March 25, 1947. J. H. FLINK 2,417,920

APPARATUS FOR APPLYING COATING MATERIAL TO A SERIES OF OBJECTS

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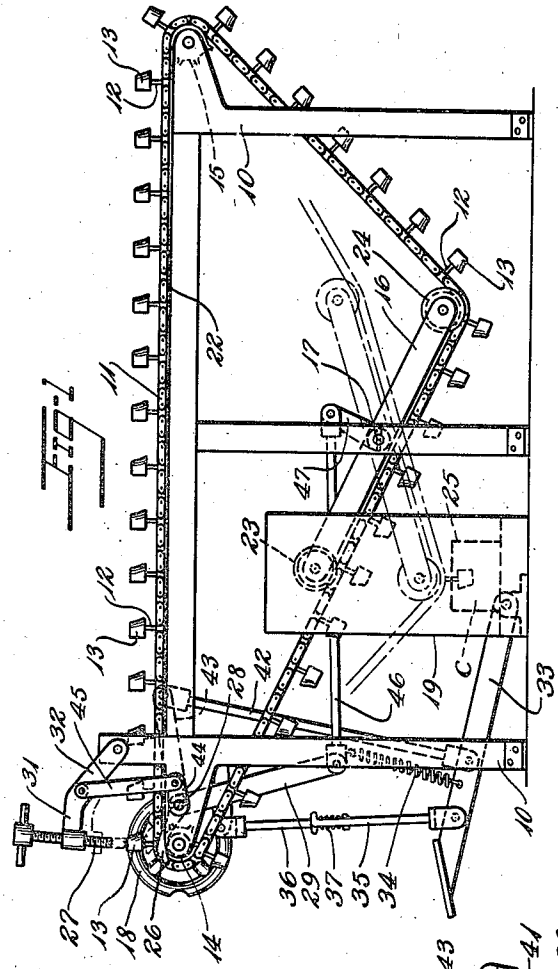


FIG-1

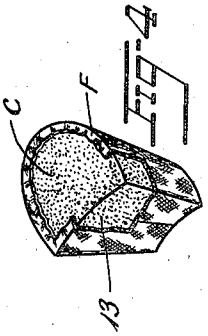


FIG-4

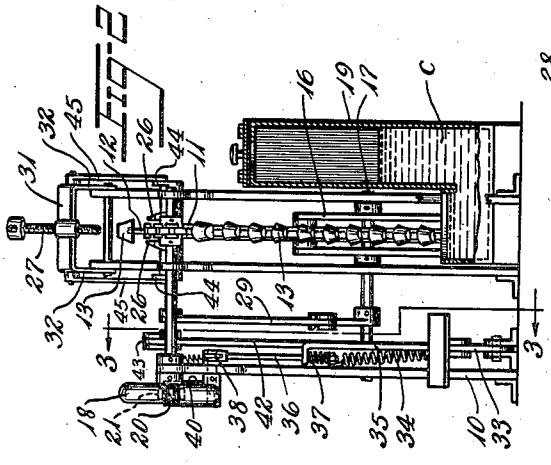


FIG-2

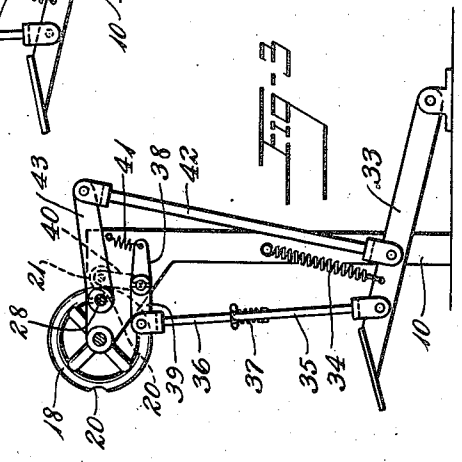


FIG-3

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APPARATUS FOR APPLYING COATING MATERIAL TO A SERIES OF OBJECTS

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17 Claims. (Cl. 91—46)

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This invention relates to apparatus for applying coating materials to the members of a series of objects, and relates particularly to apparatus for applying cement material to a series of shoe heels preparatory to covering the heels with a fabric or other covering material.

It is an object of this invention to provide novel apparatus for applying coating materials, such as cement material, to the individual members of a series of objects, such as shoe heels, in order that the operation may be performed with improved ease and efficiency. Other objects will become apparent from the detailed description of the invention appearing hereinafter.

