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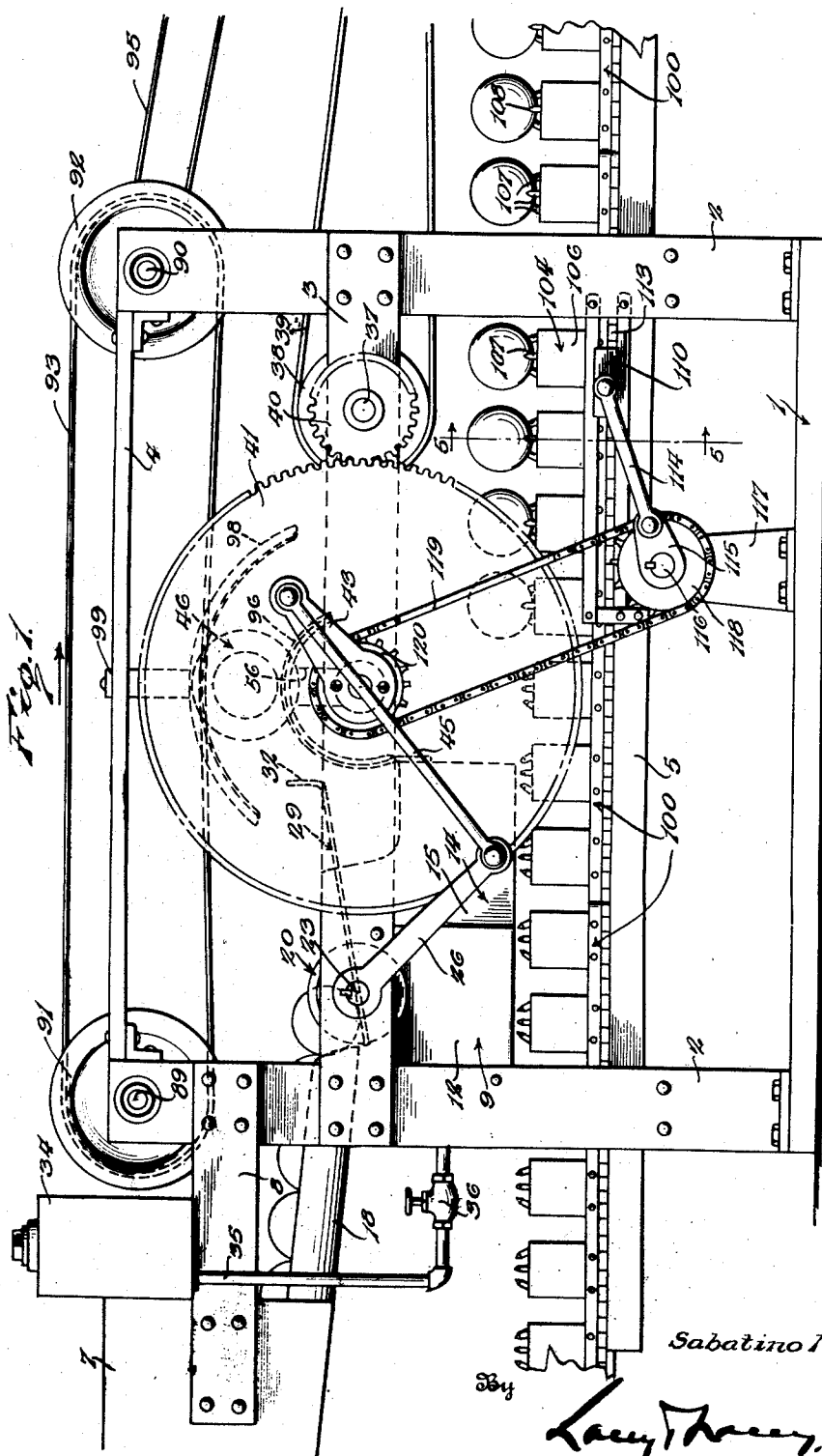
S. MAGGI

1,681,301

DIPPING AND PAINTING MACHINE

Filed Sept. 17, 1925

4 Sheets-Sheet 1



Aug. 21, 1928.

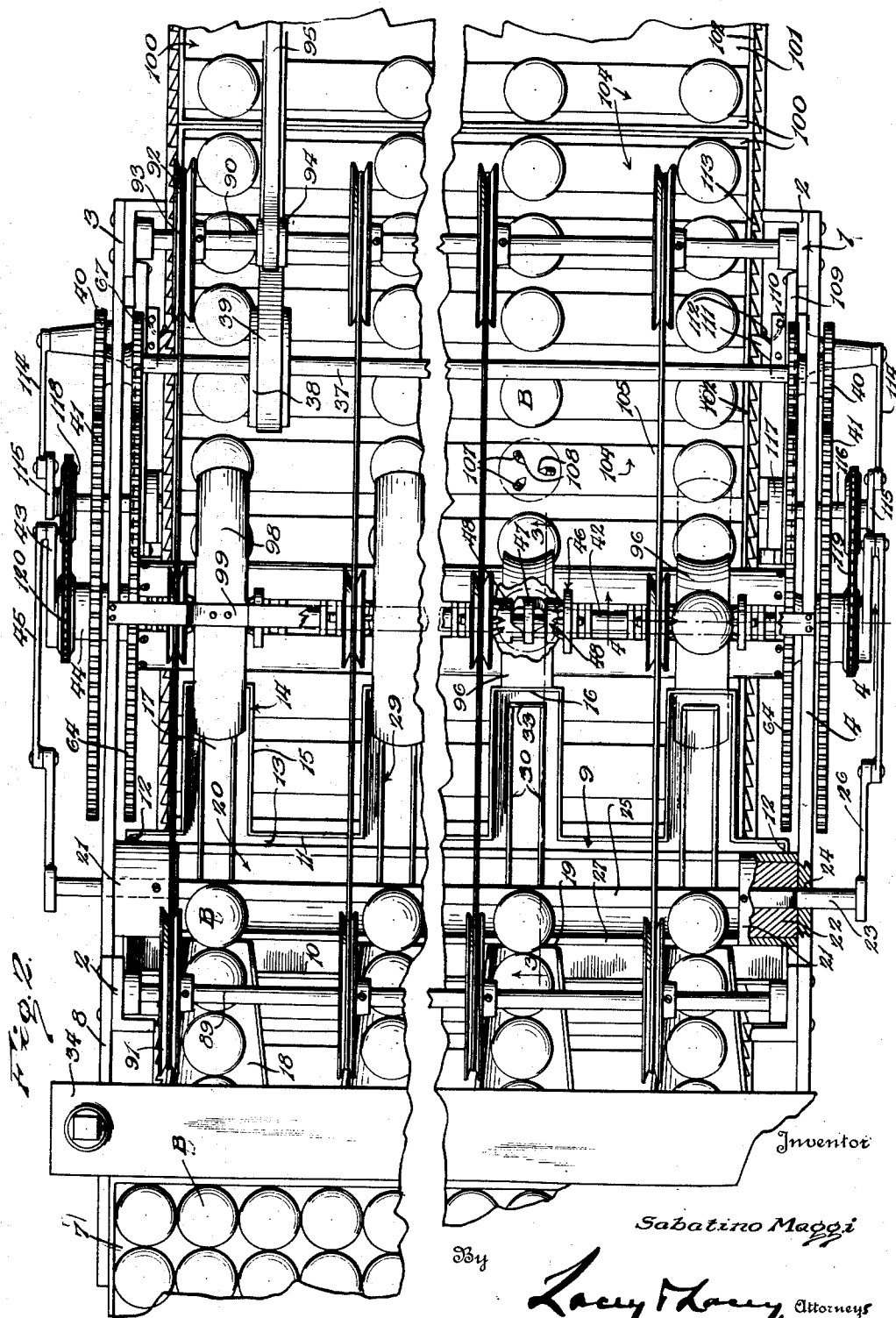
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DIPPING AND PAINTING MACHINE

