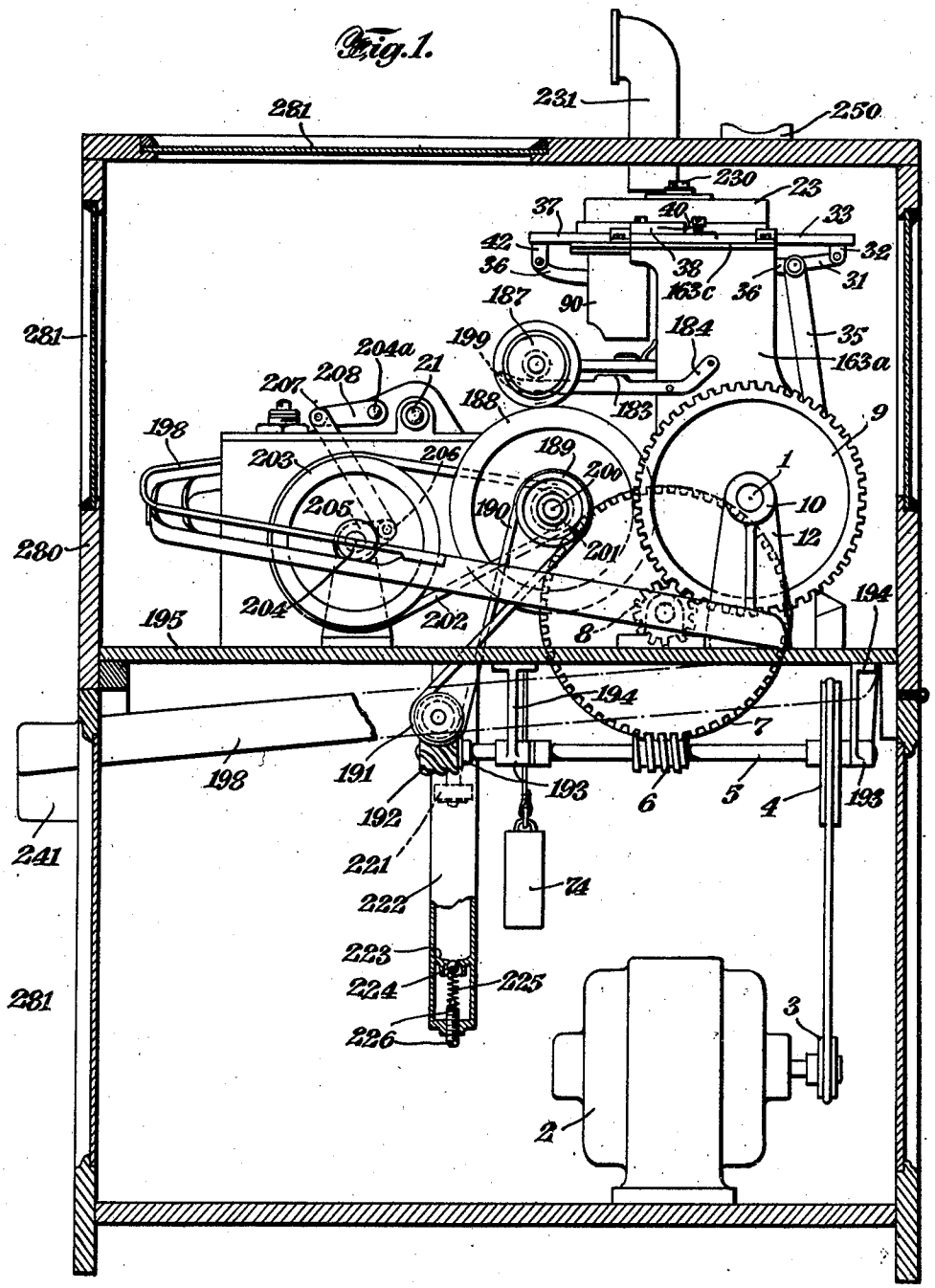
May 11, 1937. M. F. HOLT ET AL 2,079,615

GOLF BALL RECOATING

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Fig. 1.



INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
ATTORNEY

May 11, 1937. M. F. HOLT ET AL. 2,079,615

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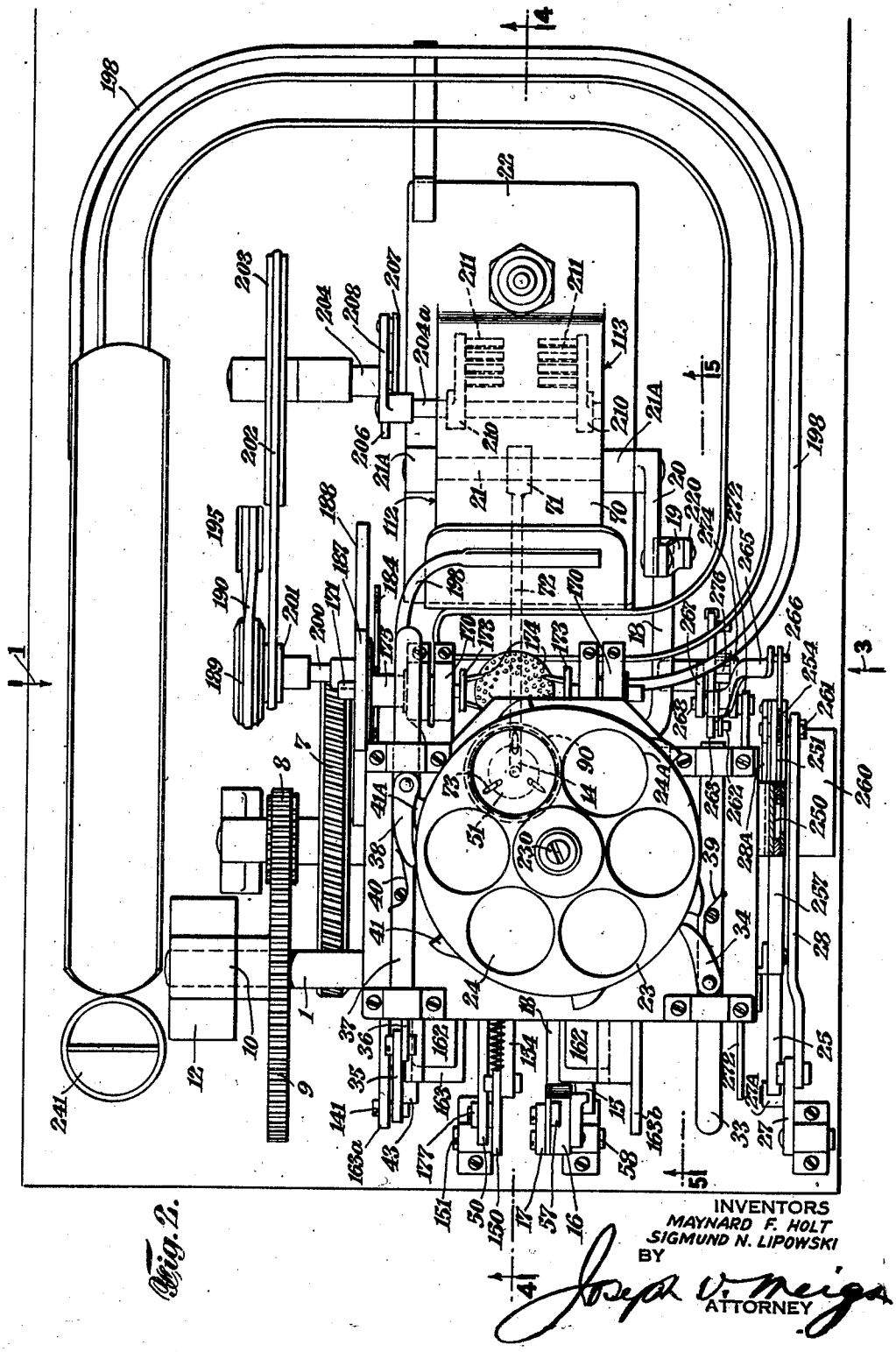


Fig. 2.

INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
Joseph V. Meiga
ATTORNEY

May 11, 1937. M. F. HOLT ET AL 2,079,615

GOLF BALL RECOATING

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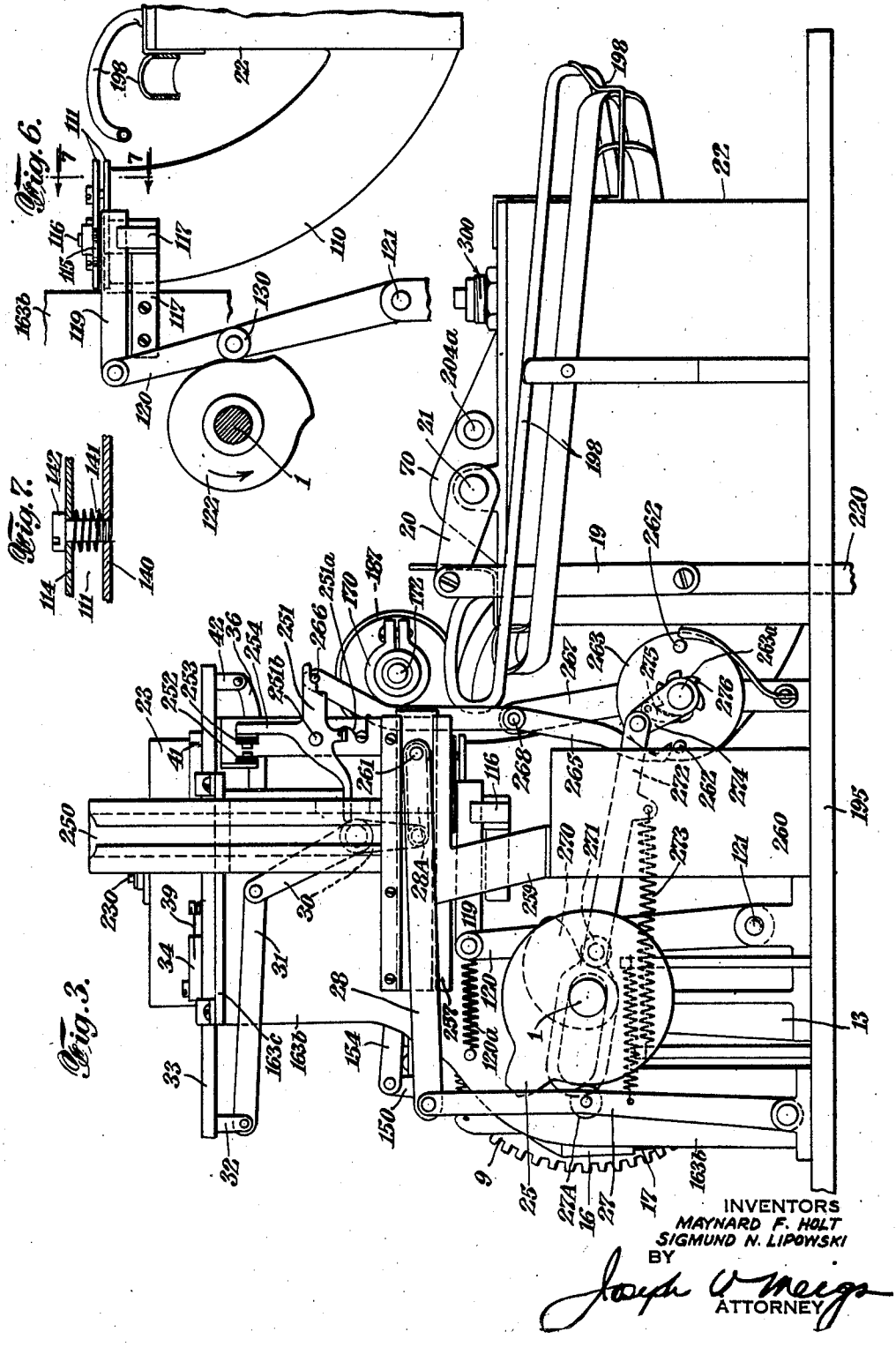


Fig. 6.

Fig. 7.

Fig. 3.

INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
Joseph V. Meigs
ATTORNEY

May 11, 1937. M. F. HOLT ET AL 2,079,615

GOLF BALL RECOATING

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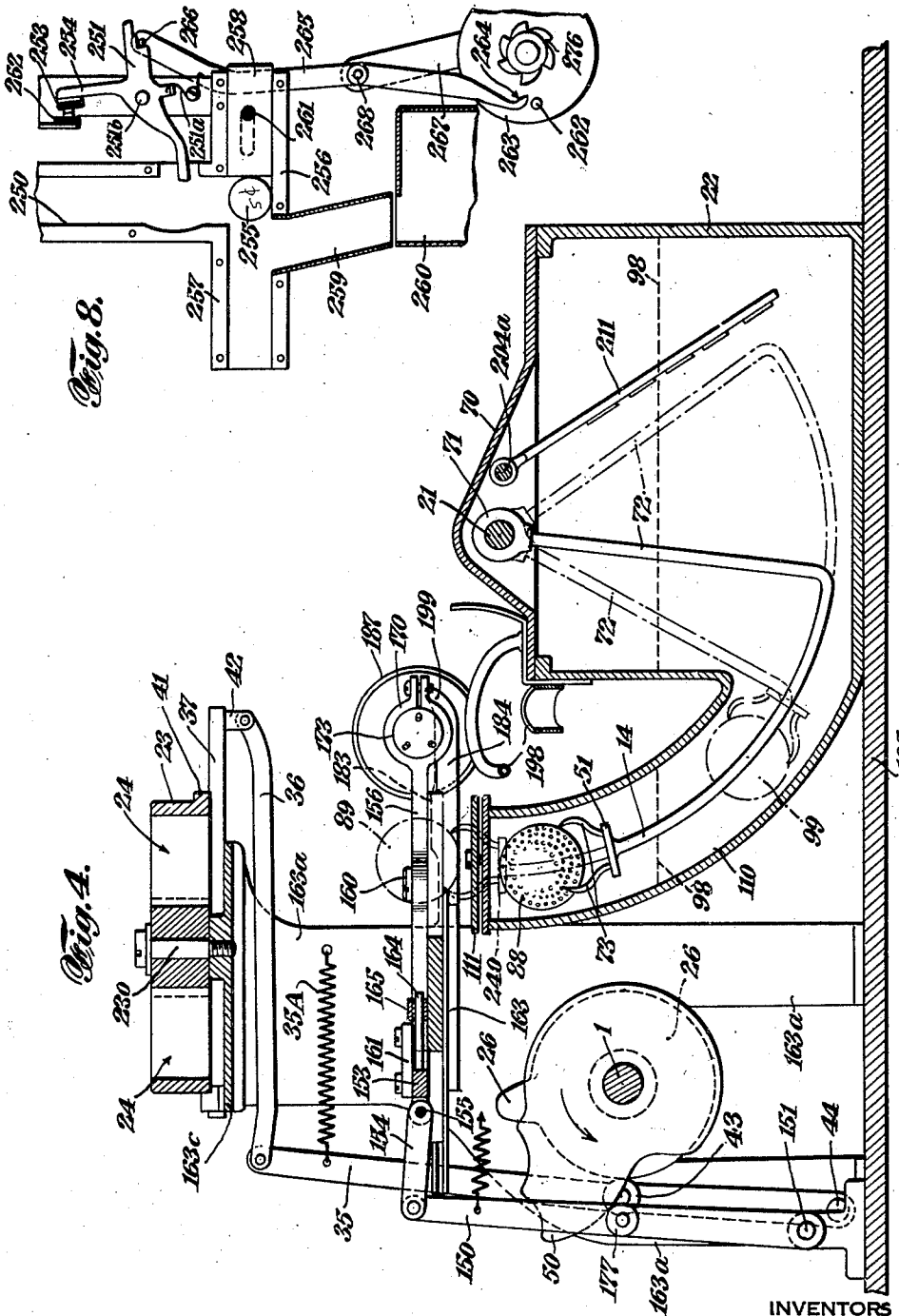


Fig. 8.

Fig. 4.

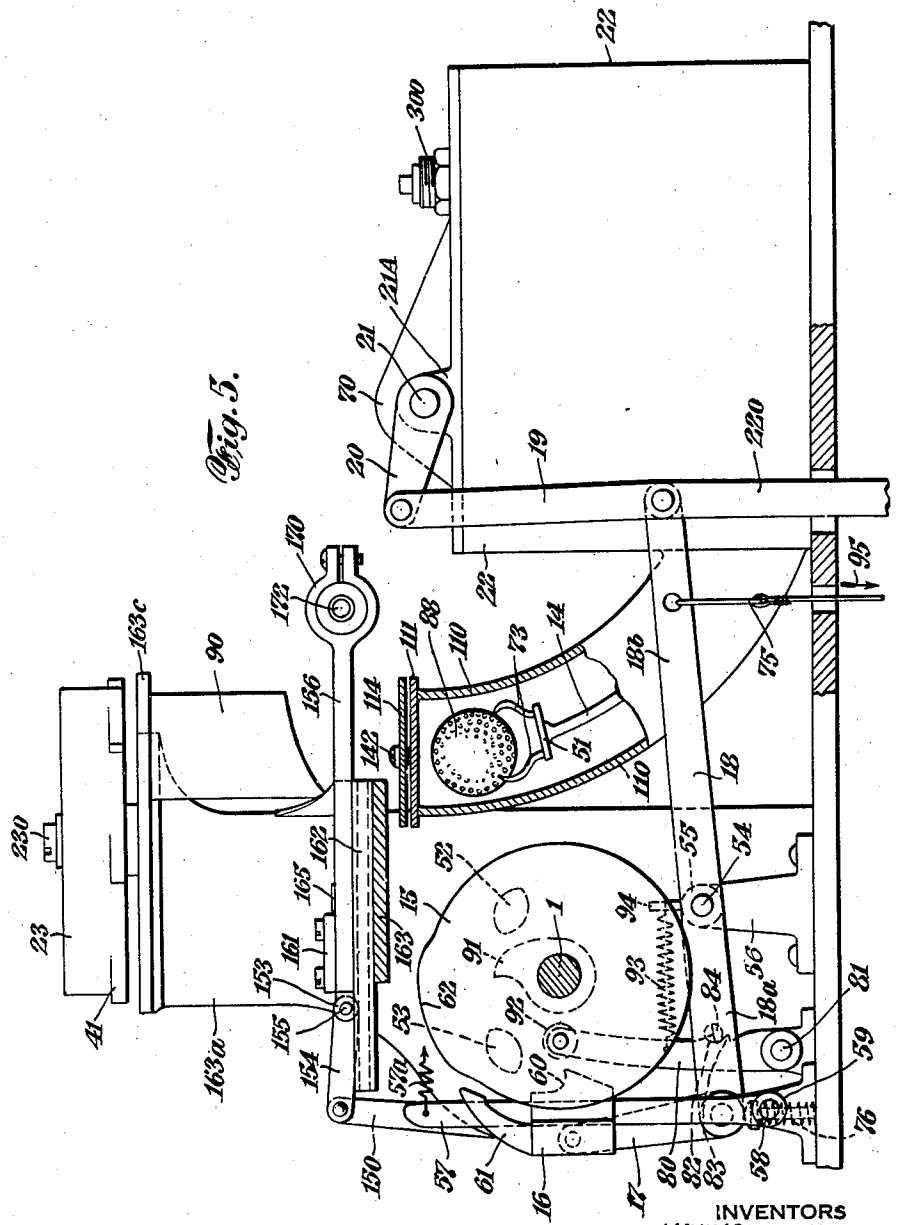
INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
Joseph V. Meigs
ATTORNEY

May 11, 1937. M. F. HOLT ET AL 2,079,615

GOLF BALL RECOATING

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Fig. 5.



INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
Joseph V. Meigs
ATTORNEY

May 11, 1937. M. F. HOLT ET AL 2,079,615

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Fig. 9.

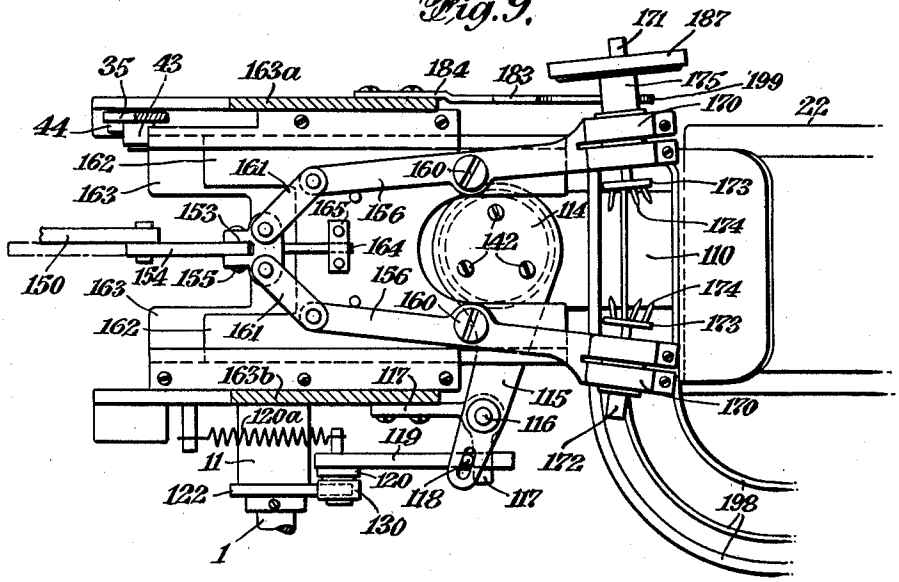
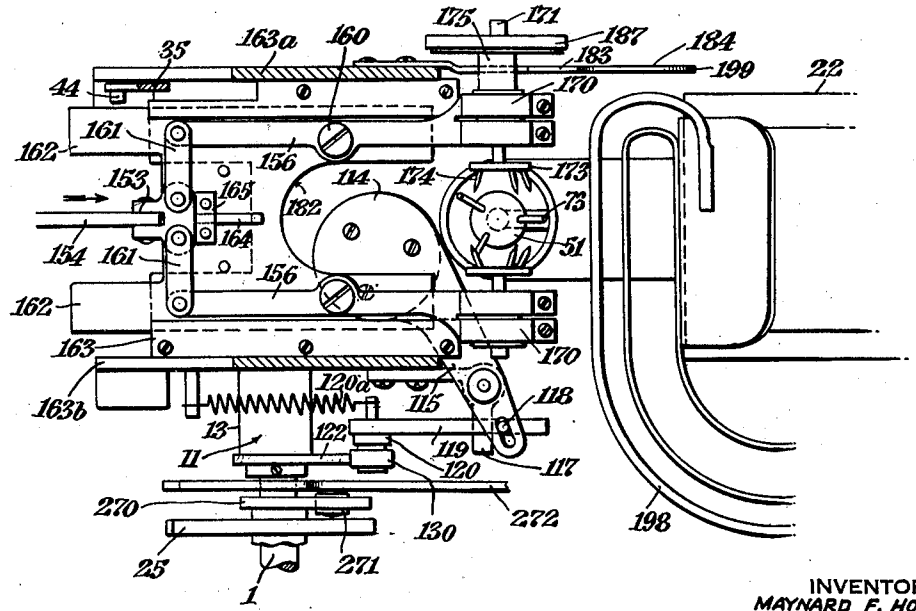


Fig. 10.



INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
Joseph V. Meiga
ATTORNEY

May 11, 1937. M. F. HOLT ET AL 2,079,615

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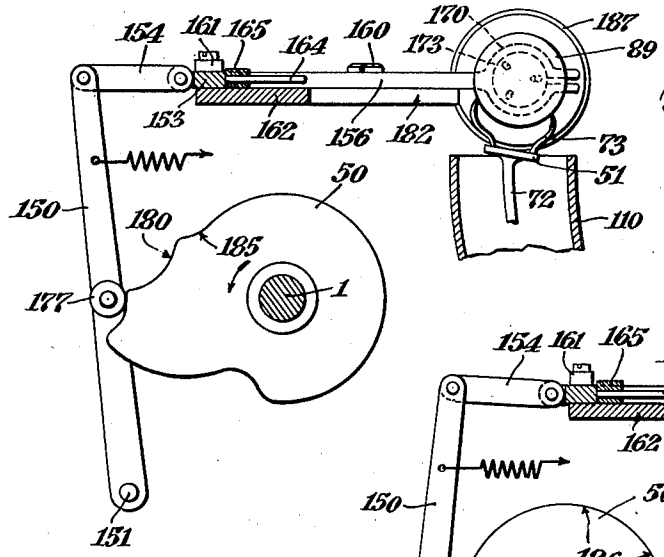


Fig. 11.

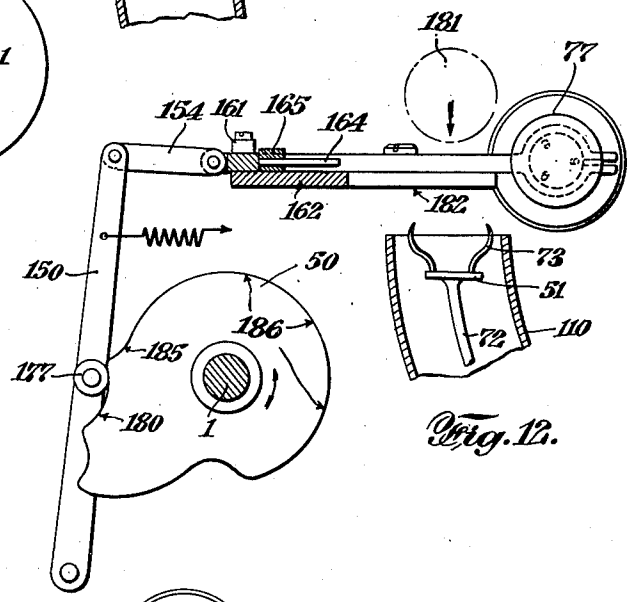


Fig. 12.

Fig. 13.

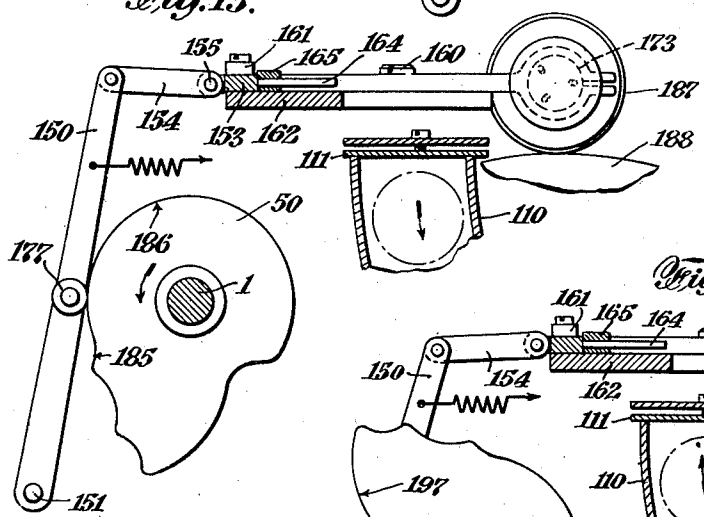
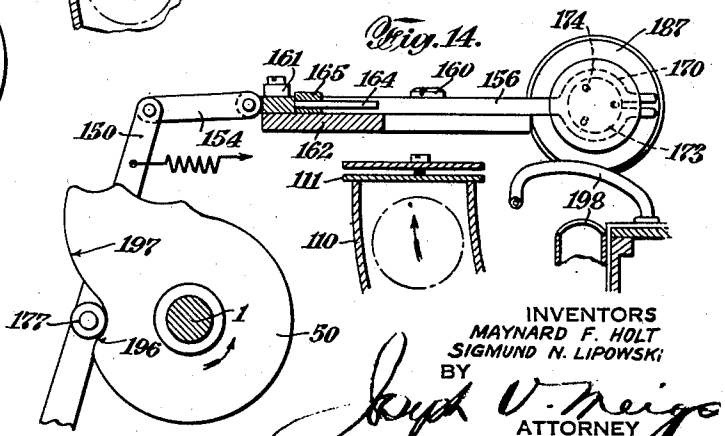


Fig. 14.



INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
ATTORNEY

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GOLF BALL RECOATING

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Fig. 16.

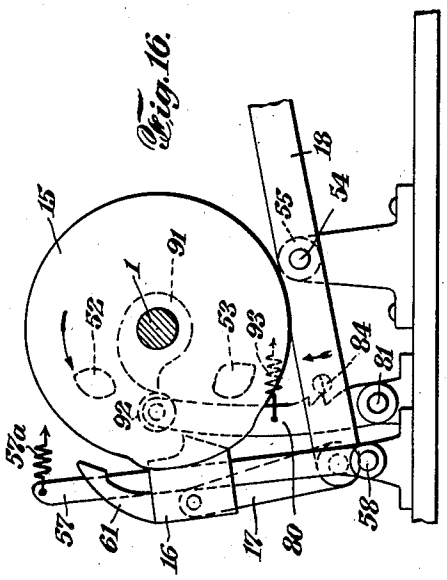


Fig. 18.