In practicing my invention I provide holding means for holding the individual objects of a series of objects. Then I arrange the objects around a definite path, move the objects along the path, and at periodic intervals interrupt the motion and apply the coating material to at least one of the objects during the interruption. This is conveniently done by arranging the objects in a closed path and then, during the interruption of movement, changing the shape of the closed path in order to immerse at least one of the objects in the coating material. After the immersion the path is returned to its original shape and the objects are moved along the path until another object is ready for immersion.

In constructing an apparatus embodying this invention it is desirable not only to provide means for carrying out all the operations described in the preceding paragraph, but, in addition, to provide grasping means for firmly grasping at least one of the previously coated objects during a subsequent interruption of motion to faciltate further treating or acting upon the object. For example, if the object is a shoe heel which has been coated with cement material, the cement coated heel may be covered with fabric covering material while it is firmly grasped by the grasping means.

A typical apparatus constructed according to the principles of this invention will be described with reference to the accompanying drawings, of which

Fig. 1 is an elevation of apparatus embodying this invention in a preferred form;

Fig. 2 is an end view of the apparatus looking toward the grasping mechanism;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2; and

Fig. 4 is a perspective view of a finished shoe heel covered with cloth covering material.

The accompanying drawings illustrate an apparatus with which cement material is applied to shoe heels and the heels then covered with a cloth covering material. The apparatus includes a framework 10 and an endless flexible sprocket chain 11 having outwardly projecting spikes 12, 12 mounted thereon at spaced intervals for receiving and holding the individual heels 13, 13. The chain 11 is supported around a closed path by supporting and directing means including a first sprocket wheel 14, which is the driver wheel, a second sprocket wheel 15, and a rocker arm 16 pivotally mounted on a fulcrum 17 at substantially the center of the rocker arm. The first sprocket wheel 14 is keyed to a rotatable hand wheel 18 by which the sprocket chain 11 may be moved around its path. Beneath one end of the rocker arm 16 which forms one of the sprocket chain supports there is placed a barometric constant level container 19 for cement material into which one of the heels 13 is immersed whenever the rocker arm 16 is rocked on its fulcrum 17.

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The apparatus illustrated consists of other important features which make the entire apparatus efficient and extremely easy to operate. The rim of the hand wheel 18 which is keyed to the first sprocket wheel 14 is provided with two diametrically opposed notches 20, 20 in the outer circumference of the wheel. These notches 20, 20 are provided so that an engaging wedge 21 can engage one of the notches when the hand wheel 18 is stopped in such position that one of the spikes 12 extends vertically over the first sprocket wheel 14. Then when the next spike is moved into this proper position the other notch will be engaged by the engaging wedge 21. The combination of spikes 12, 12, first sprocket wheel 14, and hand wheel 18 is so constructed and arranged that adjacent spikes are separated from each other by a distance equal to one-half the circumference of the first sprocket wheel 14. Since the first sprocket wheel 14 and the hand wheel 18 are concentric to each other only two notches 20, 20 are needed in the hand wheel 18. These are preferably arranged so that when a spike is extending vertically over the first sprocket wheel the two notches in the hand wheel are in substantially horizontal alignment. The combination of spikes, first sprocket wheel, and notched hand wheel, may, of course, be constructed and arranged in any manner that is desired so that there may be any number of notches in the hand wheel and so that the spikes may be as close together or as far apart as desired. Care must be taken, however, that the spikes are not so close together that the impaled

heels 13, 13 interfere with each other. The preference is that the construction be as shown as this has been found admirably suited for immersing ordinary shoe heels in cement material.

The endless sprocket chain 11 is supported and guided at three principal points: the first sprocket wheel 14, the second sprocket wheel 15, and the rocker arm 16. The second sprocket wheel 15 is merely an idler wheel. The sprocket chain 11 travels in a generally horizontal direction between the first sprocket wheel 14 and the second sprocket wheel 15 and is at least partially supported by a flat bed 22 extending between the two sprocket wheels. The rocker arm 16 which comprises the third support or guide for the sprocket chain 11, is pivotally mounted on a fulcrum 17 near the center of the arm. At one end of the rocker arm there is positioned one idler wheel 23 while the other end of the rocker arm carries a second idler wheel 24, both of which engage the sprocket chain and serve to guide it. The first idler wheel 23, as shown in Fig. 1, is normally on a level higher than the level of the second idler wheel 24. Therefore when the rocker arm is rocked the first idler wheel comes down and the second idler wheel goes up. Under the first idler wheel 23 there is positioned the open end 25 of a container 19 for cement material C so that each time the rocker arm 16 is rocked a shoe heel 13 is immersed in the cement. As the distance between adjacent spikes 12, 12 is the same for all spikes, once the container 19 is properly positioned it will be in proper position for all the spikes and their impaled shoe heels.

