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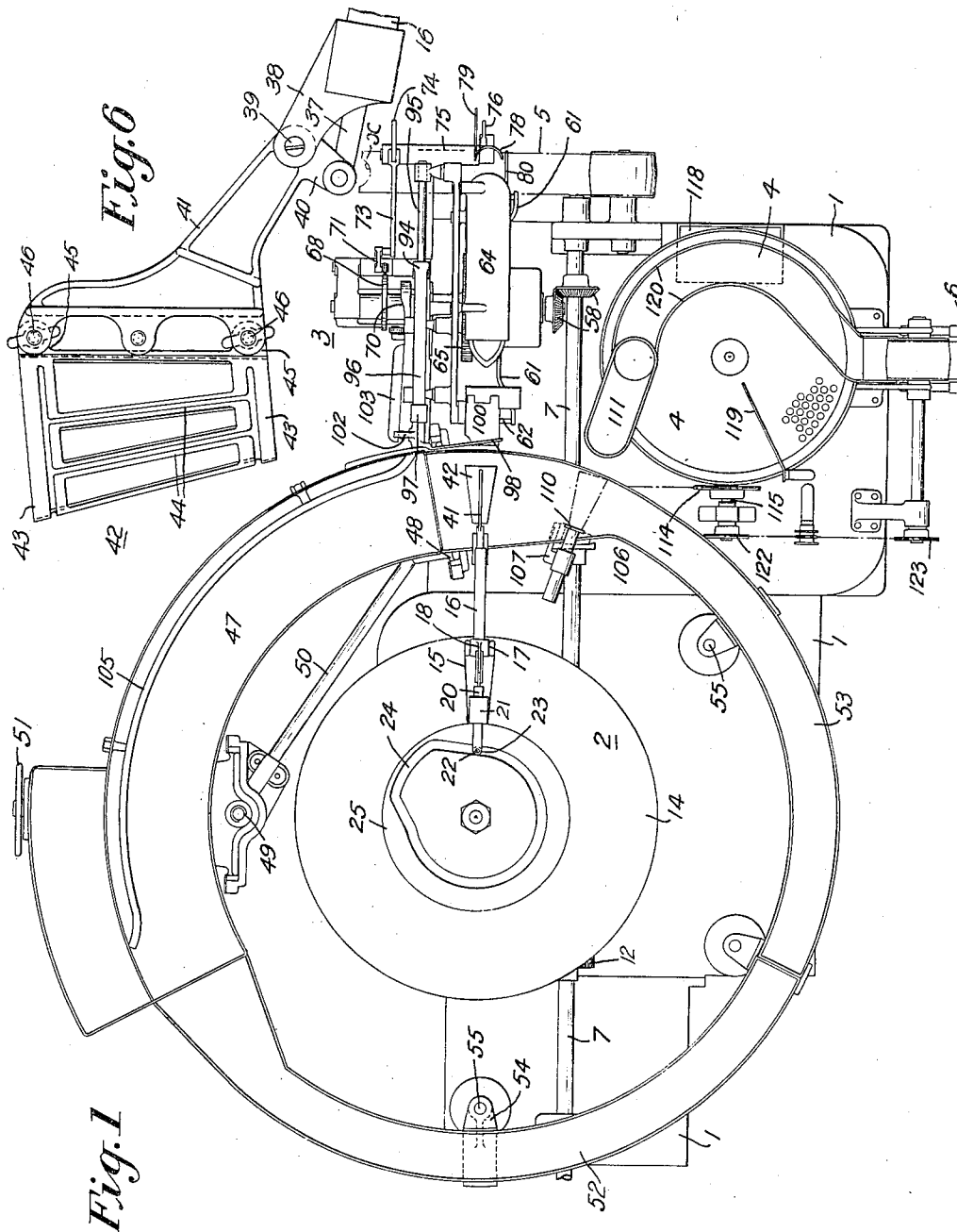
D. WOOD

