

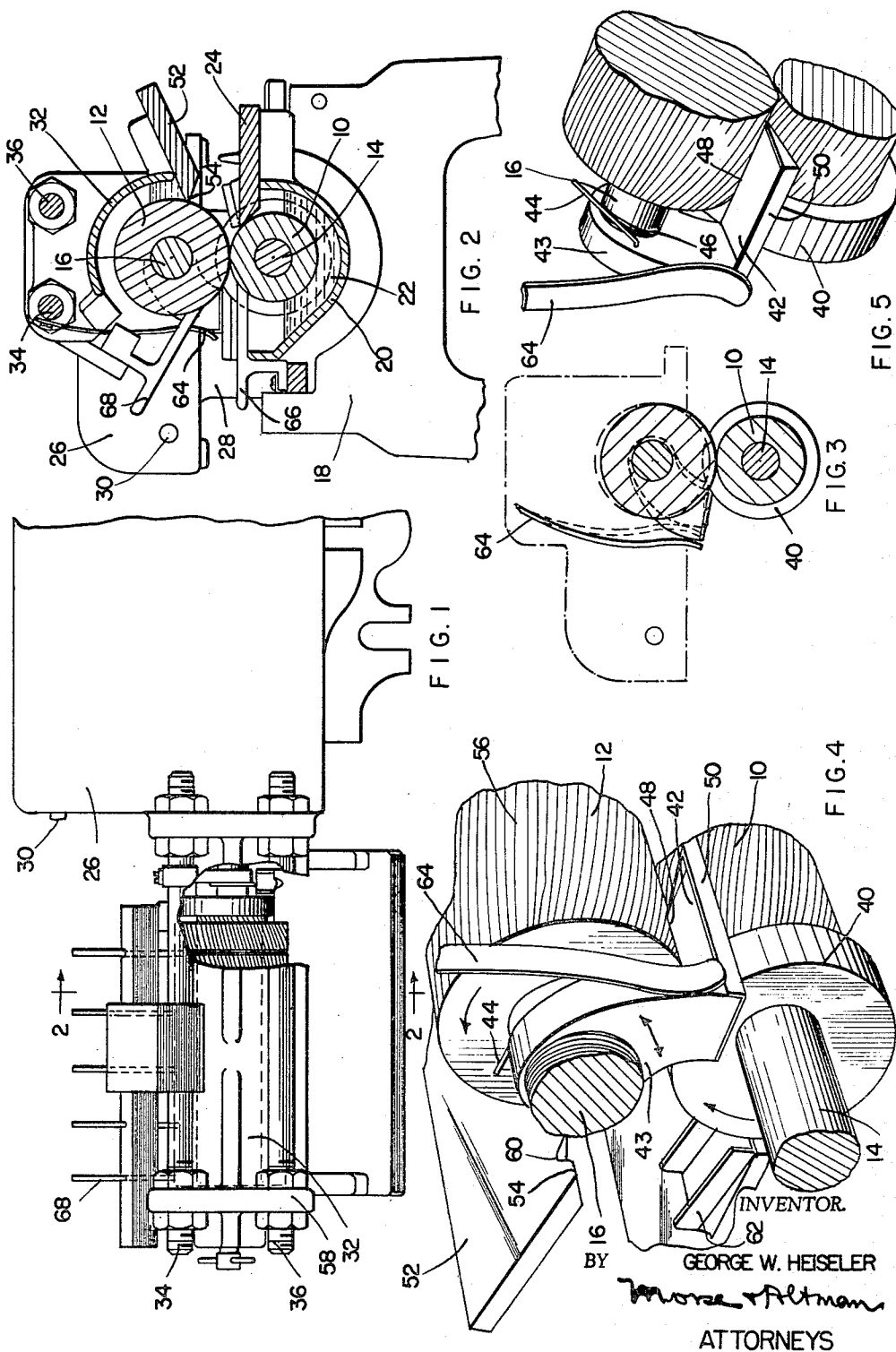
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G. W. HEISELER

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DUPLEX COATING MACHINE

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DUPLEX COATING MACHINE

George W. Heiseler, Saugus, Mass., assignor to Boston Machine Works, Company, Lynn, Mass., a corporation of Massachusetts

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This invention relates to a machine for applying coatings of liquid simultaneously to upper and lower surfaces of a relatively flat object such as a layer for a shoe sole. The machine includes two rolls between which the workpieces are caused to pass to receive coatings from the surfaces of the rolls. An object of the invention is to provide simple but effective means for keeping the upper roll adequately supplied with liquid from a pool thereof in which the lower roll is partly immersed. The means by which this is done is described hereinafter and is illustrated on the drawing, of which

FIGURE 1 is a plan view of a coating machine embodying the invention, partly broken away to show hidden members;

FIGURE 2 is a section on the line 2-2 of FIGURE 1;

FIGURE 3 is a sectional view of some of the parts shown in FIGURE 2, the broken lines indicating a change of position;

FIGURE 4 is a fragmentary perspective view from the rear, on a larger scale, of the parts for feeding the liquid; and

FIGURE 5 is a fragmentary view of the parts shown in FIGURE 4 but from a different angle.