For forcing heels onto the pins and also for holding the cement covered shoe heels in firm grip so that they may be covered with covering material, or otherwise further treated, there are provided clamping and grasping means positioned adjacent the first sprocket wheel 14. These clamping and grasping means consist of two convexly curved jaws 26, 26 each having serrated edges, for contacting the bottom of the heel, and an adjustable screw clamp 27 for contacting the top of the heel. The curved jaws 26, 26 straddle the sprocket chain 11 and operate around a shaft 28 located beneath the sprocket chain 11. The jaws 26, 26 extend beyond the shaft 28 and merge into the bars 29, 29 which are directed generally downward. The screw clamp 27 is normally above the first sprocket wheel 14 and is supported on a U-shaped structure 31. The screw is threaded through the center of the horizontal portion of the U. The legs 32, 32 of the U extend to the right (Fig. 1) in a generally downward direction and are movably fastened to the framework 10 of the machine. These legs 32, 32 are preferably slightly bent at approximately the center to form a knee-like structure.

For operating the clamping and grasping means and the rocker arm mechanism, a foot treadle 33 is provided beneath the apparatus. This foot treadle 33 is connected by linkage means to the jaws 26, 26, the screw clamp 27, and the rocker arm 16. These linkage means are so constructed and arranged that they serve to close the grasping means, consisting of the jaws 26, 26 and the screw clamp 27, and also to rock the rocker arm 16 when the foot treadle is pressed down with the foot. A spring 34 provided for normally holding the foot treadle up, thereby maintaining the clamping means in open position and the rocker arm in its normal position, all as illustrated in Fig. 1.

The linkage means connecting the foot treadle

33 with the grasping means and the rocker arm 16 may be constructed in various ways. In the particular construction shown there is provided a rod 42 movably connected to the foot treadle 33 and extending in a generally upward direction. This connecting rod 42 is also movably connected at its upper end to a generally horizontal bar 43 the other end of which is keyed to the shaft 28 holding the grasping jaws. A pair of short bars 44, 44 are placed parallel to the first bar 43 and these are also keyed to the shaft 28 supporting the jaws. These second bars are movably connected to the U-shaped structure holding the clamp screw 27 by means of a pair of upwardly extending bars 45, 45. As set out hereinabove, the grasping jaws 26, 26 merge into two downwardly extending bars 29, 29. These bars are movably connected at their downward ends to the rocker arm 16 of the dipping mechanism by means of a substantially horizontal rod 46 and a short bar 47 keyed to the fulcrum 17 of the rocker arm and placed at substantially right angles to the rocker arm. Through this mechanism, as described, pressure on the foot treadle simultaneously closes the grasping means consisting of jaws 26, 26 and clamp screw 27 to hold a cement coated heel and also rocks the rocker arm 16 to immerse a heel in the cement.

The foot treadle 33 may also serve to operate the engaging wedge 21 which engages one of the two notches 20, 20 in the hand wheel 18 when a spike 12 is in position over the center of the first sprocket wheel 14. This engaging means may also be constructed in any manner desired. The construction shown consists of a vertical rod 35 movably fixed to the foot treadle 33 and extending in a generally vertical direction to a second vertical rod 36. This second rod is slidably fastened to the first through a spring 37 and extends vertically to an inverted T structure 38. The second rod 36 is movably fastened to one end of the horizontal portion 39 of the inverted T 38 which is pivotally fastened in the center. The vertical section 40 of the T contains a notch-engaging wedge 21 at the end. The other end of the horizontal portion 39 of the T is connected to a weak second spring 41. The second spring 41, being weak, holds the notch-engaging wedge 21 lightly against the circumference of the wheel so that it will click lightly into place when the notch is reached and thus enable the operator to know that the conveyor is properly positioned for operation of the rocker arms and grasping mechanisms. The foot treadle 33 is then pressed down, compressing the first spring 37 and holding the wedge 21 firmly against the notch to lock the hand wheel, and thus the whole rotating mechanism. While so held the cement coated heel can be wrapped manually with fabric covering material F to produce the covered heel shown in Fig. 4.

