting coupling for maintaining the drive connection notwithstanding substantial movements of said pivoted support.

6. In a machine for applying adhesive to the margin of a sole element all around the margin of the sole, a pair of angularly related oppositely rotating wheels for engaging opposite sides of the sole element at the margin thereof to advance said element between the wheels, the axes of said wheels being disposed in different vertical planes which intersect each other, means applying adhesive to the periphery of one of said wheels whereby said wheel applies it to the engaged margin of the sole element simultaneously with the advance thereof, guide means laterally of the wheels for engaging the edge of the sole element and guiding the course of the element so that the wheels engage the margin progressively all around the element, and a member rotatably mounted above the sole element inward from the wheel at the upper side of said element, said member engaging the sole element inward from its margin and being self-adjusting to accommodate variations in the thickness of the engaged work, and being rotated by the advancing element to maintain the body of the sole element approximately in the plane of its wheel-engaged margin.

7. In a machine for applying adhesive to the

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margin of a sole element all around the margin of the sole, a pair of angularly related oppositely rotating wheels for engaging opposite sides of the sole element at the margin thereof to advance said element between the wheels, the axes of said wheels being disposed in different vertical planes which intersect each other, means applying adhesive to the periphery of one of said wheels whereby said wheel applies it to the engaged margin of the sole element simultaneously with the advance thereof, guide means laterally of the wheels for engaging the edge of the sole element and guiding the course of the element so that the wheels engage the margin progressively all around the element, and a roller mounted for rotation generally about the axis of the wheel at the upper side of the element and biased into contact with a face of that wheel, said member engaging the upper surface of the sole element inward from its margin and being rotated by the advancing movement of said element.

8. In a cement applying machine, an applicator wheel rotating on a fixed axis, means supplying adhesive to the periphery of the said wheel, a frame pivotally mounted for movement generally in directions toward and away from said fixed axis and gravity-actuated toward said fixed axis, a second wheel rotatably mounted on said frame in position for coaction with the applicator wheel to feed work between them and having its axis in a vertical plane different from and intersecting the vertical plane of said fixed axis, relatively fixed guide means for guiding the course of the feeding work, means for adjusting the limit of movement of the frame under the influence of gravity thereby to space said second wheel a predetermined distance from the applicator wheel, means for driving said wheels in opposite directions, and coupling means in the drive connection for said second wheel self-adjusting for maintaining the drive connection notwithstanding substantial movements of said frame about its pivot.

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