Filed Sept. 17, 1925

4 Sheets-Sheet 2



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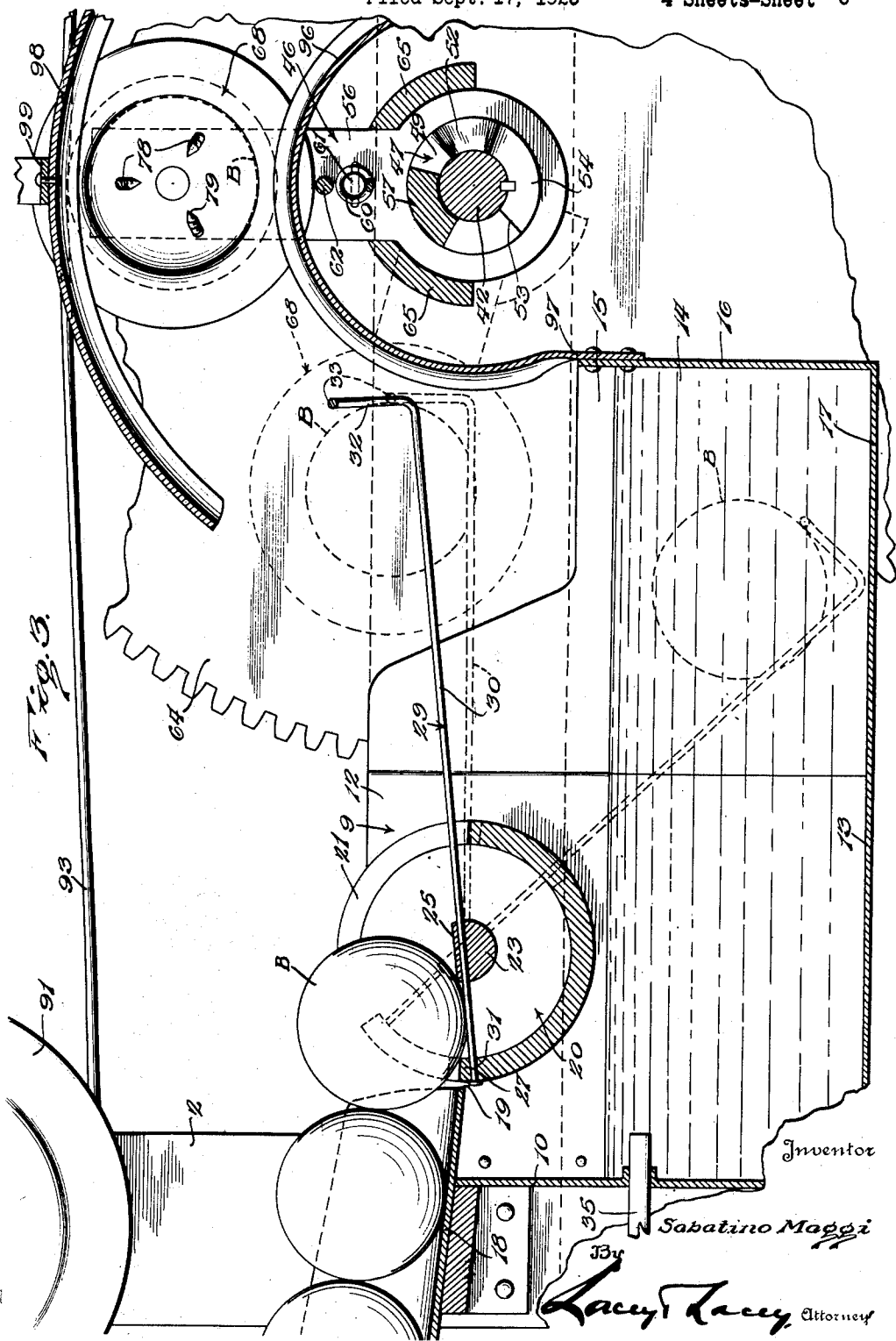
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DIPPING AND PAINTING MACHINE

Filed Sept. 17, 1925

4 Sheets-Sheet 3



Aug. 21, 1928.