The apparatus of this embodiment of the invention is, as has been indicated, particularly useful in cementing and covering heels for women's shoes. These heels 13, 13 are usually made of some hard wood such as maple, beechwood, or the like, and before being built into the shoe are covered with any of a variety of covering materials. These covering materials include any of several types of fabric or cloth, various sheet plastics, and similar materials.

In using the machine illustrated to cover wooden shoe heels the sprocket-chain 11 should move in a counter-clockwise direction as viewed in Fig. 1. The hand wheel 18 is turned until a spike 12 is moved into position over the first

sprocket wheel 14 between the convexly curved grasping jaws 26, 26 and under the clamp screw 27. A heel 13 is placed over the spike 12 with the small end of the heel turned up and then the foot treadle 33 is pressed down. This causes the jaws 26, 26 to move up and the clamp screw 27 to come down thereby driving the heel 13 onto the spike 12 a predetermined distance. This distance is regulated by the clamp screw 27 which may be adjusted for heels of any height. The operation is repeated until the spikes all have a heel impaled on each. In the meantime the rocker arm 16 will have been rocked each time the foot treadle 33 was pressed. As soon as a heel 13 moves into position under the left idler wheel 23 (Fig. 1) on the rocker arm 16 this heel is dipped in cement material C in the constant level cement tank 19 beneath the rocker arm 16.

When the apparatus thus comes completely into operation with all spikes having impaled heels the hand wheel 18 is turned until a spike with its cement coated heel comes into proper position between the grasping means. The foot treadle 33 is pressed down. This grasps the cement coated heel between the jaws 26, 26 and the clamp screw 27 and also rocks the rocker arm 16 so that another heel is immersed in cement material. Simultaneously the notch-engaging wedge 21 engages one of the notches 20, 20 in the hand wheel 18 so that the hand wheel is firmly locked. Then, while the foot treadle 33 is still pressed down, the cement coated heel is wrapped with a covering material. After the heel is covered pressure is released from the foot treadle 33 and its spring 34 pulls it back up into open position. The covered heel is removed from the spike and another heel is placed over the spike. Without moving the conveyor, the foot treadle 33 is again pressed down, thereby driving the new heel onto the spike and, at the same time, again immersing the same heel that was immersed in cement material during the wrapping operation. Thus each heel is immersed twice in cement material, thereby serving to insure complete coverage of the heel with cement material. The foot treadle 33 is released and the next spike with its cement covered heel is moved into position. This completes one cycle of operation.

A power drive with appropriate manual or automatic controls obviously may be substituted for the manual drive shown and described.

This invention is particularly useful for cementing and covering wooden shoe heels, as has been described, but it may also be used to apply any type of coating material to almost any series of reasonably small objects. The coating material may be paint, enamel, cellulose acetate solution, or any similar coating composition. The cement material used in the embodiment illustrated may be rubber cement, rubber dispersions such as natural rubber latex or reclaimed rubber dispersions, or it may be liquid compositions of synthetic rubber. There are, of course, many other cement materials that are also useful.

Having described my invention together with a detailed description of one preferred form of apparatus, it is my desire that the invention be not limited to any one or more of these details but rather protected broadly within the spirit and scope of the invention as set out in the accompanying claims.

I claim:

1. In an apparatus for applying coating material to a series of objects, apparatus including holding means for holding the objects in a generally linear relationship arranged around a closed path, means for moving said objects around said path, said last named means being so constructed and arranged as to permit periodic interruption of movement of said objects, means for changing the shape of the closed path during said interruption of movement, and means for immersing at least one of the objects in coating material during the changing of the shape of the path.

2. In an apparatus for applying coating material to a series of objects, apparatus including holding means for holding the objects in a generally linear relationship around a closed path, means for moving said objects around said path, said last named means being so constructed and arranged as to permit periodic interruption of movement of said objects, means for changing the shape of the closed path during said interruption of movement, means for immersing at least one of the objects in coating material during the changing of the shape of the path, and means for returning the path to its original shape after such immersion.