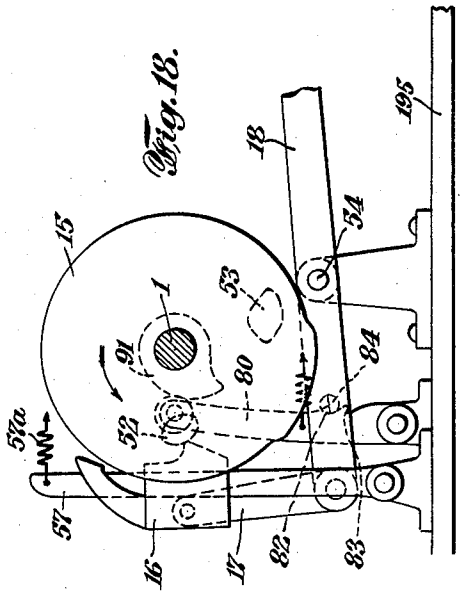


Fig. 15.

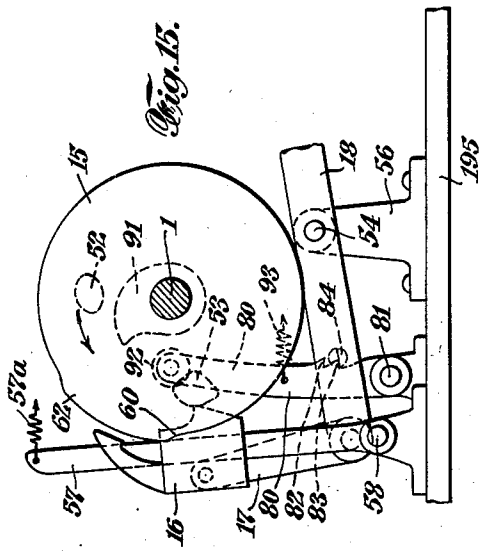
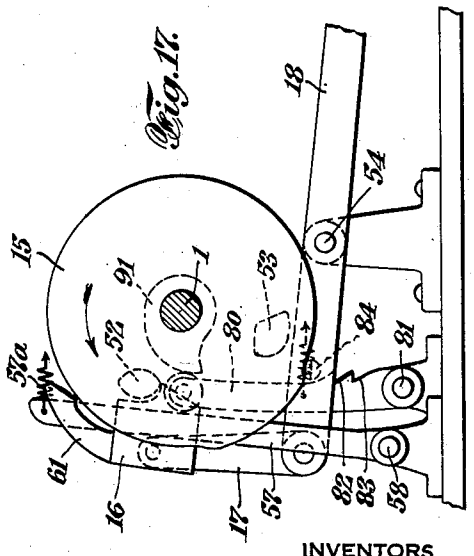


Fig. 17.



INVENTORS
MAYNARD F. HOLT
SIGMUND N. LIPOWSKI
BY
Joseph V. Meiga
ATTORNEY

Patented May 11, 1937 2,079,615

UNITED STATES PATENT OFFICE

2,079,615

GOLF BALL RECOATING

Maynard F. Holt, Rye, and Sigmund N. Lipowski, New York, N. Y.; said Lipowski assignor to said Holt

Application August 1, 1935, Serial No. 34,124

35 Claims. (Cl. 91—46)

The present application is a continuation in part of our copending applications Serial Number 654,188, filed January 30, 1933, and Serial Number 683,986, filed August 7, 1933. Therefore certain subject matter found in those applications is also present in this application together with a number of improvements.

The series of patent applications and corresponding inventions above referred to relates primarily to a method and apparatus for recoating used golf balls. New golf balls rapidly lose their white brilliance in use and take on a dirty gray or non-descript appearance which makes it difficult to distinguish the balls from the area into which they may be driven.

The invention in question includes the concept of providing at the golf links a novel method and automatic means of restoring to used golf balls a recoating or new surface which restores them to the same appearance possessed by a new ball.

The present invention is the first commercially successful embodiment of method and means for recoating used golf balls whereby an old ball may be dropped into the machine of the invention and emerge (after a time interval that may be as short as of the order of ¾ to 2 minutes) with a brilliant, hard, tough, dry coating ready for instant use. The invention appears to blaze a new trail in this particular field.

The problems overcome in successfully reducing the concept to practice are quite different from those connected with the manufacturer of new balls in a factory and the coating thereof.

First the machine and method is one operated by golfers, that is, the public, at golf links and not by skilled workmen in a factory and therefore must be substantially foolproof and automatic. Secondly, it must be rapid and capable of delivering a coated ball in a condition ready for use in a minimum space of time, for example two minutes. This is one of the chief problems. The coating material is a lacquer or varnish containing volatile solvents. In a factory, dipped and coated balls can be set aside to dry. Not so in dealing with the public at a golf links. From the time the ball is delivered to the machine until it emerges therefrom is required to be a matter of a few minutes, the fewer the better, and in this short interval the ball must be thoroughly coated and dried ready for immediate use. Even with the quickest drying lacquers available and suitable for the purpose, the problem exists. It is a problem of method and mechanism, solved by the present invention.

Extremely complicated mechanism and method would defeat its purpose because it would be too expensive to make, maintain and service and would be prone to get out of order. One of the problems has therefore been to devise a principle of operation permitting simple structure and mode of operation. In this connection it has also been necessary to keep the machine compact and small. The relatively large volume or space occupied by a machine that might be satisfactory in a factory would be out of the question.

It is an object of the present invention, and those embodied in our copending applications, above identified, to solve the problems above mentioned. Other objects will appear from the more detailed description appearing below and the accompanying drawings forming a part of the specification.

According to the method forming a part of the present invention, the ball may be submitted to a series of operations as follows. First the ball is immersed in a suitable quick drying lacquer. (This may be a nitro cellulose lacquer including nitro cellulose, solvents and pigments. Since quick drying lacquers are known to the art and since the present invention is not for the lacquer but for the method and apparatus of applying it, the lacquer will not be further described.) Secondly, the ball is raised out of the lacquer in an upward movement. This movement is however interrupted and the ball is held at a predetermined station to permit excess lacquer to drain off. This interruption of the upward movement cooperates with subsequent steps to permit delivering a completely dried ball in a time interval of say two minutes. Thirdly, the upward movement of the ball may be continued to another predetermined station. Here it is slowly inverted, i. e. turned upside down. During the draining operation above mentioned, the lacquer in draining off tends to concentrate at the bottom. The upside-down movement or inversion causes uniform distribution. Fourthly, the ball (with excess lacquer drained off and the coating evenly distributed) is submitted to a drying operation which may comprise a rapid spinning to induce evaporation. Draining, in cooperation with subsequent spinning, substantially reduces the time necessary to produce a dry ball. Spinning alone, of a ball containing excess lacquer on the surface, would eventually produce drying but would extend the time and also cause difficulty by throwing off particles of lacquer by centrifugal action. This is prevented and the time of drying substantially reduced by the draining step herein described. Draining alone would be ineffective. The com-

bination of draining followed by rapid drying by evaporation, e. g. by spinning, is effective in accomplishing one of the objects of the present invention.

The above method and principles illustrated thereby can be carried out in a number of different mechanisms. The accompanying drawings show one of such mechanisms for purposes of illustrating the basic principles and not for purposes of limitation to all the details indicated. The invention will be defined in the claims properly interpreted in the light of the specification and drawings in which:

Figure 1 is a general or assembly elevational view looking in the direction of arrow 1 of Figure 2;

Figure 2 is a general plan view;

Figure 3 is an elevation looking in the direction of arrow 3 of Figure 2;

Figure 4 is a sectional view substantially on the line 4—4 of Figure 2;

Figure 5 is a fragmentary sectional elevational view taken substantially on the line 5—5 of Figure 2;

Figure 6 is a fragmentary view showing the spout on the lacquer container and the cover associated therewith;

Figure 7 is a detail of certain parts of Figure 6;

Figure 8 is a detail view of the coin control mechanism;

Figures 9 and 10 are plan views showing mechanism for effecting certain stages of movement of the ball after it has been dipped and drained;

Figures 11 to 14 illustrate cam means for operating the mechanism shown in Figures 9 and 10; and

Figures 15 to 18 (and Figure 5) show mechanism for cooperating with that shown in the other figures, e. g. with that shown in Figures 9 and 10, for effecting the dipping, draining, inversion and spinning operations referred to as a part of the method.

As set forth in our application Serial Number 683,986, filed August 7, 1933, the invention comprises a conveyor arm having an article supporting portion mounted for movement in a vertical plane, article delivering mechanism having an article delivery opening containing the plane of movement of the conveyor arm, a lacquer container positioned to contain the plane of movement of the conveyor arm, means for operating the conveyor arm between a position in which the article supporting portion is directly beneath the delivery opening of the article delivery mechanism and a position in which the article supporting portion is wholly within the lacquer container, and means for distributing and drying the lacquer on an article comprising a pair of pivotally mounted levers slidably mounted for conjoint movement transversely to the path of movement of the conveyor arm, gripping jaws rotatably mounted on said levers, means for moving the gripping jaws transversely to the path of movement of the conveyor arm, means for causing the jaws to contract and grip an article supported by the conveyor, and means for rotating the gripping jaws in one extreme position of their movement transversely to the path of movement of the conveyor arm.

Thus the subject matter common to this application and Serial Number 683,986 comprises (1) a conveyor arm having an article supporting end portion; (2) article delivery mechanism; (3) a lacquer container; (4) means for operating the conveyor arm; and (5) means for distributing and drying the lacquer, all operatively arranged as above and hereinafter set forth.

