March 11, 1947. R. R. CAMPBELL 2,417,102

MACHINE FOR COATING HEELS

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Fig.2.

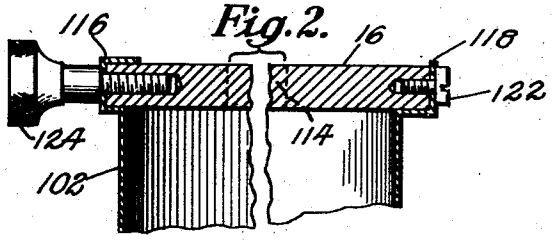


Fig.3.



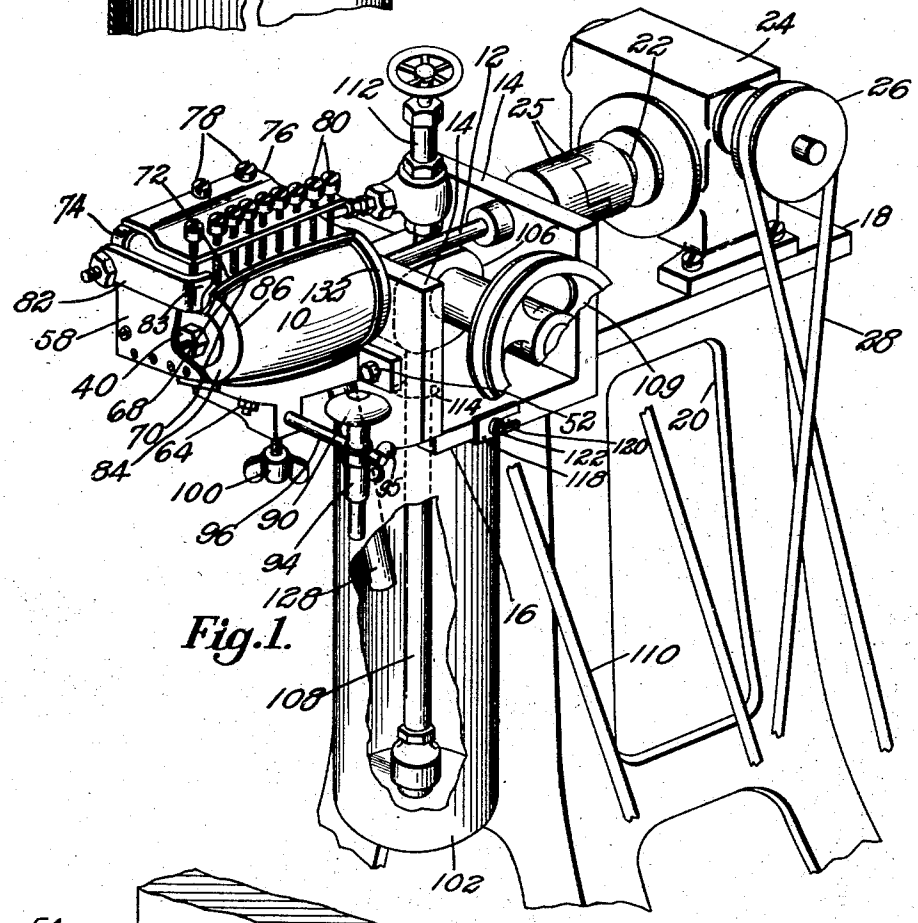


Fig.1.

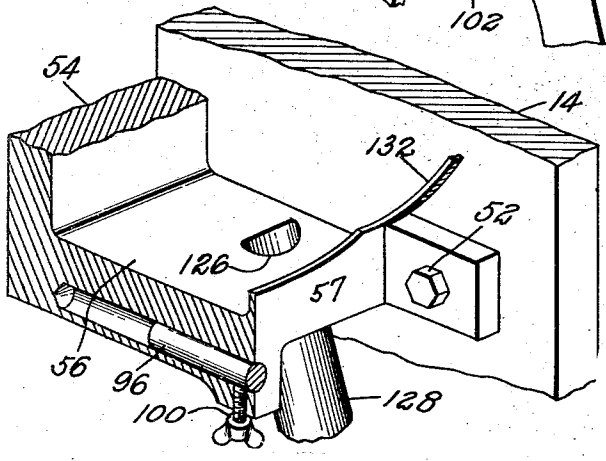


Fig.4.