3. In an apparatus for applying coating material to a series of objects, apparatus including holding means for holding the objects in a substantially linear relationship around a closed path, means for moving said objects around said path, said last named means being so constructed and arranged as to permit periodic interruption of movement of said objects, means for changing the shape of the closed path during said interruption of movement, means for immersing at least one of said objects in coating material during the changing of the shape of the closed path, means for returning the path to its original shape after the interruption, and means for firmly grasping at least one of the thusly coated objects during interruption of the movement.

4. In an apparatus for applying cement material to a series of shoe heels, apparatus including flexible traveling means having a series of holding means carried thereby for holding the individual shoe heels, said traveling means being movably supported around a closed path, means for moving the flexible traveling means with the shoe heels around said path, said means for moving being so constructed and arranged as to permit periodic interruption of movement of said flexible traveling means, means for changing the shape of the closed path during said interruption of movement, means for immersing at least one of said shoe heels in cement material during the changing of the shape of the closed path, means for returning the path to its original shape after the interruption, and means for firmly grasping at least one of the cement coated shoe heels during the interruption of movement.

5. In an apparatus for applying cement material to a series of shoe heel members, apparatus including an endless flexible chain having a series of spikes carried thereby at spaced intervals for impaling and holding individual shoe heels, said chain being movably supported around a closed path, means for moving said chain and spike arrangement around said path, said last named means being so constructed and arranged as to permit periodic interruption of movement of said chain, means for changing the shape of the closed path during said interruption of movement, means for immersing at least one of said shoe heels in cement material during said changing of the shape of the closed path, means for returning the path to its original shape after the immersion, and

means for firmly grasping at least one of the cement coated shoe heels during the interruption of movement of the chain.

6. In an apparatus for applying cement material to a series of shoe heels, apparatus including an endless flexible chain having a series of spikes carried thereby at spaced intervals for impaling and holding individual shoe heels, said chain being movably supported around a closed path, a pivotally mounted rocker arm guiding a portion of the chain, means for moving said chain around said path, said last named means being so constructed and arranged as to permit periodic interruption of movement of said chain, means for rocking said rocker arm during the interruption of movement to change the shape of said path, means for immersing at least one of the shoe heels in cement material during the rocking of the rocker arm, means for returning the rocker arm to its original position, and means for firmly grasping at least one of the thusly coated heels during the interruption of movement of the chain.

7. In an apparatus for applying cement material to a series of shoe heels, apparatus including an endless flexible chain having a series of spikes carried thereby at spaced intervals for impaling and holding individual shoe heels, said chain being movably supported around a closed path, a rocker arm guiding a portion of said chain, said rocker arm being pivotally mounted on a fulcrum at substantially the center of said arm, a sprocket wheel engaging and guiding another portion of the chain, a hand wheel movable with the sprocket wheel for causing movement of said chain around its path and also for interrupting said movement, means for rocking said rocker arm on its fulcrum during interruption of movement to change the shape of said path, means for immersing at least one of the shoe heels in cement material during the rocking of the rocker arm, means for returning the rocker arm to its original position, and means for firmly grasping at least one of the thusly coated heels during each subsequent interruption of movement of said chain.

8. In an apparatus for applying cement material to a series of shoe heels, apparatus including an endless flexible chain having a series of spikes projecting outwardly therefrom at spaced intervals for impaling and holding individual shoe heels, said chain being movably supported around a closed path, a rocker arm guiding a portion of the chain, the rocker arm being pivotally mounted on a fulcrum at substantially the center of said arm, a sprocket wheel engaging and guiding another portion of said chain, a hand wheel movable with the sprocket wheel for causing movement of said chain around its path and also for interrupting said movement, a cement holding means placed immediately beneath one end of the rocker arm into which shoe heels can be immersed, grasping means for firmly grasping a shoe heel after it has received a coating of cement, a foot treadle, and connecting means connecting the foot treadle to the grasping means and to the rocker arm so constructed and arranged that operation of the treadle simultaneously rocks the rocker arm to immerse a shoe heel in the cement material and causes the grasping means to grasp firmly a cement coated heel, said action taking place during an interruption of movement of the endless chain.

9. In an apparatus for applying liquid coating material to objects, a container for the liquid coating material, flexible conveyor means for transporting the objects over the container, means for imparting linear motion to said flexible conveyor means, said means for imparting motion being so constructed and arranged as to permit periodic interruption of said motion, and means for lowering a localized zone of the flexible conveyor means and thereby dipping an object in the liquid coating material during said interruption.