2,106,940

WAXING MACHINE

Filed Sept. 21, 1936

3 Sheets-Sheet 1



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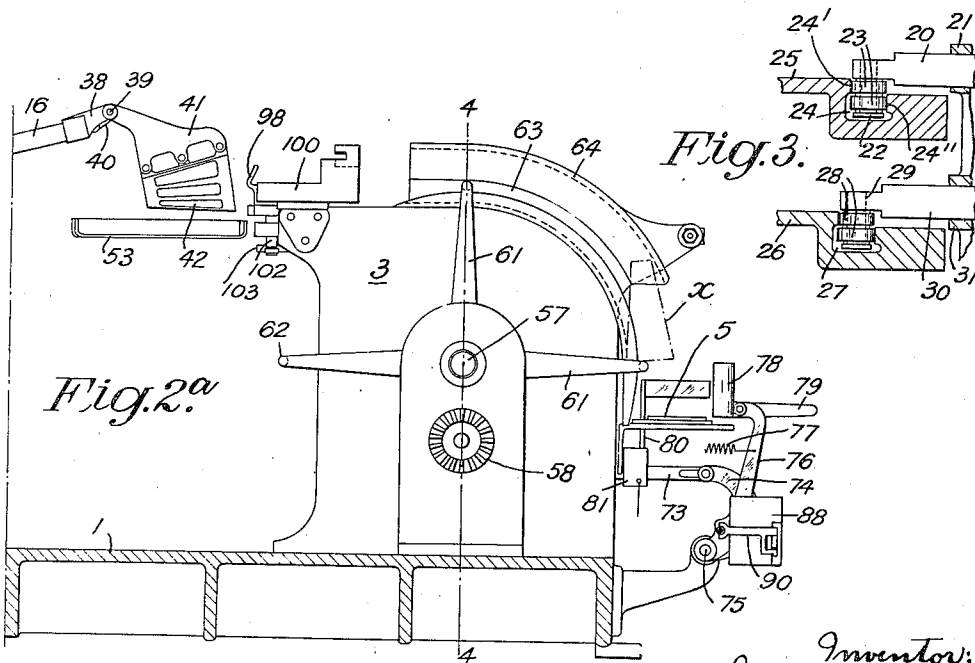
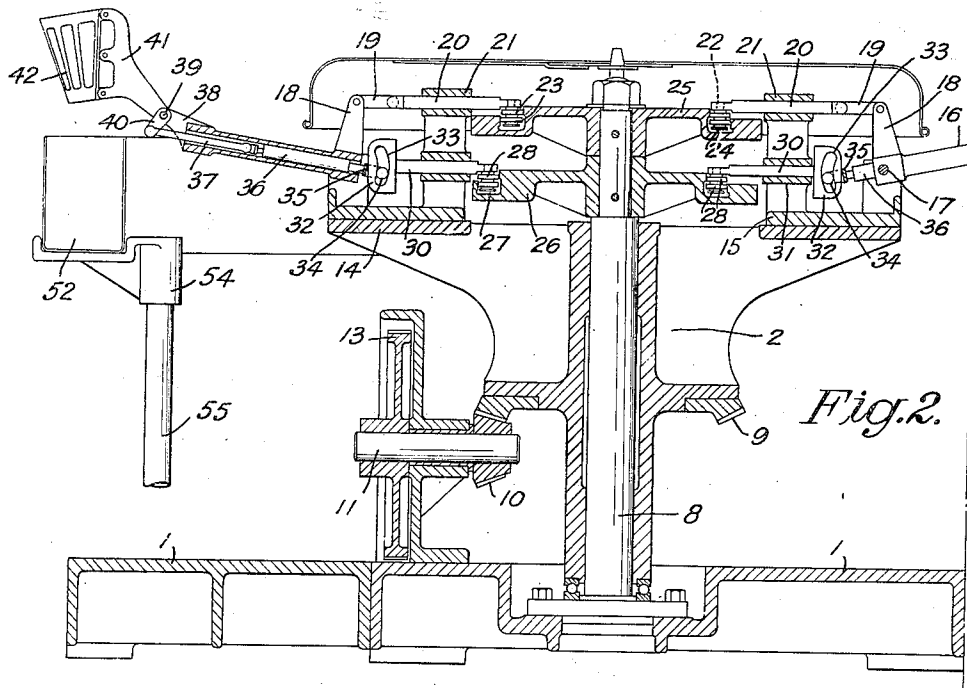
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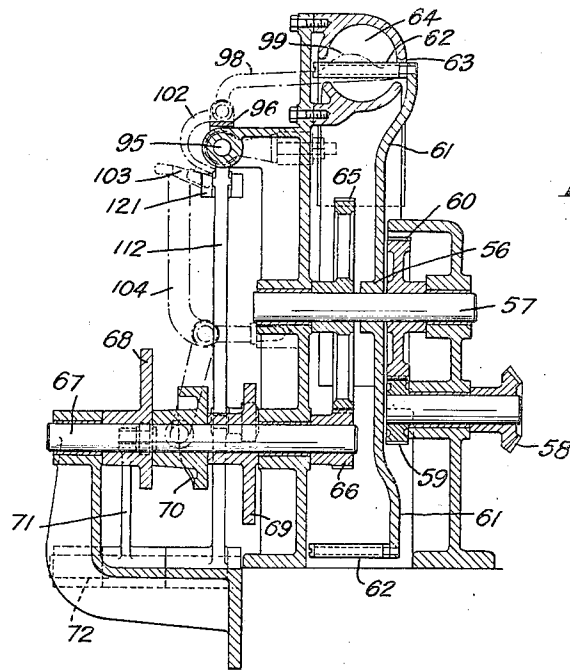