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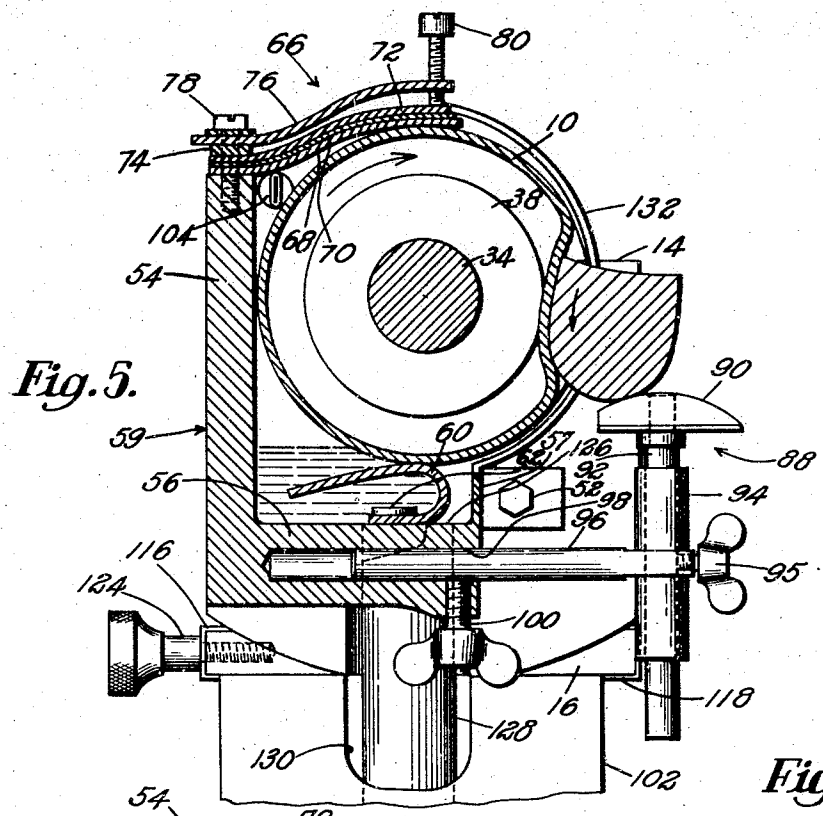


Fig. 5.

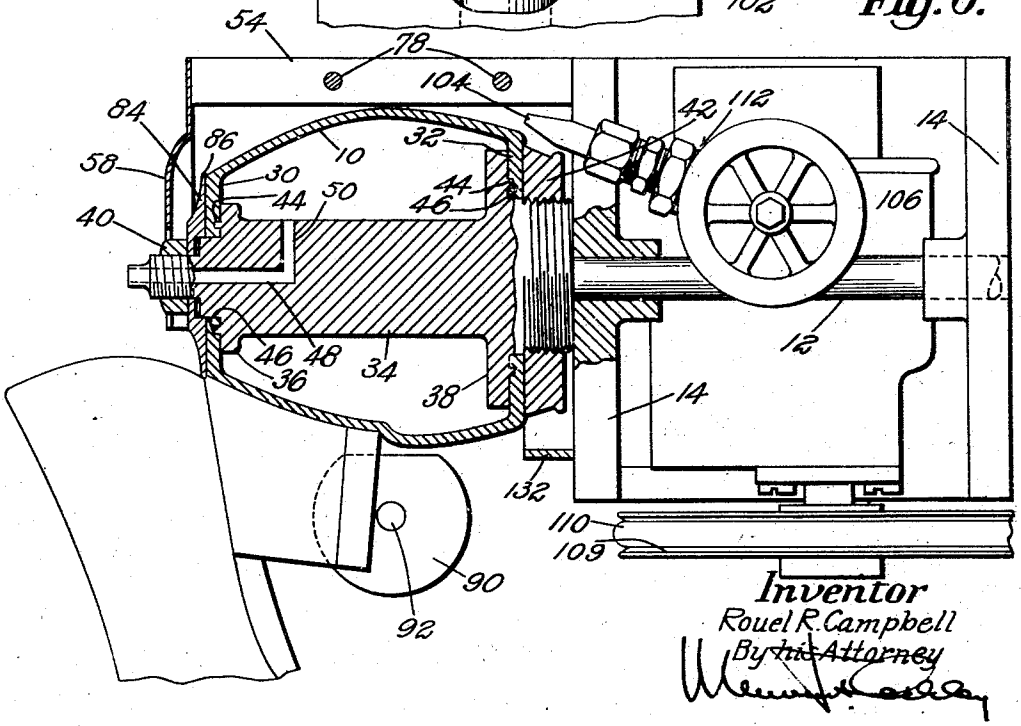


Fig. 6.