These several elements or means may be operated by suitable cams on a central cam shaft 1 actuated by motor 2 through the train of mechanism including pulleys 3 and 4, shaft 5, worm 6, gear 7, pinion 8 and gear 9. Shaft 1 is journalled in bearings 10 and 11 mounted on brackets 12 and 13.

The conveyor arm 14 is actuated by disk 15 through a train of mechanism including the sliding block 16, link 17, rocker arm 18, link 19, crank 20, and shaft 21, the latter being journalled in bearings 21A formed in the upper part of lacquer container 22.

The article delivering mechanism is substantially as set forth in our copending applications Serial Numbers 654,188 and 683,986, and comprises the disk 23 with ball pockets 24. It is likewise operated from central shaft 1 by the cooperation of two cams 25 and 26 and associated mechanism. Cam 25 effects partial movement of disk 23 through mechanism including lever 27, link 28, link 28A, crank 30, link 31, link 32, bar 33 and pawl 34. The other cam 26 completes the movement of the disk (to deliver a ball to the conveyor arm in accordance with the movement of the latter) by a train of mechanism including lever 35, provided with spring 35A, link 36, bar 37 and pawl 38.

The article delivery mechanism including disk 23 is positioned above the lacquer container and is arranged to drop a ball by gravity onto the ball supporting end portion 51 of conveyor arm 14 when it is in the highest position indicated in Figure 4. This position is however also that occupied (at a previous time) by a ball which has been dipped and drained and is ready to be treated to distribute and dry the lacquer. Therefore the mechanism for distributing the lacquer and drying it is so constructed and arranged that it removes a ball (which has been coated and drained) from the ball supporting end portion of the conveyor arm when the latter is in the highest position shown in Figure 4 and moves the coated ball out of the path of a succeeding ball.

The mechanism for accomplishing this may be termed the means for distributing and drying the lacquer and is shown in plan in Figures 9 and 10 and in elevation in Fig. 4. This mechanism is likewise operated from shaft 1 through cam 50, the successive movements of which are shown in Figures 11 to 14.

Thus some of the more important movements are brought about by the cams 25, 26 and 50 and disk 15 secured on central shaft 1.

Coating and drying the ball

On central shaft 1, the disk 15 is provided with lugs 52 and 53 which cooperate with sliding block 16 to cause movement of the conveyor arm 14 with its ball supporting end portion 51 according to a method and by means of mechanism which will now be described. Reference to Figures 4, 5 and 15 to 19 is made to trace the cycle of operation including the dipping, draining and drying of the ball. Rocker arm 18 is pivoted on shaft 54 journalled in bearing 55 supported by bracket 56. The rocker arm 18 is thereby pivoted at a point intermediate the ends thereof, one end being pivotally connected to link 19 which is connected to crank 20, the other end of link 18 being pivotally connected to link 17 which is pivotally mounted on sliding block 16. Block 16, in turn, is slidably mounted for movement in a substan-

tially vertical plane on the lever 57; the latter being provided with a spring 57a. Lever 57 is pivotally mounted on the shaft 58 journalled in the bearing 59 so that lever 57 is adapted to oscillate in a vertical plane. When the disk rotates counter-clockwise, the lugs 52 and 53 respectively engage arcuate shoulder 60 of the sliding block 16 and depress the latter thereby forcing downwardly the link 17 and the end of the rocker arm 18 pivotally secured thereto. This movement forces upwardly the end of the rocker arm pivotally secured to the link 19 and causes an upward movement of the bell crank 20 secured to the shaft 21 mounted within the housing 70 in the upper portion of the lacquer container. Since the fulcrum 54 of the rocker arm 18 is nearer one end than the other, depression of the end connected to link 17 through a given distance causes elevation of the other end through a greater distance determined by the respective radii or arms 18a and 18b. A hub 71 is keyed or otherwise secured to said shaft 21 to rotate therewith. From this hub 71 a radial arm 72 extends at the end of which an arcuate conveyor arm 14 extends having a ball supporting end portion 51 including three supporting prongs 73. Depression of the sliding block 16 therefore causes upward movement of the conveyor arm 14 with its ball supporting end portion 51. The configuration of the shoulder 60 on the sliding block 16 and of the lugs 52 and 53 is such that the latter not only force down the sliding block 16 but also cause it to move to the left and out of engagement with the lugs. When the sliding block is disengaged by the counter-clockwise motion of a lug, the end of the rocker arm 18 connected to the link 19 has a tendency rapidly to move downwardly because, except as hereinafter noted, it would then be free to move downwardly in a vertical plane and the weight of the train of mechanism at the end connected to the link 19 is greater than that of the mechanism at the end connected to the other link 17. Furthermore this tendency is intentionally increased by the presence of a weight 74 (see also Figure 1) hung on the rocker arm 18 at the point indicated by the cord 75 and that tendency is further increased by a spring 76 at the other end of the rocker arm 18. The rocker arm 18 and also the ball conveyor 14 connected thereto are caused to remain in predetermined positions for predetermined time intervals in the following manner. A lever 80 is pivoted on the shaft 81 at the base thereof for oscillation in a substantially vertical plane. It is provided with notches 82 and 83 which cooperate with a pin 84 on the rocker arm 18. Downward motion of the end of the rocker arm 18 connected to the link 17 causes the pin to engage in each of these notches successively. Assume that the lug 52 has forced down the sliding block 16 and thereby caused the pin 84 to engage with the notch 82 as shown in Figure 18. The position of the ball conveyor arm 14 and the ball is then shown as indicated by numeral 88 in Figure 5 and in that position the ball is adapted to drain off excess lacquer, it being assumed that the ball has previously been dipped and raised into that position. The height to which the ball conveyor end portion 51 is raised is determined by the lengths of the respective arms or radii 18a and 18b on rocker arm 18 and the arc through which lug 52 forces the end of the rocker arm connected to link 17. The ball then remains in the position mentioned for a predetermined interval of time determined by the angular distance between the lug 52 and the lug 53 and the speed of rotation of the shaft 1 which may be about one revolution in 45 seconds.

When the lug 53 engages the sliding block 16 the latter is again forced down by means of the link 17 and the pin 84 is then engaged with the second or lower notch 83 on the lever 80. Figure 15 shows the position of the sliding block 16 just after the lug 53 has engaged the latter and thereby forced the pin 84 into the second or lower notch 83. This moves the ball conveyor arm with its ball supporting end portion 51 and the ball up into the highest position 89 shown in dot and dash lines in Figure 4. It remains in this position long enough to have the coated ball removed from the prongs 73 by the distributing and drying mechanism and to permit a succeeding ball to drop onto the prongs 73 from the article delivery mechanism including the rotatably mounted disk 23 and the subjacent ball delivery chute 90 (see Figure 5). The length of time referred to is determined by the arrangement and configuration of the cam 91 which, as shown in Figure 16, engages the cam follower 92 on the lever 80, forces the lever 80 against the tension of the spring 93 connected to the pin 94 on the bracket 56 and thereby releases the pin 84 from engagement with the lower notch 83 on said lever. Figure 17 shows the position of the sliding block 16, lever 80, and rocker arm 18 just after the pin 84 has been released by the action of the cam 91. The rocker arm 18 is then, under the conjoint action of the weight 74 and the spring 76, caused to move rapidly downward in the direction of the arrow 95 shown in Fig. 5 (near the cord 75 from which the weight 74 is suspended). This rapid downward movement causes the ball conveyor arm end portion 51 with the ball thereon to be rapidly immersed in the lacquer as shown in Figure 4, the height of the lacquer surface being indicated by numeral 98. The time of immersion is again determined by the angular distance between the lugs 52 and 53 and the speed of rotation of the shaft 1, since rotation of the disk 15 and the lug 52 brings that lug into engagement with the sliding block 16, depresses the latter, elevates the conveyor arm 14 and thereby causes the pin 84 to become engaged with the notch 82. Thereupon the ball is raised out of the lacquer into a position where excess lacquer drains off as shown in Figures 4, 5 and 18.

The lugs 52 and 53 on disk 15 thus provide a pair of elements angularly spaced in respect to each other about the common axis 1, these elements being mounted to rotate counterclockwise in a vertical plane and being adapted to successively engage the sliding block 16 to successively depress the corresponding portion of rocker arm 18 and thus successively raise the ball conveyor end portion 51 of conveyor arm 14 into its respective positions. As shown in the drawings, the lugs 52 and 53 are spaced radially as well as angularly, the radius of 53 being longer than that of 52. Thus lug 53 travels through a wider arc (for a given angular rotation) than lug 52.

The overhanging arm 61 serves to prevent the sliding block 16 from falling too far to the right. The end of this arm rides on the edge of disk 15 and keeps the block 16 at a position to engage the lugs 52 and 53. The arm 61 also helps in disengaging the lug 53 by riding over the high portion 62 of disk 15.

A stop or brake is provided to prevent too rapid descent of the conveyor arm 14 and to prevent the end portion 51 from falling too far into the

lacquer. For this purpose a link 220 carries a plunger 221 (see Figure 1) adapted to reciprocate in a dash pot 222. At the bottom thereof is an orifice in a flange 223 cooperating with a ball 224 carried on a spring 225 adjustable by means of screw 226. The extent to which the plunger 221 falls is controlled by the tension of the ball 224 against the orifice of the flange 223 and this is controlled by the screw 226.

Figure 4 clearly shows the three substantially vertically spaced positions occupied by the ball. The lowest position 99 is that where the ball is immersed, the highest 89 is that where the coated ball is removed from the prongs 73 and a fresh ball delivered thereto. The intermediate position 88 is that where the upward movement of the coated ball is interrupted for a predetermined length of time to permit draining off of excess lacquer. In the operation just described all the successive movements of the ball are caused by the disk 15 and its associated lugs.