Fig. 4.

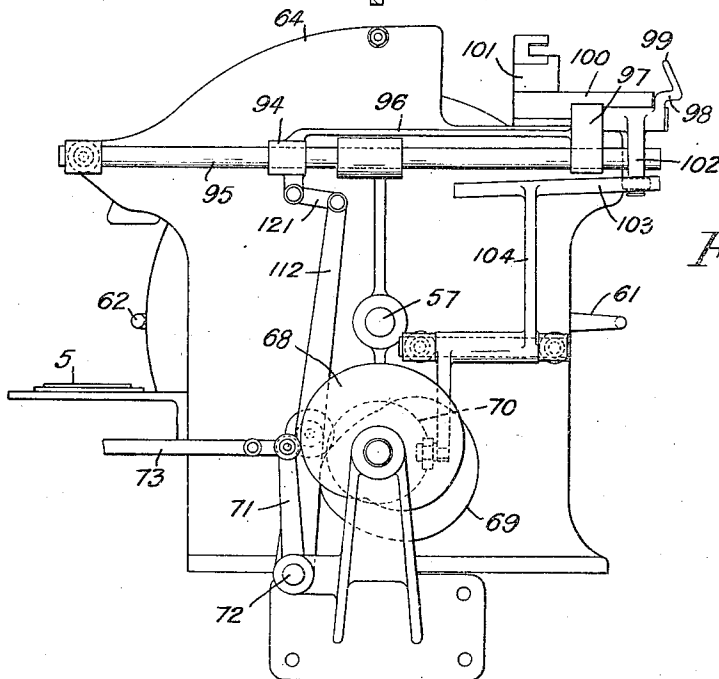


Fig. 5.

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UNITED STATES PATENT OFFICE

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WAXING MACHINE

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In Great Britain August 30, 1935

7 Claims. (Cl. 91—46)

This invention relates to waxing machines for impregnating cartons or like articles with a proofing composition, for example in the manufacture of cartons to be employed as containers for milk or other substances, whether liquid, semi-liquid or solid.

The main object of the invention is to provide a machine of the character described, comprising a plurality of dippers mounted upon a carrier adapted for continuous or intermittent rotation, the cartons being fed successively to the dippers at one point of the rotary movement and subjected to the impregnation with wax or other composition during part of the rotary movement, after which they are stripped from the dippers and delivered singly on to a travelling conveyor for cooling the composition or for transport to a cooling chamber for the same purpose, to a storage room or direct to a filling machine, as may be desired.

Another object of the invention is to provide an improved dipping device which receives a carton from a feeding mechanism, plunges the carton into proofing liquid, withdraws and inverts it for draining purposes and offers it to an ejector device for stripping and delivery, the movements of the dipper being produced during the rotation of a carrier around a vertical axis.