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MACHINE FOR COATING HEELS

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6 Claims. (Cl. 91—51)

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This invention relates to machines for applying coatings to shoe parts and is shown herein as embodied in a machine by the use of which a coating may be applied to heels which have already been attached to shoes.

Various machines and applicators have been made for applying a coating of stain, hereinafter called ink, to shoe heels, but most of them have proved cumbersome and slow because of the necessity for providing complex movements of the applicator or heel, or both, or numerous adjustments of the applicator to take care of the varying extent of the convex surface of the heel and differences in size and style of the heel, or, because of the lack of these adjustments, have proved inadequate to deal with more than a few sizes and styles of heels.

It is an object of the present invention to provide a machine by the use of which substantially any heel, regardless of its size or style, may be coated rapidly and uniformly, and which has an ink applicator which will automatically conform without adjustment to the complexities of the surface of each heel.

As illustrated herein and in accordance with a novel feature of the invention, the machine includes a rotatably mounted pneumatic applicator against which the heel of the shoe may be placed and rotated in a manner to cause intimate rolling contact between the surface of the applicator and the convex surface of the heel from breast edge to breast edge. The machine shown also includes means for rotating the applicator, and means for supplying a film of ink to the surface of the applicator for transference to the surface of the heel. As illustrated, the pneumatic applicator is a hollow rubber envelope which is so formed that it is substantially ovate, its ends being truncate. The convex periphery of the heel of a shoe will be so presented to the applicator that the end which is to be attached to a shoe is adjacent to the small end of the ovate envelope and a longitudinal section through this envelope must closely approximate a complement of the average height wise curvature of a heel. The envelope is normally self-sustaining, but is supplied with a medium under low pressure so that when a heel is pressed against its surface it will conform to the heel without collapsing. A doctor is provided for governing the quantity of ink on the surface of the applicator, the doctor being formed of a flexible material which is held in conformity with the ovate surface of the applicator by adjustable means which is arranged to adjust the proximity

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of any given portion of the doctor to or from the surface of the applicator independently of other portions of the doctor. In another aspect, novelty resides in the combination with the applicator of a container into which it dips and means in the container beneath the applicator which divides the container into two compartments, one of which lies at the upgoing side of the applicator and one of which lies at the downgoing side, means for supplying ink to the one compartment, and means for withdrawing unused ink from the other compartment.

With these and other objects in view, the invention consists in certain novel features of construction and combinations of parts which are set forth in the appended claims, a preferred form of embodiment being described with reference to the accompanying drawings, wherein

Fig. 1 is a perspective view of a machine embodying the novel features of the invention;

Fig. 2 is a section illustrating the construction provided for removably attaching the container for the liquid coating to the machine;

Fig. 3 is a detail of one of the container-attaching members;

Fig. 4 is a perspective view of the casting which forms the liquid-containing receptacle in which the pneumatic applicator rotates;

Fig. 5 is a section through the pneumatic applicator at right angles to its longitudinal axis of rotation; and

Fig. 6 is a horizontal section along the axis of rotation of the pneumatic applicator.

The pneumatic applicator comprises an inflatable, substantially ovate rubber envelope 10 (Fig. 6), having its ends truncate, mounted in a horizontal position on a shaft 12 which is journaled for rotation in a pair of spaced walls 14 rising vertically from a horizontal web 16 (Fig. 1). One of the walls 14 is welded in a vertical position to the edge of a horizontally disposed table 18 which, in turn, is fixed to the top of a stand 20. The shaft 12 is connected for rotation to a drive shaft 22 extending from a speed-reducing gear box 24, by a separable coupling 25. A pulley 26 and belt 28 transmit motion from an outside source of power to gears in the gear box and hence to the shaft 12.