The cementing machine illustrated on the drawing comprises two horizontal rolls 10, 12 which are supported on and rotated in opposite directions by shafts 14, 16, respectively, the shafts being driven by mechanism such as is illustrated and described in U.S. Patent No. 2,598,717.

A base 18 supports a receptacle 20 for a pool 22 of liquid cement to be applied to workpieces such as parts for shoe soles. The shaft 14 which carries the lower roll 10 is journaled in the end walls of the receptacle 20 so that the roll 10 is partly immersed in the pool 22 and picks up therefrom a film of cement as it rotates, the thickness of the film depending on the consistency and viscosity of the cement. A table 24 is mounted on the base 18 with an edge close to the ascending side of the roll 10. By adjusting the table 24 toward or from the roll 10, the thickness of the film carried over by the roll can be regulated.

The upper roll 12 and its shaft 16 extend out from a side of and are supported by the cover 26 of a housing 28 which encloses driving connections (not shown) for the two shafts. The cover 26 is hinged to the housing so as to rock about an axis 30, the shaft 16 remaining in driving connection with the driving means when the cover 26 is rocked to any angle about its hinge axis. Thus the roll 12 and the cover 26 which helps to support it can lift to accommodate a thick workpiece between the rolls, and the cover and roll can be swung up and back to facilitate cleaning the rolls. To provide a rigid support for the end of the roll 10 remote from the cover 26, an extension 32 projects out from the cover 26 over the roll 12 and is reinforced by a pair of tension and compression rods 34, 36. The supports for the roll 12 are preferably adjusted to provide a minimum clearance between the rolls greater than the thickness of the film of cement carried over by the lower roll 10 so that the roll 12 receives no cement from the roll 10.

The machine is designed to coat simultaneously both sides of the workpieces which pass between the rolls. For this purpose it is preferable to supply cement to the upper roll 12 independently of the roll 10 so that the coatings can be applied uniformly to the upper and lower

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surfaces of the workpieces and can be independently regulated. At the outer end of the roll 10 a disk 40 of larger diameter than the roll 10 is mounted on the shaft 14 and dips into the pool 22 to pick up cement therefrom. To transfer cement from the disk 40 to the upper roll 12, a shelf 42 is arranged to engage the periphery of the disk at a point to the rear of the nip of the rolls, that is, near the top of the descending side of the disk 40. Since the diameter of the disk 40 is greater than that of the lower roll 10, the shelf does not touch this roll. The shelf is supported by a bracket 43 to the lower end of which it is secured, the upper end of the bracket being a bearing which surrounds a portion of the shaft 16 which turns freely therein. To maintain the bracket 43 against axial displacement on the shaft, the bracket carries a small spring 44 which bears against the shaft 16 and rides in a circumferential groove 46 in the shaft. Although no cement is supposed to get on the shaft 16, yet some is apt to at times and can cause trouble if it works into the bearing of the bracket 43 and dries there. To prevent dragging or binding from such cause, the portion of the shaft within the bearing is screw threaded and the inner surface of the bearing which engages that portion of the shaft is also screw threaded but in the opposite direction, that is, the thread on one surface is a right-hand thread while that on the other surface is a left-hand thread. Thus the threads do not mesh but the crests move transversely of each other as the shaft 16 revolves, thus chewing up any cement that may be solidifying in the bearing.