In the accompanying drawings,—

Fig. 1 is a plan of the improved waxing machine.

Figs. 2 and 2a are conterminous portions of a part sectional elevation of the machine on a larger scale.

Fig. 3 is a detail in section on a still larger scale.

Fig. 4 is a sectional elevation of the feeding mechanism, taken on the line 4—4 of Fig. 2a.

Fig. 5 is a partial elevation of the feeding mechanism, as seen from the left of Fig. 4.

Fig. 6 represents, on a larger scale, one of the holders for the cartons, shown in the draining position.

Referring to Figs. 1, 2 and 2a, the machine comprises a base 1, preferably made in sections bolted together, upon which there is mounted a rotatable carrier 2 for the dipping devices, a mechanism 3 for feeding the cartons or the like to the dipping devices, and a rotary table 4 to which the cartons are delivered after dipping. A belt conveyor 5 brings the cartons to the feed mechanism, and a second conveyor 6 receives them from the rotary table after delivery. All these mechanisms are driven by a main shaft 7 through various means hereafter described.

The rotatable carrier 2 comprises a sleeve

mounted upon a stationary vertical pillar 8 bolted in a recess upon the base 1; upon this sleeve there is secured a bevel gear 9 meshing with a bevel pinion 10 fixed upon a shaft 11 which is driven by reducing gears 12, 13 from the main shaft 7. The top of the carrier forms an annular support 14 upon which the dipping devices are mounted in radial positions, there being for example thirty of these devices mounted upon separate wedge-shaped blocks 15 spaced uniformly round the circumference.

Each of the dipping devices comprises a tubular arm 16 extending in a radial direction beyond the outer edge of the carrier 2, the arm being mounted upon a transverse pivot 17 towards the outer end of the block 15 and provided with an upwardly extending crank 18 which controls the pivotal movement; the extremity of the crank is connected by a link 19 to a slider bar 20 mounted in a radial guide 21 at the top of the block and the inner end of this bar is fitted with a vertical pin 22 for a pair of rollers 23 engaging in a cam groove 24 provided upon a stationary plate 25 secured to the top of the supporting pillar 8. The cam groove 24 (see Fig. 3) comprises two tracks 24', 24'', at different levels, one for each of the rollers 23, so that the latter engage on one side only and revolve in opposite directions. A second cam plate 26 mounted below the first has its groove 27 similarly engaged by a pair of rollers 28 upon a vertical pin 29 at the inner end of a second radial slider bar 30, mounted in a guide 31 directly below the first bar 20, the outer end of this second bar being provided with a vertical plate 32 having an arcuate slot 33 therein substantially concentric with the pivot 17 of the dipping arm. A roller 34 engaged in the arcuate slot 33 is carried by the forked end 35 of a push rod 36 slidable in the interior of the tubular arm 16, and the other end of this push rod is provided with a link 37 which extends out from the open outer end of the arm, to which there is secured a bracket 38 supporting a transverse pivot 39. The projecting end of the push rod is attached to the short arm 40 of a bell crank lever mounted on the transverse pivot, the other arm 41 of the bell crank being provided with a holder 42 for the carton or the like.

The holders 42 preferably consist of baskets or cages, made of stamped metal, the ends 43 and connecting ribs 44 being indented to increase the stiffness and to reduce the area of contact with the cartons, as can be seen in Fig. 6; the ends are formed with eyes 45 for detachable mounting upon the bell crank arms by means of bolts 46 or the

like. If desired the holders may be mounted upon spring clips, allowing them to be readily exchanged, for example to accommodate cartons of a different size.

The two cam grooves 24, 27 control the respective slider bars 20, 30 in such a way as to rock the tubular arm 16 about its pivot 17 and to rock the carton holder 42 about its pivot 39 on the bracket at the outer end of the arm; thus the arm 16 and carton holder 42 can be raised or lowered together by the first mentioned cam, the inner end of the push rod 36 sliding idly in the arcuate slot 33, or the carton holder 42 only may be raised or lowered by the second cam while the arm 16 remains at a fixed inclination, or again by a combined operation of the two cams and slider bars the carton holder 42 can be made to rock while the tubular arm 16 is rising or falling.