Referring to Fig. 6, the truncated ovate rubber envelope 10 has end walls 30 and 32, through which are formed apertures, and is mounted on a hub 34 fixed to the free end of the shaft 12. The end walls 30 and 32 bear against flanges 36 and 38 formed on the hub and are held clamped thereto by nuts 40 and 42 threaded onto the hub.

To prevent leakage of air from the envelope, each flange is provided with an annular ridge 44 and each wall of the envelope is provided with an annular groove 46 which co-operates with its corresponding ridge in sealing relation. Leading through the outer end of the hub 34 is an axial passage 48 which is connected by a radial passage 50 in the hub with the inside of the envelope. The terminal end of the hub is reduced and threaded on the inside, thereby to receive a Schrader valve (not shown) and to afford a connection for attaching air compressing means. A bicycle pump, for example, may be attached to the reduced end of the hub to inflate the envelope to a desired degree.

It will be realized that the curvature of the side face of the heel adjacent to the breast edge is much less than it is along the back of the heel with its overhanging portion. Accordingly, the ovate envelope has been given a contour, as defined by a longitudinal section therethrough, which closely approximates a complement of the average heightwise curvature of a heel. In applying ink to the surface of the heel, the heel is placed breast down with one breast edge against the surface of the applicator and the shoe is then rotated in such timed relation to the rotation of the applicator that the surface of the heel and applicator move at the same linear speed. This insures rolling contact between the surfaces and hence the ink is applied to the surface of the heel without rubbing, which would cause streakiness. It is also to be observed that by rotating the heel, as indicated, a breast edge of the heel, both at the beginning and end of the rotation, is moving in the same linear direction as the applicator and hence no ink will be caused to accumulate at the breast edges and run over onto the breast.

Ink is supplied to the applicator as follows. Fastened to one wall 14 by bolts 52 (Fig. 4) is a casting having vertical walls 54 and 57 joined by a horizontal bottom portion 56 which extends beneath the applicator, thereby forming an ink receptacle 59 (Fig. 5) adapted to receive the bottom peripheral portion of the applicator. The wall 54 rises nearly to the top of the applicator adjacent to its back side. The wall 57 at the right-hand edge of the bottom portion 56, as viewed in Fig. 5, rises upwardly beneath the applicator and its upper edge is curved to conform to the longitudinal curvature of the surface of the applicator. The inner end of the casting is closed by the aforesaid wall 14, to which it is bolted, and the outer end is closed by a thin plate 58 (Fig. 1) screwed to the end of the casting against the end of the applicator. A wiper 60 (Fig. 5) is fixed to the bottom of the receptacle 59 beneath the lowermost point of the applicator. This wiper is made of resilient material, such as sheet rubber, and is bent back upon itself, as illustrated in Fig. 5, in the direction of rotation of the applicator. A plate 62 overlies an edge of the wiper and is fastened to the bottom of the receptacle by bolts 64 (Fig. 1), thereby securing the wiper in place. The wiper extends axially (i. e. generally parallel to the axis) or lengthwise of the applicator from the bottom of the receptacle to and against the surface of the applicator and hence divides the receptacle into two longitudinal compartments and, as will appear hereinafter, the ink is supplied to the compartment which lies between the upgoing side of the applicator and the wiper and the side wall 54.

In order uniformly to distribute the ink on the surface of the applicator and to remove the excess ink, control means including a scraper or doctor 66 is provided near the top of the applicator. As illustrated (Fig. 5), the scraper comprises a composite flexible sheet consisting of a layer of felt 68 and a layer of leather 70 stuck together, with the felt on the underside. The composite sheet is disposed in a substantially horizontal position with the felt sheet bearing against the surface of the applicator. Overlying this composite sheet there is a rubber sheet 72 one end of which extends beyond the outer or small end of the applicator (Fig. 1) and is held bent over this end, as will appear. The sheets 68, 70 and 72 are fastened along one edge to the top edge of the side wall 54 in the aforesaid horizontal position so that their free ends overlie the top of the applicator and bear against it. Above the aforesaid sheets and spaced therefrom by a spacer bar 74 is a sheet metal plate 76 which is fastened by screws 78 to the rear wall with the aforesaid sheets. The outer or free edge of the sheet metal plate 76 coincides with the edges of the sheets 68, 70 and 72 and through its margin are threaded a plurality of screws 80 (Figs. 1 and 5) the lower ends of which bear against the superimposed sheets. By adjusting the screws 80, the superimposed sheets may be caused to bear against the surface of the applicator with uniform pressure over its entire length, or if it should be desirable, different pressures may be had at different portions of the applicator.