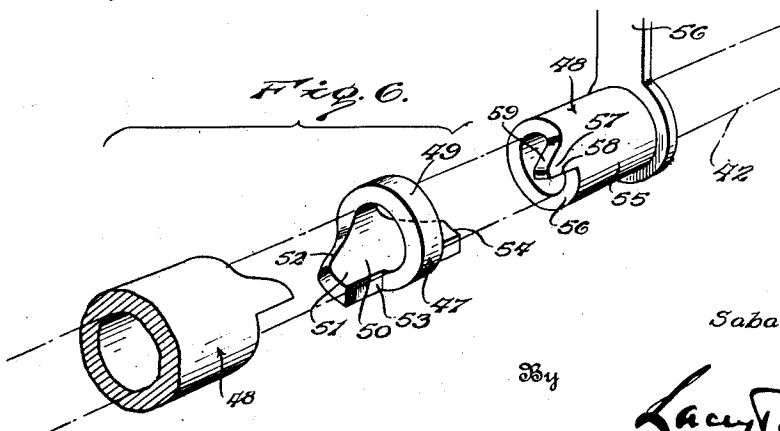
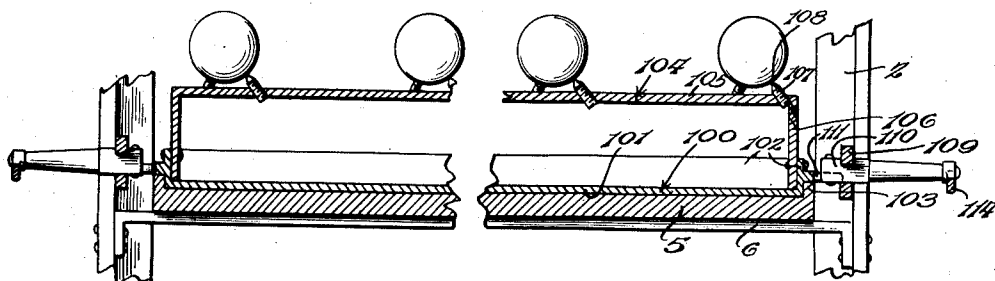
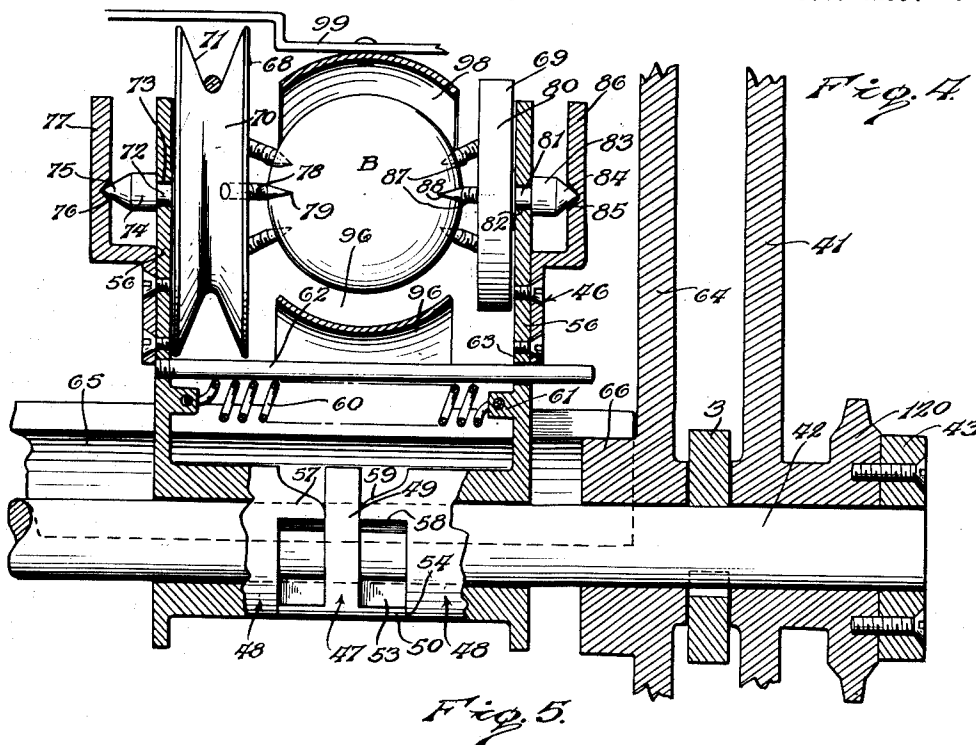
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S. MAGGI

DIPPING AND PAINTING MACHINE

Filed Sept. 17, 1925

4 Sheets-Sheet 4



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DIPPING AND PAINTING MACHINE

Application filed September 17, 1925. Serial No. 57,001.

This invention relates to machines for dipping and painting objects of all kinds although it is more particularly adapted to dip and paint golf balls, and the general object of the invention is to provide a machine which will expeditiously perform this function.

Another object of the invention is to provide a machine for the purpose stated which will operate to provide an even coating of paint upon the surfaces of the balls.

Another object of the invention is to provide a machine of the class described embodying means for dipping the golf balls in paint, elevating the balls from the paint into which they have been dipped, and gripping the balls and rapidly rotating the same so as to effect an even distribution of the paint and obviate any coating imperfections, so that the market value of the balls treated by the machine of the present invention will be enhanced.

Another object of the invention is to provide novel means for collecting the balls after they have been dipped and automatically advancing said collecting means to a position where the same may be handled to remove a number of the balls, at one time, from the machine and to a place where they may be permitted to dry.

In the accompanying drawings:

Figure 1 is an elevation of the machine embodying the invention.

Figure 2 is a top plan view thereof, the view illustrating parts broken away to better illustrate the structure.

Figure 3 is a vertical longitudinal sectional view, in detail, taken substantially on the line 3—3 of Figure 2, looking in the direction indicated by the arrows.

Figure 4 is a vertical transverse sectional view taken substantially on the line 4—4 of Figure 2, looking in the direction indicated by the arrows.

Figure 5 is a vertical transverse sectional view taken substantially on the line 5—5 of Figure 1, looking in the direction indicated by the arrows.

Figure 6 is a group perspective view illustrating the cam elements of the transfer mechanism of the machine.