It will be noted that the shaft 21 carrying the hub 71 and radial arm 72 is mounted above the surface of the lacquer, the only communication of the lacquer with the atmosphere being through the arcuate spout 110 provided with the cover 111. This is a peculiar structure but it provides a substantially up and down movement of the ball in a vertical plane on the ball conveyor end portion 51 even though the point of application of the force for the movement is at the shaft 21 mounted above the surface of the lacquer. This construction eliminates the necessity of having any moving part extending through the wall of the lacquer container below the surface of the lacquer and thus prevents trouble due to leakage and evaporation of lacquer and fouling or gumming of bearings. The cover 111 is arranged to operate, that is to open and close, in consonance with the movement of the ball conveyor arm 14, the opening of the cover being only for a short interval of time to permit the coated ball to be raised into the highest position 89 shown in Figure 4 where it is removed, a succeeding ball to be delivered to the prongs 73 on the conveyor arm 14 and to permit the latter to rapidly descend for purposes of immersing the ball in the lacquer. Thus evaporation of the lacquer is minimized. Furthermore, as already stated, the particular construction of the ball conveyor arm 14 and radial arm 72 and their mounting provide that the former operate entirely within the lacquer container 22. Therefore, even though the parts thereof may become entirely coated with lacquer, there is substantially no evaporation with its consequent accumulation of heavy, gummy deposits. The arcuate arm 14 and the radial arm 72 move in a vertical plane contained in the lacquer container 22. This plane is midway between the sides 112 and 113 of the lacquer container and said plane is also contained in the ball delivery opening of the ball delivering mechanism including disk 23 and chute 90 in the same manner as set forth in application Serial Number 683,986. It is necessary to prevent sedimentation of the solids contained in the lacquer and for that purpose an agitator is provided to stir up the contents of the lacquer container 22. This will be more fully hereinafter described.

Reference to Figures 6, 8 and 10 show how the cover for the arcuate spout 110 of the lacquer container is operated in consonance with the ball conveyor 51. The cover (see Figures 6, 7, 9, 10) comprises a circular portion 114 and an extending arm 115 which is pivoted intermediate the ends thereof on the pin 116 supported by the bracket 117. One end contains a slot cooperating with a pin 118 on a horizontal bar 119 pivotally secured at one end thereof to the lever 120 provided with spring 120a which lever in turn is pivotally mounted at the base thereof by means of the pin 121 for oscillation in a substantially vertical plane. Oscillation is caused by the cam 122 secured on main shaft 1, in cooperation with cam follower 130. Reciprocation of the bar 119 causes oscillation of the cover in consonance with the movement of the ball conveyor 14, the ball delivery mechanism and the mechanism for distributing and drying the lacquer, this consonance being brought about by disk 15 and cams 25, 26 and 50 and associated mechanism.

Figure 7 shows a detail of the cover. It comprises the portion 114 and a lower portion 140 held in spaced relation thereto by springs 141 mounted on screws 142. Thus the part 140 is pressed against the orifice of the lacquer container and evaporation guarded against.

Thus, as in copending application, Serial Number 654,188, the invention comprises a combination of a lacquer container, a movable cover for the lacquer container, a conveyor arm for supporting the article to be lacquered, means for delivering an article onto the conveyor, means for moving the conveyor substantially vertically in a plane containing the lacquer container to immerse the article in the lacquer and remove the article from the lacquer, means for moving the cover of the lacquer container, to open the lacquer container, and means for coordinating the lacquer container cover moving means and the means for effecting relative vertical movement between the conveyor and the lacquer container.

Distribution and drying of lacquer

The invention includes the operation of mechanism which provides for the removal of the ball from the conveyor 51 and distribution and drying of the lacquer so as to provide a perfectly dry ball ready for use. The mechanism involved has been described in our copending application, Serial Number 683,986 and the description thereof and of the method aspects of the invention will be described together with the improvements of the present application.

Reference should be had more especially to Figures 1, 4, and 9 to 14 inclusive. One of the more important elements of this mechanism is the cam 50 shown clearly and in various positions in Figures 11 to 14. Cam 50 is mounted on central shaft 1 and cooperates with the lever 150 rotatably mounted on the shaft 151 at the base thereof for oscillation in a substantially vertical plane. The lever 150 is provided with a cam follower 177. One end of the lever 150 is pivotally secured to a bifurcated member 153 by means of a link 154 and pin 155. A pair of levers 156 are pivotally mounted by means of pins 160 for oscillation in a horizontal plane. These levers 156 are pivotally secured at one end to respective links 161 which in turn are secured at their respective ends to the bifurcated member 153. The levers 156 are pivotally mounted by means of said pins 160 upon a plate 162 which is in turn slidably mounted in grooves to slide on a bed plate 163 for reciprocating movement in a horizontal plane. The bed plate 163 is a transverse partition supported by vertical standards or brackets 163a and 163b. A guide 164 keeps the bifurcated member properly centered. The guide

slides in a hole in the strap 165. The end of the levers 156 opposite the bifurcated member 153 are provided with bearings 170 carrying rotatably mounted shafts 171 and 172. One end of each shaft carries a disk 173 provided with prongs 174. The shaft 171 carries a bushing 175 and a pulley 187 for purposes to be presently described. Thus the links 161 and levers 156 with their associated parts provide a pair of toggle joint jaws which open and close in a manner determined by the movement of the lever 150, cam follower 177, and cam 50. It will be noted that the levers 156 have a movement which may simultaneously be one of translation and oscillation in a horizontal plane said plane being positioned intermediate between the ball delivery mechanism (including the rotatably mounted disk 23 and delivery chute 90) and the opening of the spout 110 of the lacquer container 22 with its cover. The movement of the jaws or levers 156 and the coordination of this movement with that of the ball conveyor 51, the cover and the ball delivery mechanism may be readily followed by reference to Figures 1, 9, 10 and 11 to 14 inclusive, as well as Figures 4 and 5. Figure 4 shows the position of the ball at its highest point 89 after it has been dipped and permitted to drain. At this point the jaws or prongs 174 grip the ball and the position of the cam 50 for this purpose is illustrated in Figure 11. The next movement of the cam 50 causes the cam follower 177 to ride over the portion 180 and the ball moves to the right as shown in Figure 12, thereby accomplishing two objects. In the first place, the coated ball is removed out of the path through which a succeeding ball must drop, the succeeding ball being shown in position 181 by dot-dash lines in Figure 12. Attention is directed to the reentrant portion 182 providing a space through which a succeeding ball can drop from the ball delivery mechanism including the chute 90, onto the prongs 73 as shown in Figure 12. In the second place, during this transverse movement of the coated ball to the right, it is subjected to an inverting operation, that is it is turned upside down. The purpose of this is to cause distribution of the lacquer which, during the draining operation, tended to collect at the bottom of the ball. When the ball is turned upside down, the portion which was the bottom during the draining operation becomes the top and any accumulation of lacquer flows down and distributes itself over the surface of the ball. This inversion or upside down movement of the ball is caused by engagement between the hub or bushing 175 and a raised portion 183 on the bar or rail 184 secured to the upright by screws as shown more specifically in Figure 1. After the inversion is completed the ball remains stationary for a few seconds. The next movement of the ball to the right is caused by the cam follower riding over the portion 185 of the cam 50 which brings the cam follower 177 into engagement with the concentric portion 186 of said cam 50 thus stopping translatory movement. This further movement of the ball to the right brings the pulley 187 into engagement with the wheel 188 and causes the pulley 187 to be rapidly rotated in order to bring about rapid drying. Figure 13 shows the cam follower 177 in engagement with the circular portion 186 of the cam 50 and the pulley 187 in engagement with the periphery of the wheel 188. The wheel 188 carries a pulley 189 connected by a belt 190 to the pinion 191 rotated by the worm gear 192 secured on shaft 5 which in turn is journalled in bearings 193 carried by brackets secured to the partition 195. So far as translatory motion is concerned, the ball remains in a stationary position and is rapidly rotated during the time the cam follower 177 is engaged with the concentric portion 186 of the cam 50 as shown in Figure 13. Thereafter the cam follower 177 rides over the portion 196 of the cam 50 and the ball undergoes a slight further movement to the right which brings the ball slightly beyond, that is slightly to the right of, the position where it is dropped. Immediately thereafter the cam follower 177 rides over the portion 197 of the cam 50 and a rapid movement of the levers to the left accompanied by opening of the jaws follows whereupon the ball, dried and ready for use drops upon the runway 198 as shown in Figures 1, 2 and 3 exactly in the middle of that runway. The runway 198 is an inclined track and delivers the ball to the pocket 241. Just before the ball reaches the position shown in Figure 14, the hub 175 rides up on the raised portion 199 of the bar 184 which thus acts as a brake and stops the spinning so that the ball is no longer spinning as it drops on the runway 198.

In combination with the spinning, drying may be further hastened by directing a stream of air on the ball as set forth in our copending applications above identified.

The wheel 188 for spinning the ball to dry it is mounted on a shaft 200 carrying a pulley 201 connected by a belt 202 to a pulley 203 mounted on a shaft 204 journalled in a bearing 205. Rotation of the wheel 203, the crank 206, and the link 207 causes oscillation of the crank 208 which in turn oscillates the shaft 204*a* which carries the paddles 211, the oscillation of which during the operation of the machine keeps the lacquer agitated and prevents sedimentation.

The lacquer contains highly volatile solvents and carries pigments suspended therein. It is necessary not only to keep the solids uniformly suspended but also to preserve the proper viscosity of lacquer by maintaining a proper proportion of solvents. Two cooperating things are necessary to accomplish the above results. (1) Proper concentration of solvents is maintained by the construction of the lacquer container, the only opening being the end of spout 110 closed by its cover, and (2) uniform suspension of pigments is maintained by operation of the paddles 211.