In order to guide the heel during the application of the ink to its convex surface and prevent the ink from running over onto the upper, a rand-crease disk 84 (Fig. 6) having a thin peripheral edge 86 is mounted on the reduced portion of the hub, as seen in Fig. 6, between the small end of the applicator and the nut 40. The disk is slightly larger in diameter than the small end of the applicator and is adapted to enter the rand crease. The end of the rubber sheet 72 near the small end of the applicator is bent down into engagement with it, thereby to hold the composite sheet in close engagement with the rand-crease disk 84 to keep it clean. To hold the rubber sheet thus, a clamp bar 82 (Fig. 1) is bolted to the wall 54 so that it extends transversely of the small end of the applicator near its periphery. The free end of the bar 82 is bent inwardly at 83 toward the end of the applicator, and its end edge is undercut so that it bears on the peripheral corner of that disk. While the disk 84 serves to steady the shoe near the attaching lift, that is, at the rand crease, it is also desirable to steady the shoe near the top-lift to prevent wavering and to insure constant contact between the surface of the heel and the applicator. Accordingly, supporting means 88 (Fig. 5) is provided adjacent to the applicator about midway between its ends upon which the top-lift of the heel may be rested. The supporting means 88 consists of a convex disk 90 adjustably mounted for horizontal movement to and from the applicator and for vertical movement. To this end, the disk 90 is fixed to the top of a stem 92 which is telescopically fitted into a sleeve 94, the latter being supported in a collar at the end of a horizontal rod 96. A thumbscrew 95 threaded through the collar and sleeve provides means for fixing the stem heightwise. The rod 96, in turn, is slidably fitted into an aperture 98 at the bottom of the receptacle and adjustably retained therein by a thumbscrew 100.

The ink is delivered to that portion of the receptacle 59 to the left of the wiper 60, as seen

in Fig. 5, from a container 102 (Figs. 1 and 2) at a point near the top of the receptacle between the wall 54 and the applicator by way of a nozzle 104 (Figs. 5 and 6) which is connected to the outlet side of a gear pump 106 the intake side of which is connected to a tube 108 (Fig. 1) extending into the container. The gear pump 106 is mounted on the horizontal web 16 between the walls 14 and is driven by a pulley 109 and belt 110. A valve 112 is placed between the nozzle and the pump to control the flow of ink. The tube 108 extends through an opening 114 in the web 16 into the container 102 which is removably fastened to the web 16 below the pump. To this end, a pair of hooks 116 and 118 (Figs. 2 and 3) are formed at the upper sides of the container. The hook 116 hooks over the top edge of the web 16 and is slidable thereon. The hook 118 has a horizontal slot 120 in it which engages the neck of a screw 122 threaded into the opposite edge of the web 16. An aperture is formed in the hook 116 and a clamp screw 124 is passed through it and threaded into the edge of the web 16, thereby providing means for fixing the container 102 in place.

While most of the ink is removed from the applicator during rotation of the heel, some ink remains on the applicator, especially on portions not contacted. This ink is wiped off the lower part of the downgoing side of the applicator by the wiper 60 and collects in that part of the receptacle 59 to the right of the wiper 60, as seen in Fig. 5. To dispose of this ink, so that it will not accumulate, and to carry off any particles of wood or leather dust picked up from the work, it is returned to the container 102 from the receptacle 59 by way of an opening 126 formed in the bottom of the receptacle near the base of the wiper 60 into which there is welded a tube 128 leading from the opening 126 through an opening 130 (Fig. 5) formed in the side wall of the container.

Near the inner or large end of the applicator there is a guard ring 132 which, as illustrated, is formed integral with the wall 57. The guard ring 132 is in the form of a flat band which extends outwardly and upwardly from the wall 57 and follows the surface of the applicator around to the top where it is attached to the top of the wall 54, for example, by welding.