10. In an apparatus for applying liquid coating material to objects, a container for the liquid coating material, flexible conveyor means for transporting the objects over the container, rocker mechanism guiding a portion of the conveyor over the container and means for rocking the rocker mechanism to deflect a section of the conveyor downward and thereby to dip an object in the liquid coating material.

11. In an apparatus for applying liquid coating material to objects, a container for the liquid coating material, flexible conveyor means for transporting the objects over the container, means guiding a portion of the conveyor over the container, means for moving the last said guiding means to deflect a portion of the conveyor downward and thereby to dip an object in the liquid coating material, means for grasping another of the objects carried by the conveyor, and a single means for simultaneously operating both the conveyor-deflecting means and the grasping means.

12. In an apparatus for operating on a series of objects such as wooden shoe heels, a flexible conveyor mounted for travel in a closed path in a generally vertical plane, a series of spikes projecting outwardly from the conveyor at spaced-apart positions for impaling the objects, means for intermittently moving the conveyor predetermined distances proportioned to the distances between the spikes, means for forcing an object into impaled position on one of the spikes and for firmly grasping an impaled object while the conveyor is stationary, a container for coating material disposed underneath the normal path of the conveyor, means for deflecting the conveyor downward and thereby to immerse some of the impaled objects in the coating material, and a single means for simultaneously operating the grasping means and the conveyor deflecting means.

13. In an apparatus for applying cement material to a series of shoe heels or the like, an endless flexible chain having a series of spikes each projecting outwardly therefrom at spaced intervals for impaling and holding individual shoe heels, said chain being movably supported around a closed path, a pivotally mounted rocker arm guiding a portion of said chain, a sprocket wheel engaging and guiding another portion of the chain, a hand wheel movable with the sprocket wheel for causing movement of said chain around its path and also for interrupting said movement, means for rocking said pivotally mounted rocker arm during interruption of movement to change the shape of said path, means for immersing at least one of the shoe heels in cement material during the rocking of the rocker arm, means for returning the rocker arm to its original position, and means for firmly grasping at least one of the thusly coated heels during each subsequent interruption of movement of said chain.

14. Apparatus of the character described, said apparatus comprising a conveyor having means for holding objects thereon, a container for liquid material disposed adjacent the conveyor but

in such position that conveyor-carried objects normally do not pass into the liquid material, a reach of the conveyor passing over said container being arranged for downward deflection, and means for temporarily deflecting said reach downwardly to dip a conveyor-carried object into the liquid material.

15. Apparatus of the character described comprising an endless conveyor having outwardly directed spikes for holding objects thereon, means guiding the conveyor about a path including a downwardly-directed angular reach, object-clamping means disposed adjacent the path of the conveyor at a position removed from the vertex of the downwardly-directed reach, the means guiding the conveyor about the vertex of the downwardly-directed reach being shiftably mounted so as to permit shifting the vertex along the path of the conveyor, a container for liquid material disposed so that objects impaled on said spikes normally do not pass into the liquid material but so that at least one of said objects will be immersed in the liquid material when the said vertex is shifted, and means operable to actuate the said object-clamping means and to shift the said vertex guiding means so as to immerse an object in the liquid.

16. Apparatus of the character described comprising an endless conveyor having outwardly-directed spikes for holding objects thereon, means guiding the conveyor about a path including a downwardly-directed angular reach, object-clamping means disposed adjacent the path of the conveyor at a position removed from the vertex of the downwardly-directed reach, the means guiding the conveyor about the vertex of the downwardly-directed reach being shiftably mounted so as to permit shifting the vertex along the path of the conveyor, a container for liquid material disposed so that objects impaled on said spikes normally do not pass into the liquid material but so that at least one of said objects will be immersed in the liquid material when the said vertex is shifted, and a single operator-controlled means for actuating the said object-clamping means and for shifting the said vertex guiding-means so that an object carried by the conveyor is immersed in the liquid while another object is being clamped.

17. In a heel-dipping machine, the combination with a conveyor having outwardly projecting spikes for impaling the heels, of means for clamping a heel on a spike, a container for liquid material disposed adjacent the conveyor but so positioned that conveyor-carried heels normally do not pass into the liquid, means for deflecting a portion of the conveyor downward to dip a heel into the liquid, and a single means operable to actuate simultaneously the clamping means and the conveyor-deflecting means.

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