Delivery of the ball prior to dipping, draining and drying

The mechanism for accomplishing this operation in consonance with the steps of dipping and draining the ball and distributing and drying the lacquer thereon are substantially as set forth in our copending applications, Serial Number 683,986, filed August 7, 1933 and Serial Number 654,188, filed January 30, 1933. As set forth in application Serial Number 654,188, the mechanism includes the combination comprising means for coating an article with a lacquer, including a conveyor for the articles to be lacquered, means for delivering articles to said lacquering means, including a delivery chute for dropping articles dispensed by the delivery means onto the conveyor of the lacquering means, and control means for said delivery means including several control elements, each operative to effect partial operation of the delivery means, means for effecting successive operation of said control elements, and

means for actuating one of said control elements in accordance with the operation of the article conveyor.

The article delivery means includes the rotatably mounted disk 23 and the delivery chute 90 shown in several figures including Figures 1, 2, 3, 4 and 5. The disk 23 is rotatably mounted by means of a pin or shaft 230 on the plate 163c supported on brackets or standards 163a and 163b, and carries six circular holes 24 extending therethrough, the angular distance between the centers of successive holes being sixty degrees. The plate 163c contains a single aperture, the diameter of which is the same as the diameter of an aperture in the disk 23 and before a ball can pass into the chute 90 an aperture 24 in the block or disk 23 must be brought into register with said aperture through the plate 163c. Movement of the disk is counter-clockwise and is effected in two successive stages, each of which causes the disk 23 to rotate through an angle of 30°. Delivery of a ball to the machine occurs through the hopper 231 the opening of which on the interior of the casing, is in register with a hole 24A in the disk 23 the center of which is out of register with the center of the said hole in the plate 163c (and also the center of the chute 90) by an angle of 60°. Movement of the disk 23 through an angle of 30° is caused by translatory movement of the bar 33 carrying the pawl 34 and the leaf spring 39. The bar 37 carrying the pawl 38 and leaf spring 40 then moves the disk 23 through the remaining 30° whereupon the center of the ball pocket 24 registers with the opening through the plate 163c and the ball drops onto the prongs 73 as shown in Figure 12. The disk 23 is therefore moved through successive operation of the control elements including the bars 33 and 37, the operation of which will now be described. Operation of the bar 33 is effected through counter-clockwise rotation of the cam 25 in association with a train of mechanism including the lever 27 mounted pivotally at its base, links 28 and 28A, crank 30, link 31 and bracket 32. When the cam follower 27A rides over the high portion of the cam 25, links 28 and 28A are moved to the left thereby oscillating the crank 30 which in turn pulls the link 31, bracket 32 and bar 33 to the right a distance sufficient to rotate the disk 23 through an angle of 30°. The ratchets 41 on the disk 23 are so arranged that this movement brings the pawl 38 into engagement with the ratchet 41A and movement of the pawl 38 on the bar 37 causes the disk 23 to be rotated through the remaining 30° sufficient to bring the ball pocket into register with the opening through the plate 163c to cause the ball to drop into the chute 90. Movement of the bar 37 is effected by a train of mechanism (see Figure 4) including the bracket 42, link 36, lever 35, cam follower 43, and cam 26, the lever 35 being provided with spring 35A and being pivotally mounted at its base by means of pin 44 for oscillation in a substantially vertical plane. Figure 3 shows cam 25 about to move the lever 27 to the left. Figure 4 shows cam 26 with the high portion disposed angularly with respect to the high portion of cam 25 so that movement of lever 35 will follow movement of lever 27 to cause successive movements of disc 23 through successive angles of 30° each.

Operation of the ball delivery disk, magazine, or turret 23 is coordinated with movement of the conveyor 14 so that a ball is dropped onto the prongs 73 when the ball conveying end portion 51 carrying prongs 73 is in the highest position 89 shown in Figure 4. This coordination includes the arrangement of cams 25 and 26 and disk 15 with its lugs.

Thus, as described in our copending applications the article delivery means includes a rotatably mounted disk having an opening therethrough adapted to receive an article to be lacquered, a plate subjacent thereto having an article receiving opening therethrough and a superlying hopper having an article delivery opening angularly spaced about the disk in respect to the receiving opening in the plate, and operating means for the disk comprising a pair of elements, means for actuating one of the elements to rotate the disk from a point in which the opening therethrough registers with the delivery opening in the hopper to a point intermediate the delivery opening of the hopper and the opening through said subjacent plate, means for actuating the other element to move the disk to a position in which the opening therethrough registers with the opening through the subjacent plate, and means for coordinating the action of said last mentioned element with the operation of the lacquering means.

The sequence of operations may be illustrated as follows, reference being had to the several figures, more particularly Figures 2, 4, 5, 11 to 14 and 15 to 18. Let it be assumed that the ball is in the pocket 24A and the ball conveyor end portion 51 is in the intermediate position shown in full lines in Figure 4. The pin 84 is then in engagement with the notch 82 (see Figures 5 and 18). Operation of the machine then results in advancement of the ball through two successive angles of 30° each to a position where the ball pocket 24A is immediately above the opening in the plate 163c registering with the chute 90. This operation may require a time interval of the order of ten seconds. In the meantime the ball conveyor end portion 51 is raised to the position 240 (see Figure 4) by means of lug 53 on disk 15 which has advanced from the position shown in Figure 18 to that shown in Figure 15, and by depressing the sliding block 16, has moved conveyor arm 18 into a position where pin 84 engages notch 83. The ball conveyor end portion, then in the position indicated by the number 240 in Figure 4, receives the ball as it drops. The end portion 240 carrying the ball then rapidly descends by the action of the weight 74 and the spring 76 (see Figures 1 and 5 respectively) acting on the conveyor arm 18, the lever 80 having been released by the action of the cam 91. Figures 16 and 17 show the lever 80 being released or tripped. Rapid descent of the ball into the lacquer for dipping is controlled by the link 220 (see Figure 5) carrying the plunger 221 (see Figure 1) which operates in dash pot 222. The ball descends to the position 99 shown in Figure 4. In the meantime lug 52 on disk 15 (see Figure 17) has advanced to where it again engages sliding block 16 depressing the latter and forcing pin 84 into notch 82 thereby raising ball conveyor end portion 51 into the intermediate position shown in full lines in Figure 4. The ball remains in that position to drain off excess lacquer until the lug 53 advances from the position shown in Figure 18 to that shown in Figure 15 whereupon the ball is raised to the position 89 shown in dot-dash lines in Figure 4 at which time the pin 84 is in engagement with the notch 83. The ball conveyor end portion 51 remains in the position indicated by the numeral 240 in Figure 4 until

the cam 91 trips the lever 80. During that period two operations occur, first the ball is moved from the position 89 shown in Figures 4 and 11 to the position 77 shown in Figure 12 (during which movement it is inverted). Secondly, another ball pocket has advanced to register with the opening in the chute 90 and a ball falls upon the prongs 73. The latter then rapidly descends into the lacquer and the operation is repeated as long as the machine operates and as long as balls are delivered thereto.

The time it takes the ball conveyor end portion 51 to pass from the position indicated by the numeral 240 in Figure 4, down into the lacquer and back again into the same position may be of the order of forty-five seconds. The time elapsed from the delivery of the ball to the hopper 231 until it emerges into the receiver 241 at the end of the runway 198, may be regulated and at the present time the practice is to fix this period at about two minutes. The ball is thoroughly dry and free from tackiness when it is delivered into the receiver 241. It is substantially dry when it is dropped from the prongs 174 onto the runway 198. Some further drying may occur as the ball rolls down the inclined runway. The following periods of time may be noted as examples of the exceedingly rapid action of the machine with a speed of rotation of main shaft 1 of one revolution per 45 seconds: advancement of a ball from hopper 231 to chute 90, 10 seconds; dipping and draining, 45 seconds; inversion and spinning, 45 seconds, total, 1 minute and 40 seconds. When a succession of balls is delivered to the machine, a coated ball is dispensed every 45 seconds.

The starting and stopping of the machine may be automatically controlled by a coin control mechanism so that one, two, or more balls may be coated by the delivery of a coin, for example, a nickel, to the machine. This control mechanism will now be described, reference being had more especially to Figures 1, 3 and 8 for this purpose. When a suitable coin, for example, a nickel, is dropped into the slot 250, it trips a lever 251 pivoted on spindle 251*b* thereby closing an electric circuit in series with the motor 2 by means of contacts 252 and 253, the latter being supported on the arm 254 extending from the lever 251. The coin 255 comes to rest against the lower edge 256 of a groove in the bracket 257 (see Figures 3 and 8). In this groove there is slidably mounted a bar 258 pivotally connected to the link 28. Movement of the link 28 to the left causes a slight movement of the bar 258 and this movement causes the coin 255 to drop through the chute 259 into the coin receptacle 260. A pin 261 on the bar 258 is connected to the link 28A which is pivotally connected at the other end to the link 30 for actuating the bar 33 and the ball mechanism 23. Operation of the machine continues until the contacts 252 and 253 are again broken. Figure 8 shows the position of the coin control mechanism just after the circuit has been closed. The circuit continues to be closed until the pin 262 on the wheel 263 rotatably mounted on shaft 263*a* comes into engagement with the end 264 of the lever 265 carrying at one end a pin 266 which supports the lever 251. Engagement of the pin 262 with the end 264 of the lever 265 moves the upper end carrying the pin 266 to the right a distance sufficient to release the lever 251 which then moves downwardly by means of spring 251*a*, thus breaking the electrical circuit by causing a separation of the contacts 252 and 253. The lever 265 is pivotally mounted on a bracket 267 by means of spindle 268. Movement of the wheel 263 is caused by cam 270 carried on the main shaft 1 operating in cooperation with cam follower 271, carried on the link or fork 272 provided with spring 273. The lever or fork 272 is pivotally connected to a crank 274 carrying a pawl 275 which engages with ratchet wheel 276. Rotation of the cam 270 causes successive advancement of the wheel 263 to which the ratchet 276 is secured and when this advancement is sufficient to bring a pin on the wheel 263 into engagement with the end 264 of the lever 265, the circuit is broken as above explained and the machine stops operation. There may be one or more pins 262 on the wheel 263 spaced apart and at distances such that the machine will come to rest when one or more balls have been delivered to the machine and coated for a single coin. Lacquer container 22 is provided with a filling opening having a closure 300 preferably carrying a safety blow-off valve therein.