In preparing the device for use, the envelope 10 is inflated to the desired degree, that is, so that when the heel is pressed thereagainst the surface of the envelope will conform readily to the surface of the heel. It is to be observed that the pressure should not be so great as to make it difficult to force the heel into the envelope to cause envelopment of its convex surface and yet it should not be so small that the envelope collapses about the heel, hence applying ink to parts, such as the bottom face of the top-lift and the breast of the heel, which should not receive a coating of ink. The valve 112 is adjusted to furnish ink to the receptacle 59 as it is used and the heel support 90 is adjusted to the proper position, both heightwise and widthwise. The shoe is then placed with its rand crease in engagement with the disk 84, breast down and one breast edge lightly against the surface of the applicator. The operator then rapidly rotates the shoe in a counterclockwise direction and as the convex surface of the heel turns the heel is steadied by engagement of the convex surface of the top-lift with the support 90. It is to be observed that the surfaces of the heel and the applicator at their line of contact are traveling in the same direction so that the ink is applied to the surface of the heel without rubbing and hence eliminates streakiness. Because of the direction of rotation, the initial breast edge moves with the surface of the applicator and thus no ink is caused to accumulate and run onto the breast. For the same reason, when the other breast edge of the heel comes into contact with the applicator it will be moving with the applicator and hence no ink will build up at this edge and run onto the breast. Because the applicator is yieldable and inflated, it accurately envelops the contour of the heel which is held against it, regardless of its shape or size, and hence coats the entire surface thereof, and this even though there may be local irregularities in the convex surface of the heel.

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 applying a coating to the convex surface of a heel, a rotatably mounted applicator against which the heel may be placed and rotated to roll the convex surface in contact with the surface of the applicator, means for rotating said applicator, a receptacle into which the lower side of the applicator dips, and means in said receptacle below the applicator and which bears against the applicator axially thereof, said means dividing the receptacle into two compartments one of which is filled with liquid up to a point which reaches the under surface of the applicator and the other of which is substantially empty.

2. In a machine for applying a coating to the convex surface of a heel, a rotatably mounted applicator against which the heel may be placed and rotated to roll the convex surface in contact with the surface of the applicator, means for rotating said applicator, a receptacle into which the lower side of said applicator dips, means in said receptacle below the applicator and which bears against the applicator lengthwise thereof, said means dividing the receptacle into two compartments one of which lies at the upgoing side of the applicator and contains coating liquid and the other of which lies at the downgoing side of the applicator, and means for draining said last-named compartment.

3. In a machine for applying a coating to the convex surface of a heel, a rotatably mounted applicator against which the heel may be placed and rotated to roll the convex surface in contact with the surface of the applicator, means for rotating said applicator, a receptacle into which the lower side of said applicator dips, means in said receptacle below the applicator and which bears against the applicator lengthwise thereof, said means dividing the receptacle into a compartment which lies at the upgoing side and a compartment which lies at the downgoing side, means for supplying liquid coating to the first compartment to maintain the level above the lowermost surface of the applicator, and means for draining the other compartment.

4. In a machine for applying a coating to the convex surface of a heel, a rotatably mounted applicator against which the heel may be placed and rotated to roll the convex surface in contact with the surface of the applicator, means for rotating said applicator, a receptacle into which the lower side of the applicator dips, a container for liquid coating material adjacent to the receptacle, means extending axially of and yieldably contacting the underside of said applicator

dividing the receptacle into compartments which lie at opposite sides of the applicator, means for delivering liquid coating material from the container to the compartment which is at the upgoing side of the applicator, and means for returning the liquid coating material from the other compartment to the container.

5. In a machine for applying a coating to the convex surface of a heel, a rotatably mounted, readily yieldable applicator supplied with liquid coating against which the heel may be placed and rotated to roll the convex surface in contact with the applicator, said applicator comprising a substantially ovate rubber envelope the ends of which are truncate, and supporting means to facilitate support by the operator of the heel for rotation in contact with that portion of the peripheral surface of the applicator adjacent to its small end.

6. In a machine for applying a coating to the peripheral surface of a heel, a rotatably mounted, readily yieldable applicator supplied with liquid coating against which the heel may be placed and rotated to roll the peripheral surface in contact with the applicator, said applicator comprising a normally self-sustaining, ovate rubber envelope

the ends of which are truncate, and supporting means to facilitate support by the operator of the heel for rotation in contact with the applicator, said envelope being filled with a medium under pressure to assist said applicator in withstanding pressure brought to bear upon its surface by the rotation of the heel in contact therewith.

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