The machine embodying the invention includes a frame structure embodying a base or foundation 1, corner uprights 2, longitudinal side members 3, which extend between the uprights 2 at the opposite sides of the structure, side members 4 which extend between

the upper ends of the uprights 2 at the opposite sides of the structure, a table 5 supported between the uprights 2 and above the base 1, and cross braces 6 which extend transversely between the side members and beneath the said table 5 and which serve not only to brace the said uprights but also serve as a support for the said table. The numeral 7 indicates a hopper for the balls to be dipped, and this hopper is supported between bracket arms 8 which are located at the opposite sides of the hopper and are secured in any suitable manner to the rear uprights 2 of the frame. The numeral 9 indicates a trough which contains the paint with which the balls are to be coated, and this trough extends between the rear uprights 2 of the frame structure and is supported thereby and by the side members 3 of said structure. For a purpose to be presently explained, the trough 9 comprises a main body including a rear wall 10, a front wall 11, end walls 12, and a bottom 13, and the trough is provided at its front with extensions 14 each including side walls 15, a front wall 16, and a bottom 17, so that paint delivered to the body of the trough will flow into and occupy the said extensions 14 as clearly shown in Figure 3 of the drawings, the bottoms 17 of the several trough extensions being in the same plane as the bottom 13 of the body of the trough, and the said body of the trough and the said trough extensions being open at their tops. The numeral 18 indicates runways which lead from the hopper 7 in a forward and slightly downwardly inclined direction and have their delivery ends 19 located within the body of the trough near the top thereof, these runways serving to conduct the balls, to be dipped, from the hopper 7 to the trough, and the said balls being adapted to roll by gravity down the said runways and to follow one another in the manner clearly shown in Figures 1 and 3 of the drawings. The invention contemplates the delivery of the balls, which are indicated by the reference letter B, one by one, to the extensions of the troughs by a dipping mechanism which will now be described.

The dipping mechanism referred to above comprises a ball receiving member which is indicated by the numeral 20 and is of hollow semi-cylindrical form except at its ends, where it is provided with cylindrical portions 21 to accommodate cylindrical bushings 22. A shaft 23 is fitted axially through openings in the bushings and is journaled at its

ends in bearing openings 24 formed in the side members 3 of the frame structure, the shaft being of a diameter less than the diameter of the semi-cylindrical receiving member 20 and having its upper side flattened throughout its length except at its ends, as indicated by the numeral 25. Crank arms 26 are secured at their inner ends to the outer ends of the shaft 23 outwardly of the frame structure, as clearly shown in Figure 2 of the drawings. It will be observed by reference to Figure 3 of the drawings that the open side of the receiving member 20 is presented upwardly and that the member is to be rotated from the full line position shown in the said figure to the dotted line shown therein, during the dipping operation. It will likewise be observed by reference to the said Figure 3, that when the receiving member 20 is in the full line or receiving position, one side 27 of the member will extend relatively close to the delivery ends 19 of the runways 18 and substantially in a plane with the bottoms of said runways. At this point it will be understood that the receiving member is to be continuously oscillated in the operation of the machine and that, therefore, it will only momentarily assume the position shown in full lines in Figure 3, at which time the foremost ball in each runway will roll to the position shown in said figure with its lower side resting against the upper side of the shaft 23 and the edge or side 27 of the receiving member. The receiving member supports, substantially in alinement with each runway, a dipper indicated by the numeral 29, and preferably made of wire rod material and comprising spaced parallel side members 30 which at their rear ends are secured, as at 31, through the side of the member 20 which is located next adjacent the delivery ends of the runways 18, the said side members 30 being extended at this point, across the member 20 in a forward direction and through the shaft 23 and thence forwardly beyond the receiving member for a suitable distance. The forward portions of the side members 30 are then curved upwardly in parallel relation to each other, as indicated by the numeral 32, to provide an abutment or rest for the balls to be dipped, the upper ends of the portions 32 being connected by a forwardly bowed portion of the wire from which the dipper is formed, indicated by the numeral 33, so that the spaced side members of the dipper are relatively braced. It will be observed by reference to Figure 2 of the drawings, that the extensions 14 of the trough are located substantially in alinement with and in advance of the runways 18 and that the dippers 29 are to operate within said trough extensions.

Through mechanism to be presently described, oscillatory motion is to be imparted to the receiver 20 to effect lowering of the balls, in the trough extensions, for dipping,

and a subsequent elevation of the said balls. By referring to Figure 3 of the drawings, it will be observed that the balls are permitted to travel down the runways until the foremost ball assumes a position resting upon the receiver, the receiver and the dipper being at such time in the full line position shown in Figure 3, the present description referring to a single one of the runways and dippers, although it will be understood that any number of dippers may be employed and that all will operate in unison. From the elevated position shown in full lines in Figure 3 of the drawings, and as the receiving member 20 is oscillated toward its dotted line position, it will assume first the slightly rotated position shown in Figure 3, in which position its side which is next adjacent the delivery ends of the runways 18, will be elevated somewhat above the bottoms of the runways so that, in the continued movement of the receiving member in this direction, said side will offer an obstruction to the second ball in line. Likewise in this continued movement of the receiving member, the dipper 29 will be lowered and the ball which has been taken up by the receiving member will be permitted to roll by gravity down the side members of the dipper until it comes to rest against the members 32 thereof. As the dipper reaches the full lowered position shown in the lower dotted line illustration in Figure 3, the ball will be immersed in the paint in the respective trough extension 14. At this time, the receiving member 20 will be oscillated in the reverse direction, thereby elevating the dipper and the ball carried thereby. Mechanism to be presently described then operates automatically to pick up the dipped ball immediately prior to the time the receiving member and dipper reaches the full line position shown in Figure 3, at which time the ball then foremost in the respective runway 18, may roll onto the receiver, as previously described.

Paint is supplied to the trough 9 from a reservoir 34 mounted upon the brackets 8, and by way of a pipe 35 which leads from the bottom of the reservoir into the said trough through the rear wall 10 thereof, a valve 36 being interposed in said pipe and adjustable to control the supply of paint.