Concentrically of the pillar 8, there is mounted a waxing tank or trough 47 of part-annular shape extending partly round the carrier 2; this tank is filled with wax or other proofing composition, suitably heated by gas, electricity or other means to maintain the wax in molten condition and fed to a constant level from a preheating and storage tank (not shown). The waxing tank 47 is supported on two screw jacks 48, 49 having their screws coupled together by a shaft 50 and operated by a single handle 51 upon a radially disposed horizontal shaft (not shown) geared to the screw jack 49, to permit the tank to be adjusted in height and lowered for cleaning. Also concentrically of the pillar 8, there are mounted two part-circular draining trays 52, 53, the opposite ends of which abut against the ends of the tank 47 so as to complete the circle around the carrier; these trays are carried by brackets 54 at the top of pillars 55 secured to the base 1 of the machine.

The feeding mechanism comprises a wheel 56 mounted upon a shaft 57 driven from the main shaft 7 through bevel wheels 58 and reducing gears 59, 60; the wheel 56 has equally spaced arms 61, for example four in number, provided with fingers 62 extending parallel to the shaft 57, these fingers being adapted to pass in turn through open slots 63 in a tubular guide 64 as the wheel 56 revolves. The movement of the wheel carries the fingers close to the edge of the conveyor belt 5 upon which the cartons stand in a vertical position, resting upon their closed or larger ends, and from which they are pushed laterally, in timed relation to the wheel 56, so that a carton *x* is lifted by a finger 62 and pushed up through the tubular guide 64 for transfer to the holder 42 at the feeding position of the carrier 2. The shaft 57 is also fitted with a gear wheel 65 meshing with a pinion 66 secured upon a timing shaft 67, the latter revolving at four times the speed of the wheel 56 in the case where four fingers 62 are provided on the wheel, so that each lifting movement corresponds to one revolution of the shaft 67; three cams are secured upon the timing shaft, one cam 68 effecting the lateral movement of the carton from the conveyor belt 5, another cam 69 operating a device for transfer of the carton to the holder 42, and the third cam 70 controlling the movements of the transfer device, the third one being a face cam.

The cam 68 engages a roller-fitted arm 71 rocking on a pivot 72 and connected by a link 73 to a crank arm 74 secured to a rock shaft 75, the other end of which carries a striker arm 76 extending above the conveyor belt 5; when the cam 68 pushes back the roller-fitted arm 71, the arm 76 is also pushed back clear of the cartons upon

the belt, but as the cam 68 revolves it allows the arm 76 to advance under the action of a spring 77 so that a striker plate 78 mounted at the top of the arm 76 can push the foremost carton *x* standing upon the belt 5 laterally over towards the rising finger 62 which is to lift it into the guide 64, as already described, the carton beginning to tilt as soon as it reaches the edge of the belt. The striker plate 78, which may be curved transversely as shown, is provided with a tail-piece 79 lying in the plane of its movement, in order to hold back any further cartons arriving along the conveyor belt 5 while the arm 76 is rocking over the top of the belt. The movements of the striker arm 76, operated by the cam 68, are timed in relation to those of the fingers 62 by the setting of the cam upon the shaft 67 and the timing of the gears 65, 66, so that the finger catches the carton *x* at the right moment.

The cam 69 for transferring the cartons into the holder 42 operates through a roller-fitted lever 112 which rocks about the same pivot as the arm 71, but this lever extends upward to connect by a link 121 with a slider 94 movable along a fixed guide bar 95 on the outside of the casing; see Fig. 5. This slider 94 is connected by a bridge 96 to a block 97 also movable along the guide bar 95, this block forming a displaceable fulcrum for a striker lever 98 which serves to transfer the cartons successively into the holders 42 of the dipping devices from a cradle 100 in which they are deposited by the fingers 62 after passage through the tubular guide 64; during such movement the lever 98 is held from rocking by the engagement of its roller-fitted arm 102 with a guide rail 103 at the upper end of a lever 104 which is stationary at this time.