The shelf 42 is supported by the bracket 43 in such a way that the front edge 48 of the shelf engages not only the periphery of the disk 40 but also a portion of the curved surface of the upper roll 12 on its ascending side at the adjacent end portion of the roll. The shelf 42 is provided with a rail 50 to maintain a pool of cement on the shelf fed by the cement which is scraped from the disk 40 by a portion of the edge 48. Since a part of this edge is in contact with the rising side of the roll 12, the latter picks up cement from the pool on the shelf and carries it over to a doctor 52 which extends along the full length of the roll 12 and is adjustable toward and from the roll to regulate the width of the clearance between an edge 54 of the doctor and the curved surface of the roll on its descending side. The cement for which the machine is designed is sufficiently viscous to form a film on the supply end portion of the roll 12 that takes cement from the shelf 42, which film is thicker than the width of the clearance between the edge of the doctor 52 and the roll surface. Hence excess cement accumulates on the upper face of the doctor which slopes outward and upward from the roll surface to contain a pool above the edge 54. The upper roll 12 is made with a helical fluting 56 on its surface arranged to propel some of the cement in the pool on the doctor 52 toward the end of the roll remote from the shelf 42, the helical angle of the fluting being such that the points of intersection of the fluting and the edge 54 of the doctor move away from the supply end of the upper roll when it rotates. When the machine is initially started in operation, cement which is deposited on the portion of the doctor 52 opposite the shelf is propelled along the doctor toward the other end of the roll until it is stopped at a wall 58 which is a part of the extension 32. When the pool on the doctor has thus been established for the full length of the roll 12, the excess which is thereafter brought up by the roll 12 from the shelf 42 drains through a notch 60 in the edge of the doctor and falls on a trough 62 which directs it back to the pool 22.

If a thick work-piece lifts the upper roll 12 when passing between the rolls, the edge 48 of the shelf remains in contact with the curved surface of the roll because the shelf is movable about the axis of the roll, but in order to

maintain contact with the disk, the shelf must swing downward as indicated in FIGURE 3. A spring 64 is mounted on the extension 32 to bear against the bracket 43 so that the shelf 42 is kept in contact with the disk 40 for small lifts of the roll 12.

The rolls 10, 12 are preferably equipped with sets of stripper fingers 66, 68, respectively, to prevent the work-pieces from being carried around one roll or the other.

The machine can readily be adjusted to coat either the under face only of a work-piece, or the upper face only, or both faces simultaneously. The foregoing description relates to the coating of both faces. Coating can be applied to the under face only of work-pieces by removing the shelf 42 from contact with the rim of the disk 40. Coating can be applied to the upper face only of work-pieces by lowering the level of the pool 22 so as not to be touched by the roll 10 but to wet the bottom of the disk 40.

I claim:

1. A coating machine comprising a receptacle for a pool of liquid cement, a horizontal lower roll extending into said receptacle for partial immersion in said pool, a horizontal upper roll above and spaced from said lower roll, means for supporting and rotating said rolls in opposite directions, and means operating when the rolls are rotating to raise cement from said pool and to apply cement to a limited end portion of the surface of said upper roll on the rising side thereof, and means on the descending side of said upper roll for propelling some of the cement carried by said end portion toward the other end of the upper roll, whereby to distribute cement from the pool along the surface of said upper roll.

2. A coating machine comprising a receptacle for a pool of liquid cement, a horizontal lower roll extending into said receptacle for partial immersion in said pool, a horizontal upper roll above and spaced from said lower roll, means for supporting and rotating said rolls in opposite directions, a disk at an end of said lower roll coaxial therewith and of larger diameter, said disk rotating with said lower roll and arranged for partial immersion in said pool, means operating when the rolls and disk are rotating to transfer cement from the periphery of said disk to the rising side of the adjacent end portion of said upper roll, and a doctor having an edge close to the descending side of said upper roll.

3. A coating machine as described in claim 2, said cement transferring means comprising a shelf, and means for supporting said shelf with one side edge engaging said disk at the descending side thereof, said shelf edge also

engaging said upper roll at the ascending side of the end portion thereof adjacent to said disk.

4. A coating machine as described in claim 3, said shelf-supporting means comprising a rockable bracket coaxial with said upper roll.

5. A coating machine for applying liquid cement to work-pieces, said machine including two horizontal rolls, means for supporting and rotating said rolls, and means for supplying cement to the curved surfaces of said rolls, said supporting and rotating means including shafts respectively coaxial with said rolls, a bearing member on one of said shafts in contact with a portion thereof, the surface of the bearing member in contact with said shaft being screw-threaded, the portion of the shaft surface engaged by said bearing member being screw-threaded in the opposite direction, whereby to chew up any cement migrating from said rolls to said bearings.

6. A coating machine for applying liquid cement to work-pieces, comprising two horizontal rolls, one above and spaced from the other, means for supporting and rotating said rolls, means for maintaining a pool of cement in contact with the lower of said rolls, means operating when the rolls are rotating to supply cement from the pool to the surface of the upper of said rolls near an end thereof, and means for distributing cement along the length of said upper roll, said last named means comprising a doctor extending alongside said upper roll and sloping upward away from said roll, said doctor having an edge close to the surface of said roll on its descending side, and helical fluting on the curved surface of said upper roll, the helical angle of the fluting being such that the points of intersection of the fluting and the edge of the doctor move away from said end of the upper roll when the roll is rotating.

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RICHARD D. NEVIUS, *Primary Examiner*.

JOSEPH REBOLD, *Examiner*.