The drive shaft of the machine is indicated by the numeral 37 and the same is journaled in suitable bearings upon the side members 3 of the frame structure and carries a pulley 38 about which is trained a belt 39 driven from a suitable source of power (not shown). Fixed upon the outer ends of the said shaft 37 are pinions 40 which mesh with gears 41 rotatably journaled upon the outer ends of a shaft 42 which is mounted in the side members 3 of the frame structure and projects at its opposite ends beyond the said side members. A crank arm 43 is fixed to

the outer end of the hub 44 of each respective gear 41 so as to rotate in unison therewith and about the shaft 42, and a connecting rod 45 is connected at its ends to the crank arms 26 and 43 at the opposite sides of the machine. It will be observed by reference to Figure 1 that the crank arm 43 is of less length than the crank arm 26 so that while the arm 43 rotates continuously, the arm 26 is oscillated so as to impart oscillatory motion to the receiving member 20, as previously explained.

After the golf balls have been dipped, they are to be deposited upon trays which trays will presently be specifically described, and means is provided for transferring the dipped balls from the dippers to the trays and imparting rapid rotary motion to the balls during the period of transfer. The transferring mechanism is best illustrated in Figures 2, 3 and 4 of the drawings, and is mounted upon the shaft 42. This mechanism includes transfer units equal in number to the number of dippers and operating immediately in advance of the respective dippers, the transfer units being indicated in general by the numeral 46. Each of these units comprises a set of cams including an intermediate cam 47 and movable cams 48 located at the opposite sides thereof. The cam 47 comprises a substantially semi-annular portion 49 which is of uniform width throughout its extent, and a body portion 50 likewise of substantially semi-annular form and having oppositely laterally disposed cam portions 51, the cam edges of which are indicated by the numeral 52. The portions 51 have abrupt transverse faces 53 at their widest portions and are gradually decreased in width, due to the contour of the working edges 52, so that the said working edges of the cam portions 51 extend from the outer ends of the abrupt faces 53 on a substantially helical curve and merge with the opposite edges of the cam portions 49. The cam member 47 is keyed or otherwise fixed upon the shaft 42 with the abrupt faces 53 thereof presented substantially toward the dippers and assuming substantially the position shown in Figure 3 of the drawings. The working edges of the portions 51 of the cam 47 have substantially straight portions 54 which merge with the respective edges 52 and extend to the abrupt faces 53. Each of the cams 48 comprises a cylindrical body 55 supporting, at its outer end, a radial arm indicated by the numeral 56, the bodies of the said cams 48 being both slidably and rotatably fitted onto the shaft 42 at the opposite sides of the cam 47. Each cam body 55, at its end which opposes the cam 47, has a working edge or face 56 which extends substantially three-fourths of the circumference of the cam body and occupies a plane substantially at right angles to the axis of the body. The other fourth of the circumference of the cam body at its said end is occupied by a cam portion 57 having an abrupt face 58 and a curved face 59 which extends between the outer end of the face 58, inwardly, and merges with the working edge 56, it being understood that the cam portions 57 are to ride against the cam edges of the cam 47 in the rotation of the cams 48. A tension spring 60 is connected at its ends to lugs 61 upon the inner sides of the arms 56 and yieldably holds the cams 48 in operative relation to the cam 47, it being understood that as the cam portions 57 of the cams 48 ride over the working edges 52 and 54 of the cam 47, separation of the arms 56 takes place against the tension of the spring 60 and that the said spring will act to immediately draw the cams 48 and their respective arms 56 toward each other at the moment the outer ends of the portions 57 of the said cams 48 ride past the outer ends of the abrupt faces 53 of the portions 51 of the cam 47. In order to guide the arms 56 in their relative movement and prevent displacement of the arms, a pin 62 is secured at one end in one of the arms, preferably radially outwardly of the spring 60, and is slidably engaged at its other end portion through an opening 63 formed in the other arm. In order that rotary motion may be imparted to the cams 48, gears 64 are freely rotatably mounted upon the shaft 42 immediately inwardly of the side members 3, and support abutment members 65, these members being of arcuate form in cross section and extending longitudinally of and in spaced relation to the shaft 42 and being mounted and secured at their ends upon the hubs 66 of the said gears 64. The relatively adjacent edges of the members 65 are so spaced as to accommodate between them the arms 56 as clearly shown in Figures 2, 3 and 4 of the drawings. A pinion 67 is secured upon each end of the power shaft 37 inwardly of the respective side member 3 and meshes with the respective gear 64 and it will, therefore, be evident that as the shaft 37 is rotated, rotary motion will be imparted to the gears 64 and, through the medium of the driving members 65, rotary motion will be imparted to the cams 48 to effect rotation of transfer devices of which the arms 56 constitute a part.

Each of the transfer devices comprises, in addition to the arms 56, ball gripping members indicated one by the numeral 68 and the other by the numeral 69. The member 68 comprises a body 70 having the form of a pulley, the grooved periphery of which is indicated by the numeral 71, and the said body is provided concentrically at its outer face with a short stub shaft 72 journaled in an opening 73 formed in the adjacent arm 56. The shaft 72 has a cylindrical enlarged portion 74 which has a conical outer end 75 constituting a tapered journal having bearing in a conical bearing seat 76 formed in a bearing bracket

77 mounted upon the outer side of the arm 56. Studs 78 are threaded into the inwardly presented face of the pulley body 70 of the gripping member 68 and are preferably disposed at an angle oblique to the axis of rotation of the said member, the said studs 78 being symmetrically concentrically arranged about the axis of the member 68 and having sharply pointed tapered ends 79 which are designed to engage one side of the ball B which is to be grasped by the transfer mechanism and carried from the dipper to the tray. The member 69 comprises a relatively flat circular body 80 having a stub shaft 81 upon its outer side and rotatably mounted in an opening 82 in the respective arm 56, this shaft being provided with a cylindrical enlargement 83 at the outer side of the said arm and terminating in a conical or tapered journal 84 which engages in a conical bearing 85 formed in the inner face of a bearing bracket 86 mounted upon the outer side of the respective arm 56. Studs 87 corresponding to the studs 78 are threaded into the inwardly presented side of the body 80 and are symmetrically concentrically arranged with relation to the axis of the shaft 81 and have tapered pointed ends 88 designed to engage the other side of the ball to be held and supported. Any desired number of the studs 78 and 87 may be provided, but there will preferably be three in each set of studs.