The face-cam 70 engages the roller-fitted lower end of the lever 104 and thereby controls the position of the guide rail 103; after the lever 98 has pushed a carton forward into the holder 42, the lever is clear of the cradle 100 as seen in Fig. 5, and the cam 70 then rocks the lever 104, causing the guide rail 103 to force back the arm 102 and raise the lever 98 above the cradle, so that its return movement due to the cam 69 can take place over the top of the cradle, the lever 98 being allowed to descend behind the cradle after the next finger 62 has deposited a carton therein and moved clear.

At the feeding position, as seen in Fig. 2a, the tubular arm 16 is approximately horizontal, while the carton holder 42 is raised slightly above the horizontal; in this position, the transfer lever 98 operated by the cam 69 as above described pushes a carton *x* from the cradle 100 into the holder, the carton having its smaller and open end in advance so as to wedge in the holder or basket. During the motion of the carrier 2 round the centre pillar 8, the tubular arm 16 will be caused by the first cam groove 24 to rock about its pivot 17 while the holder 42 is still kept in the same relation to the arm, the carton being thus lowered into the tank 47; the angle at which the carton enters the wax is so arranged as to ensure the escape of air from the interior, the upper side being submerged first at the closed end and finally at the open end or mouth.

During the travel of the carton along the waxing tank 47, it is held in position in the holder or basket 42 by a curved guide rail 105 which prevents movement of the carton in a radially outward direction.

After a suitable period, for example that cor-

responding to a quarter-revolution of the carrier 2, the upper cam groove 24 raises the tubular arm 16 gently to clear the end of the wax tank 47, and the lower cam groove 27 rocks the carton holder 42 until the carton occupies a vertical but inverted position, permitting the excess of wax to run out before finally clearing the end of the tank 47. The carton is retained in this inverted position for approximately two-thirds of a revolution of the carrier, to allow of adequate draining, the two trays 52, 53, which may be heated electrically or by gas, being provided round and beneath the path of the holders 42 to catch the drip and being preferably inclined so as to return the wax to one or other of the tanks; the first tray 52, which receives the greater part of the wax, is preferably of greater depth than the second tray 53, so as to avoid splashing over. Towards the end of the revolution of the carrier, the carton holder 42 is lowered to an approximately horizontal position, the dipping arm 16 having now reached the final or stripping position where the waxed carton is to be taken off.

The removal of the cartons from the holders 42 at this position is operated by a cam 106 upon the main shaft 7, in timed relation to the movement of the rotary carrier 2, by means of a lever 107 pivoted at 108 and working in a vertical plane at this final position. The upper end of the lever 107 carries a pad 110 which strikes against the inner end of the carton supported in the holder 42, with a quick movement in a direction radial of the carrier so as to eject the carton horizontally out of the basket or holder 42, when it falls down a curved tubular chute 111 so as to arrive in a vertical position (base downwards) upon a slowly rotating table consisting of a perforated disc 4 driven by the main shaft 7, through chain sprockets 113, and a countershaft 115; this disc 4 is heated, preferably by electrical means, the wax draining from the cartons passing through the perforations into a convenient receptacle 118 from which it may be returned to the preheating or storage tank, and the surface of the disc being kept clear of wax by a wiper arm 119. As the disc 4 rotates, it carries the cartons between two fixed guide rails 120, one or both of which will be so shaped as to guide the cartons from the disc on to a conveyor belt 6 whence they may proceed to a cooling chamber, storage room or filling machine. The belt 6 is driven by the main shaft 7, through the countershaft 115, by chain sprockets 122, 123.

It will be understood that any number of dipping devices may be provided upon the carrier, the feeding and stripping mechanisms being arranged to suit the angular spacing of the arms. Means may be provided for altering the length of stroke of the feeding and stripping mechanisms to suit cartons of different height, the carton-holders being also exchangeable according to the size of the cartons.