In order that the coated or dipped balls may be rapidly rotated during the transfer period in order to evenly distribute the paint over their surfaces, means is provided which will now be described. The numerals 89 and 90 indicate shafts which are rotatably journaled in suitable bearings in the side members 3 of the frame structure of the machine, and a series of pulleys 91 and 92 are mounted upon the shafts 89 and 90 respectively, belts 93 preferably of the round type, being trained about respective pairs of the pulleys and the arrangement being such that the lower stretch of each belt 93 will be located in a vertical plane with the groove 71 of one of the transfer gripping members 68. A pulley 94 is fixed upon the shaft 90, and a belt 95 is trained over the pulley and driven from any suitable source of power so that rapid rotary motion is imparted to the shaft 90, and the belts 93 are caused to rapidly travel about and between the pulleys 91 and 92. Likewise, the arrangement is such that as the gears 64 are rotated and rotary motion is imparted to the transfer units, the grooved peripheries of the gripping members 68 of the units will, during a period in the rotation of the units, ride against the lower stretches of the respective belts 93 and, inasmuch as these belts are being driven at a high rate of speed, the ball which is gripped between the gripping members 68 and 69 will be rotated at a high rate of speed, thereby, through centrifugal force, evenly distributing the paint upon the surface

of the ball in a thin film for coating the said surface, and, at the same time, throwing off from the said surface, any surplus paint. By reference to Figure 2 of the drawings, it will be observed that the transfer units are so arranged upon the shaft 42 that they will rotate immediately in advance of respective dippers 29 and that in the rotation of each unit, the gripping members 68 and 69 thereof will travel upwardly past and at opposite sides of the forward end of the respective dipper. The arrangement of the cams is such that when the dipper 29 has nearly reached the full line position shown in Figure 3 of the drawings, the ends of the cam portions 57 of the cams 48 will ride over the extremities of the cam portion 51 of the cam 49 and the spring 60 will then act immediately to move the arms 56 and the gripping members 68 and 69 carried thereby, toward each other, and cause the pointed extremities of the studs 78 and 87 to engage the opposite sides of the ball which is at such time supported by the dipper and has at that time been elevated from the paint trough. Therefore, the ball will be immediately firmly gripped without, however, injuring the same or marring its surface and without disturbing the paint upon said surface inasmuch as the extremities of the studs are sharply pointed and there is, therefore, no appreciable surface engagement of the gripping members with the opposite sides of the ball. It will likewise be understood that in the continued rotation of the cams 48, the arms 56 will be carried around with a rotary motion in a forward and upward direction as the ends of the cam portions 57 ride along the opposite edges of the portion 49 of the cam 47, and it is during this period of rotation of the transfer unit, that the ball which is held between the gripping members is rapidly rotated through engagement of the grooved periphery of the member 68 with the lower stretch of the respective belt 93, so that, as previously stated, the paint is evenly and uniformly distributed over the surface of the ball. As the cams 48 continue to rotate and as the ends of their portions 57 ride into engagement with the working edges 52 of the cam portions 51 of the cam 47, a separation of the gripping members 68 and 69 will be effected and the ball will be released, being deposited, at such time, upon one of the receiving trays which will presently be described. In the meantime, the dipping mechanism has been automatically operated, in consonance with the operation of the transfer mechanism, to effect dipping and elevation of the next ball to be treated.

In order to prevent the paint which is thrown off, by centrifugal force, from the balls, as they are rapidly rotated, being deposited on the operating parts of the mechanism, a transversely concave sheet metal shield 96 is arranged above the actuating

cams of each of the transfer units and concentric with respect to the shaft 42, the shield being fixedly mounted at one end as at 97, upon the front wall 16 of the respective trough extension 15, as best shown in Figure 3 of the drawings, and this shield is so arranged that its transversely concave side will be presented toward the under side of the ball which is being transferred and rotated, so that none of the paint will be thrown onto the cams. A similar shield 98 is mounted above and concentric to the respective shield 96 and, therefore, the balls which are being treated are carried beneath this shield, the shield being transversely concave and supported by a suitable cross piece 99 constituting a part of the frame structure.

The trays for receiving the coated golf balls, and heretofore referred to, are indicated in general by the numeral 100 and are mounted upon the table 5 of the machine. Each of the trays comprises a rectangular shallow body including a bottom 101 and upstanding walls 102, the said table 5 being provided upon its upper side and at its longitudinal edges with upstanding flanges 103 between which the trays are confined and by which they are guided in their movement over the table through the operation of means to be presently described. The numeral 104 indicates a number of bridge members which are mounted transversely within each tray and these bridge members may be formed from sheet metal and are arranged in spaced parallel relation and each includes a top portion 105 and depending end portions 106 riveted or otherwise secured to the upstanding side walls of the tray. A series of sets of studs 107 are arranged upon the top portion 105 of each bridge member, the studs being threaded into openings formed in the said top portion 105 and having tapered pointed ends 108, the studs of each set being symmetrically arranged about a common center and inclined upwardly and inwardly so that a coated golf ball deposited upon the pointed upper ends of the studs of any set will be firmly supported in position and yet without any appreciable surface contact which would tend to disturb the coating of paint upon its surface. It will be observed by reference to Figure 2, that the arrangement of the sets of studs 107 is such that each set, in the longitudinal movement of the tray, will move in a vertical plane with one of the dippers and the respective transfer mechanism. The trays are, as stated, slidably supported upon the table 5 and are disposed upon the table in abutment with one another and are designed to be advanced with a step by step movement over the surface of the table. This is accomplished by providing guides 109 at each side of the frame structure and slidably mounting in each pair of guides, a block 110 which carries a pawl 111 yieldably held by a

leaf spring 112, in active engagement with rack teeth 113 which are provided upon the opposite side walls of the trays. Each block 110 has connected to it a connecting rod 114, the other end of which rod is connected to a crank 115 upon the corresponding end of a shaft 116 mounted in suitable bearings 117 upon the base 1 of the frame structure and extending transversely beneath the table 5. At this point it will be understood that rotation of the shaft 116 will effect reciprocatory motion of the blocks 110 and, therefore, in the rearward movement of the blocks, the respective pawls 111 will ride over the respective racks 113 and, in the forward movement of the blocks, the pawls will positively engage the rack teeth and cause forward shifting of the respective trays, it being understood that each tray, in each operation of the shifting means, is shifted a distance equal to the distance between the centers of balls supported by the relatively adjacent bridge members of the trays, the said bridge members being, however, so spaced as to prevent any contact of the balls one with another. A sprocket gear 118 is fixed upon each end of the shaft 116 inwardly of the crank arm 115, and a sprocket chain 119 is trained about each of the said sprocket gears 118 and about a sprocket gear 120 formed integral with the hub of the respective gear 41. At this point it will be evident that inasmuch as the tray shifting means is driven directly from the gears 41, the movement of the trays is in consonance with the operation of the dipping mechanism and the transfer mechanism.

It will now be evident that in the operation of the machine, a number of balls having been dipped and the dippers having been returned to their elevated position, the transfer units will, in their rotative movement, be automatically operated to cause the gripping members 68 and 69 to grip the respective balls and lift the same from the respective dippers, the engagement of the lower stretches of the several belts 93 with the respective gripping members 68, serving to rapidly rotate the balls as they pass between their respective guards 96 and 98, during which time the members 57 of the cams 48 are riding over the opposite sides of the portions 49 of the cams 47. In the operation of the machine, and after the grooved peripheries of the gripping members 68 of the several transfer units have left the lower stretches of the belts 93, the transfer units will begin to swing downwardly in the direction of the trays, and at this time the trays are stationary. As the gripping members of the several transfer units reach a position substantially immediately above the bridge member which is then positioned to receive the dipped and coated balls, the portions 57 of the cams 48 will ride along the curved edge portions 52

of the cam portions 51 of the cams 47 and the gripping members 68 and 69 will be relatively separated so as to release the balls and deposit them upon the sets of studs 107 carried by the bridge member 104 referred to. As soon as the balls have been deposited and released, the tray shifting mechanism will become active to shift the trays so as to bring another bridge member in position to receive the next balls to be dipped, and it will be evident that as the gripping members 68 and 69 are traveling upwardly and rearwardly past the opposite sides of the respective trough extensions 14, the portions 57 of the cams 48 will be riding in engagement with the edge portions 54 of the cam portions 51 of the cams 47, thereby holding the gripping members separated until they have reached a position directly at opposite sides of the respective ball which has, in the meantime, been dipped and elevated to position to be taken up by the transfer unit. The operation is rendered continuous and it will be evident that as each tray becomes filled with dipped balls, it will, in the meantime have been advanced to a position where it can be readily removed from the projecting forward portion of the table 5 and the balls thus transposed to a suitable place where they may be permitted to dry, the step by step advancement of one tray over the table 5 resulting, of course, in advancement of the tray which has been filled with dipped balls.

It will be understood, of course, that any desired number of the dipping and transfer units may be built into the machine so that the capacity of the machine may be as great as desired. It will also be evident that due to the construction of the transfer units and the capability of the gripping members thereof separating to a greater or less extent, the mechanism is not restricted to the dipping and coating of golf balls of any definite diameter, but all of the standard sizes of balls may be deposited in the hopper 7 and operated upon by the machine regardless of their diameter.

Having thus described the invention, what I claim is:

1. In a machine of the class described, a liquid container, dipping means comprising an oscillatory dipper and means for oscillating the same to effect immersion of an object supported thereby in the liquid in the container and elevation of the dipped object after immersion, means for delivering the article to be dipped to the said dipper, means for receiving the dipped article, and means operating in consonance with the dipping means for transferring the dipped article from the dipper of said means to the receiving means.

2. In a machine of the class described, a liquid container, a runway for objects to be dipped having its delivery end located above

the container, dipping means comprising an oscillatory receiver and a dipper extending therefrom, means for oscillating the receiver to singly collect the objects and deliver them to the dipper and effect their immersion in the liquid in the container, and finally effect their elevation, means for receiving the dipped objects, and means operating in consonance with the dipping means for transferring the dipped objects from the dipping means, after their immersion, to the receiving means.

3. In a machine for dipping objects to coat the same, a liquid container, dipping means comprising an oscillatory receiver and a dipper extending therefrom and movable therewith in an up and down direction whereby to effect immersion of an object supported by the dipper and subsequent elevation of the object, means for delivering the object to the dipping means including a runway for the object having its delivery end presented close to the oscillatory receiver, the oscillatory receiver when moved to position to deliver the objects to the dipper and downwardly move the dipper, constituting means for obstructing the delivery of a following object from the runway, means for oscillating the receiver, means for supporting the dipped object, and means operating in consonance with the dipping means for transferring the dipped object from the dipping means to the said supporting means.

4. In a machine of the class described, a liquid container, dipping means operating with relation to the same, means for delivering an article to be dipped to the said dipping means, means for receiving the dipped article, and means operating continuously in consonance with the dipping means for removing the dipped article from the dipping means and transfer it to the receiving means and positively rotating said article during the period of transfer after removal from the dipping mechanism whereby to centrifugally distribute the coating liquid evenly over the surface of the article before delivery to the receiving means.

5. In a machine of the class described, a liquid container, dipping means operating with relation to the same, means for delivering an article to be dipped to the said dipping means, means for receiving the dipped article, and means operating in consonance with the dipping means for removing the dipped article from the dipping means and then transfer it to the receiving means, the said transferring means embodying coating article gripping members, and means for imparting rotary motion to said gripping members while the article supported therebetween is passing from the dipping means to the receiving means.

6. In a machine for dipping articles to coat the same, a liquid container, dipping means

operating with relation to the container to lower the object into the container and then elevate the same, means for receiving the article, and means operating in consonance with the dipping means for gripping the elevated article and mechanically removing the article from the dipping means and delivering the same to the receiving means.

7. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower the article into the container and then elevate the same, means for receiving the dipped article, means between the dipping means and the receiving means operating in consonance with the dipping means for gripping the elevated dipped article and removing the article from the dipping means and delivering the same to the receiving means, and means for rotating the article while being transferred whereby to effect even distribution of the coating fluid over the surface of the article.

8. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower the objects into the container and then elevate the same, means for receiving the articles, and means for transferring the articles from the dipping means to the receiving means comprising coacting gripping members movable between the dipping means and the receiving means, and means operating in consonance with the dipping means for effecting movement of the said members in unison from the dipping means to the receiving means, effecting movement of the gripping members toward each other to grip the object substantially at the termination of the operation of the dipping means, and effect relative separation of the members to release the object and deposit the same upon the receiving means.

9. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, means for transferring the article from the dipping means to the receiving means comprising coacting gripping members movable between the dipping means and the receiving means, and means operating in consonance with the dipping means for effecting movement of the said members in unison from the dipping means to the receiving means, effecting movement of the gripping members toward each other to grip the article substantially at the termination of the operation of the dipping means, and effecting relative separation of the members to release the article and deposit the same upon the receiving means, and means for imparting rotary motion to the article during the period of trans-

fer from the dipping means to the receiving means.

10. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, means for transferring the article from the dipping means to the receiving means comprising coacting gripping members movable between the dipping means and the receiving means, and means operating in consonance with the dipping means for effecting movement of the said members in unison from the dipping means to the receiving means, for effecting movement of the gripping members toward each other to grip the article substantially at the termination of the operation of the dipping means, and means for effecting relative separation of the members to release the article and deposit the same upon the receiving means, one of said members embodying a pulley, and means arranged in the path of travel of the pulley to frictionally coact with the same, in the movement of the gripping members, to effect rotation of the said gripping members and the article supported between the same.

11. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, means for transferring the article from the dipping means to the receiving means comprising coacting gripping members movable between the dipping means and the receiving means, and means operating in consonance with the dipping means for effecting movement of the said members in unison from the dipping means to the receiving means and for effecting movement of the gripping members toward each other to grip the article substantially at the termination of the operation of the dipping means, and means for effecting relative separation of the members to release the article and deposit the same upon the receiving means, one of said members embodying a pulley, and a traveling belt having a stretch positioned in the path of travel of the pulley for frictional coaction therewith to effect rotation of the gripping members and rotation of the article supported therebetween during the period of transfer.

12. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, and means for transferring the article from the dipping means to the receiving means comprising coacting gripping members provided upon their opposing faces

with pointed studs to engage the opposite sides of the said article with a minimum surface area of engagement with the article, the said gripping members being movable between the dipping means and the receiving means, and means operating in consonance with the dipping means for effecting such movement of the said members in unison from the dipping means to the receiving means, for effecting movement of the gripping members toward each other to grip the article substantially at the termination of the operation of the dipping means, and for effecting relative separation of the members to release the article and deposit the same upon the receiving means.

13. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, and means for transferring the article from the dipping means to the receiving means, the said means comprising a fixed shaft, a cam member fixed with relation thereto, cam members rotatable upon the shaft, means tending to move the last mentioned cam members toward each other and maintain coactive relation with the first mentioned cam member, means for effecting rotation of the said last mentioned cam members in consonance with the operation of the dipping means, arms extending from the last mentioned cam members, gripping members carried by the arms and opposing each other, and article engaging studs carried by the opposing faces of the said gripping members, the last mentioned cam members and the first mentioned cam member having coacting faces to effect movement of the gripping members toward each other to grip the article at the termination of the operation of the dipping means and to effect separation of the last mentioned gripping members to effect release of the article to deposit the same upon the receiving means when in proper position with respect thereto.

14. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, and means for transferring the article from the dipping means to the receiving means, the said means comprising a fixed shaft, a cam member fixed with relation thereto, cam members rotatable upon the shaft, means tending to move the last mentioned cam members toward each other and maintain coactive relation with the first mentioned cam member, means for effecting rotation of the said last mentioned cam members in consonance with the operation of the dipping means, arms extending from the last mentioned cam members, gripping members carried

by the arms and opposing each other, and article engaging studs carried by the opposing faces of the said gripping members, the last mentioned cam members and the first mentioned cam member having coacting faces to effect movement of the gripping members toward each other to grip the article at the termination of the operation of the dipping means and to effect separation of the last mentioned gripping members to effect release of the article to deposit the same upon the receiving means when in proper position with respect thereto, a pulley carried by one of the said gripping members, and means positioned in the path of movement of the pulley to frictionally coact with the same and effect rotation of the gripping members during the period of transfer of the article from the dipping means to the receiving means.

15. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, transfer means operating in consonance with the dipping means for gripping the article when elevated, removing the article from the dipping means, rotating the said article, and delivering the same to the receiving means, and spaced shields arranged for the passage therebetween of the article during the period of rotation thereof.

16. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, and transfer means operating in consonance with the dipping means for gripping the elevated article and removing the article from the dipping means and delivering the same to the receiving means, the said receiving means comprising a tray, means supporting the tray for sliding movement, and means operating to advance the tray in consonance with the operation of the transfer means to deposit successively treated articles thereon.

17. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, transfer means operating in consonance with the dipping means for gripping the article when elevated and removing the article from the dipping means and delivering the same to the receiving means, said receiving means comprising a tray having a series of upstanding supports therein each having a plurality of supporting studs upon its upper side, and means operating to advance the tray with a step by step movement in consonance with the operation of the transfer means to deposit successively treated ar-

ticles upon the studs of successive supports.

18. In a machine for dipping articles to coat the same, a liquid container, dipping means operating with relation to the container to lower an article into the container and then elevate the same, means for receiving the article, means for transferring the article from the dipping means to the receiving means comprising coacting gripping members movable between the dipping means and the receiving means, and means operating in consonance with the dipping means for effecting movement of the said members in unison from the dipping means to the receiving means and for effecting movement of the gripping members toward each other to grip the article substantially at the termination of the operation of the dipping means, and means for effecting relative separation of the members to release the article and deposit the same upon the receiving means, one of said members embodying a pulley, means arranged in the path of travel of the pulley to frictionally coact with the same in the movement of the gripping members to effect rotation of the said gripping members and the article supported between the same, and concentric spaced shields arranged for the passage therebetween of the article during the period of rotation thereof.

In testimony whereof I affix my signature.

SABATINO MAGGI. [L. s.]