The machine may be arranged for intermittent rotation of the carrier 2 by driving the latter through a Maltese-cross device interposed between the main shaft 7 and the shaft 11, the gearing (12, 13) being so arranged in conjunction with the Maltese-cross device that the carrier has an intermittent rotation in steps corresponding to the spacing of the dipping devices, for example 12 degrees of angular motion at each step in the case where thirty dipping devices are provided.

What I claim is:—

1. In a waxing machine, a dipping device com-

prising an arm having rotary motion about a vertical axis, a horizontal pivot for said arm, a stationary cam controlling movement of said arm about said pivot, a bell crank lever mounted on said arm, a slidable member upon said arm, a second stationary cam controlling movement of said slidable member, said slidable member engaging said bell crank lever, and a holder attached to said bell crank lever, said holder adapted to receive an article to be waxed and to dip said article by the movements produced by said cams.

2. In a waxing machine having dipping devices mounted in radial planes upon a rotary carrier, the combination of a tank for the waxing liquid, said tank being of part-circular shape, located beneath said dipping devices and extending partly around the axis of rotation of said carrier, means for actuating said dipping devices in their respective radial planes to lower the articles to be dipped into said tank and thereafter to raise them from said tank, means for tilting said holders in the radial planes of the respective dipping devices when said articles are in raised position and means for catching the liquid draining from said articles when raised after dipping, said catching means comprising a draining tray of part circular shape, substantially concentric with said tank, located beneath said dipping devices and extending partly around the axis of rotation of said carrier.

3. In a waxing machine comprising a carrier having rotary motion about a vertical axis, a dipping device consisting of an arm pivoted on said carrier, a crank upstanding from said arm, a stationary cam groove extending round said vertical axis, a slider bar connected to said crank, a pair of rollers carried by said slider bar, said rollers being arranged on a vertical axis and one below the other, said cam groove including two tracks at different levels, one of said tracks being formed at the inner side of said groove, and the other of said tracks being formed at the outer side of said groove, each of said rollers engaging one of said tracks, and means for holding an article to be waxed at the free end of said arm.

4. In a waxing machine comprising a carrier having rotary motion about a vertical axis and a tank for the waxing liquid, a dipping device comprising an arm pivoted on said carrier and movable in a vertical plane radial to said axis, a holder for an article to be dipped in said liquid, said holder pivoted on said arm and movable in said radial plane, means causing said arm to fall and rise for lowering said article into said tank and thereafter raising said article from said tank, means causing said holder to rock in said radial plane upon said arm for tilting said article in relation to said arm, and means for catching the liquid draining from said article when raised from said tank and tilted in relation to said arm.

5. In a carton waxing machine comprising a carrier having rotary motion about a vertical axis, and a tank for the waxing liquid, a dipping device comprising an arm pivoted on said carrier and movable in a radial plane relatively to said carrier, a holder for an open-ended carton to be dipped in said liquid, said holder pivoted on said arm and movable to maintain the longitudinal axis of said carton in said radial plane, a stationary cam controlling said arm to cause rise and fall of said holder for lowering said carton bodily into said tank and thereafter raising said carton from said tank, a second stationary cam controlling said holder to cause rocking move-

ment in relation to said arm for tilting said carton in said radial plane, and means for catching the liquid draining from an open end of said carton when raised from said tank by the rise of said arm and tilted by the rocking of said holder.

5 6. In a waxing machine having dipping devices mounted upon a rotary carrier, a dipping device comprising an arm pivoted on said carrier and movable in a vertical plane radial to the axis of said carrier, a holder pivoted on said arm and
10 movable in said radial plane, means controlling pivotal movement of said arm for lowering an article to be dipped and thereafter raising said article, and other means controlling pivotal move-

ment of said holder for tilting said article to facilitate draining when raised after dipping.

7. In a waxing machine having dipping devices mounted upon a rotary carrier, a dipping device comprising an arm pivoted on said carrier, a lever pivoted on said arm, a holder detachably mounted upon said lever, said holder consisting of a stamped metal cage adapted to receive an article to be dipped, means controlling pivotal movement of said arm for lowering and thereafter raising said holder, and other means controlling pivotal movement of said lever for tilting said holder and draining said article when raised after dipping.

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