A general assembly view of the machine is shown in Figure 1 which shows most of the parts thereof being supported upon a transverse partition 195 in a casing 280. The latter may be provided with windows 281 so that the operation of the machine may be viewed by those using it.

The preferred embodiments of the method and apparatus of the invention have herein been described in detail but the invention will be defined by the claims and the scope thereof is intended to be as broad as permitted by the prior art.

We claim:

1. The method of recoating used golf balls which comprises immersing the ball beneath the surface of a pool of coating liquid, raising the ball to a predetermined position above said surface, maintaining the ball at that position a predetermined period of time to permit draining off of excess coating liquid whereby liquid accumulates near the bottom of the ball, inverting the ball to cause even distribution of liquid thereon and thereafter rapidly rotating the ball to cause drying of the coating thereon.

2. In a machine for recoating used golf balls by a dipping operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; and means to interrupt the movement of said end portion through said path and to maintain said end portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball.

3. In a machine for recoating used golf balls by a dipping operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; and means to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined

period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; the said means to move the ball-conveying end portion into the said respective positions comprising a pair of elements angularly spaced about a common axis and mounted to rotate in a vertical plane, a rocker arm pivotally mounted at a point intermediate the ends thereof for oscillation in a vertical plane, means connecting one end of the rocker arm to the conveyor arm, and means at the other end of the rocker arm to successively engage said pair of angularly spaced elements.

4. In a machine for recoating used golf balls by a dipping operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; means to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; and means to return said conveyor arm end portion from said third position to said first position the said several means comprising a rocker arm pivotally mounted at a point intermediate the ends thereof for oscillation in a vertical plane, a substantially vertical lever having vertically spaced notches, means connecting one end of the rocker arm to the conveyor arm, means to engage the other end of the rocker arm successively with a respective notch on the vertical lever to hold the rocker arm and ball conveyor arm in said respective third and second positions for predetermined intervals, and means to release the rocker arm from engagement with said vertical lever to return said ball conveyor end portion from said second position to said first position.

5. In a machine for recoating used golf balls by a dipping operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; means to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and second positions to permit draining of lacquer from said ball; and means to invert said ball to cause distribution of coating liquid thereon.

6. In a machine for recoating used golf balls by a dipping operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined first path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; means to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; means to move the ball from said third position to a fourth position through a predetermined second path transverse to said first path; and means to invert the ball while moving through said second path to cause distribution of coating liquid.

7. In a machine for recoating used golf balls by a dipping operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined first path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; means to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; means to move the ball from said third position to a fourth position through a predetermined second path transverse to said first path; means to invert the ball while moving through said second path to cause distribution of coating liquid; and means to rotate said ball rapidly to cause drying of the coating liquid thereon.

8. In a machine for recoating used golf balls by a dipping operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined first path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; means to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; means to move the ball from said third position to a fourth position through a predetermined second path transverse to said first path; means to invert the ball while moving through said second path to cause distribution of coating liquid; and means to rotate said ball rapidly to cause drying of the coating liquid thereon; said means to invert and rotate the ball comprising a pair of levers slidably mounted for combined translatory and oscillatory movement in a horizontal plane transverse to the plane of movement of the conveyor arm the oscillatory movement of the levers being in opposite angular directions, pulleys mounted to freely rotate on adjacent ends of the oscillatory levers, ball gripping prongs on each pulley, a bushing on one pulley, a bar to engage said bushing to cause an inversion of said pulley and ball to distribute lacquer thereon, and means to rapidly rotate said pulley and ball to dry the lacquer thereon.

9. The method of recoating used golf balls by employing a liquid containing a volatile solvent which comprises immersing the ball beneath the surface of a pool of said liquid, raising the ball in an upward movement substantially in a vertical plane to a predetermined position above said surface, interrupting said upward movement and maintaining said ball in said position for a pre-

determined period of time to permit draining off of excess liquid whereby liquid not only drains off said ball but also accumulates at the bottom thereof, inverting said ball to cause the liquid accumulated at the bottom thereof to flow down and cause uniform distribution of liquid on said ball, and thereafter rapidly rotating said ball to cause drying of the coating thereon by evaporation of said volatile solvent.

10. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion mounted for movement in a vertical plane; ball delivering mechanism having a ball delivering opening containing the plane of movement of the conveyor arm; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and directly beneath the delivery opening of the ball delivery mechanism and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball and to return said conveyor arm end portion from said third position to said first position, the said means comprising a rocker lever pivotally mounted at a point intermediate the ends and nearer one end than the other thereof for oscillation in a vertical plane and having a long arm and a short arm, a substantially vertical lever having vertically spaced notches, means connecting the long arm of the rocker lever to the conveyor arm, means to engage the short arm of the rocker lever successively with a respective notch on the said vertical lever to hold the rocker lever and ball conveyor arm in said respective second and third positions for predetermined intervals, and means to release the rocker arm from engagement with said vertical lever to return said ball conveyor end portion from said third position to said first position.

11. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; ball delivering mechanism having a ball delivering opening; a conveyor arm having a ball supporting end portion for receiving the ball from the ball delivering mechanism at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and directly beneath the delivery opening of the ball delivering mechanism and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; the said means to move the ball conveying end portion into the said respective positions comprising a pair of elements angularly spaced about a common axis and mounted to rotate in a vertical plane, a rocker lever pivotally mounted at a point intermediate the ends thereof for oscillation in a vertical plane, means connecting one end of the rocker lever to the conveyor arm, and means at the other end of the rocker arm to successively engage said pair of angularly spaced elements.

12. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion mounted for movement in a vertical plane; ball delivering mechanism having a ball delivering opening containing the plane of movement of the conveyor arm; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and directly beneath the delivery opening of the ball delivery mechanism and to interrupt the movement of said end portion through said path and to maintain said end portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball.

13. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; ball delivery mechanism having a ball delivering opening; a conveyor arm having a ball supporting end portion for receiving the ball from the ball delivering mechanism at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the dipping operation; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and directly beneath the delivery opening of the ball delivering mechanism and to interrupt the movement of said end portion through said path and to maintain said end portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball.

14. In a machine for recoating used golf balls by a dipping and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; ball delivery mechanism having a ball delivering opening; a conveyor arm having a ball supporting end portion for receiving the ball from the ball delivering mechanism at a predetermined position in respect to said conveyor; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and directly beneath the delivery opening of the ball delivering mechanism while maintaining the ball at said predetermined position in respect to said conveyor and to interrupt the upward movement of said end portion through said path and to maintain said end portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball prior to drying the same.

15. In a machine for recoating used golf balls,

ball delivering mechanism having a ball delivering opening the center of said opening lying in a vertical plane; a lacquer container located subjacent to said ball delivering mechanism and having an opening containing said plane; means to drop a ball from said ball delivering mechanism into said lacquer container through a vertical path identified by a vertical line lying within said vertical plane; and means to raise said ball out of said container through the said vertical path.

16. In a machine for recoating used golf balls by a dipping and drying operation ball delivering mechanism having a ball delivering opening the center of said opening lying in a vertical plane; a lacquer container located subjacent to said ball delivering mechanism and having an opening containing said plane; means to successively drop a ball from said ball delivering mechanism into said lacquer container through a vertical path identified by a vertical line lying within said plane; means to raise said ball out of said container through the said vertical path; and means to remove the ball from said path to permit a succeeding ball to drop through the same path.

17. In a machine for recoating used golf balls a lacquer container having an opening the center of which opening lies in a vertical plane; ball delivering mechanism comprising a circular rotatably mounted magazine having a series of circumferentially spaced ball delivering openings therein; means to successively advance an opening until the center thereof lies in the said vertical plane contained within the opening in the lacquer container; means to successively drop a ball from an opening of said ball delivering mechanism into said lacquer container through a vertical path identified by a vertical line lying within the said plane; ball-raising means to raise said ball out of said container through the said vertical path; ball removing means to remove that ball from said path to permit a succeeding ball to drop from the ball delivering mechanism through the same path; and means to cause said ball-raising, ball-removing and ball-delivering means to act in consonance.

18. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; and means to return said conveyor arm end portion from said third position to said first position the said several means comprising a rocker lever pivotally mounted at a point intermediate the ends and nearer one end than the other thereof for oscillation in a vertical plane and having a long lever arm and a short lever arm, means connecting the long arm of the rocker lever to the ball conveyor to raise the conveyor end portion upon elevation of the said long arm, a pair of elements rotatably mounted and angularly spaced for engagement at predetermined times with the short arm of the rocker lever to depress the same and to elevate the said long arm and thereby successively move said conveyor end portion into said second and third positions, means cooperating with said rotatably mounted elements to lock said short lever arm and thereby to hold said long arm and conveyor in said second and third positions for predetermined intervals, and means to release said short lever arm to return said ball conveyor end portion from said third position to said first position.

19. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; and means to return said conveyor arm end portion from said third position to said first position the said several means comprising a rocker lever pivotally mounted at a point intermediate the ends and nearer one end than the other thereof for oscillation in a vertical plane and having a long lever arm and a short lever arm, means connecting the long arm of the rocker lever to the ball conveyor to raise the conveyor end portion upon elevation of the said long arm, a pair of elements rotatably mounted and angularly spaced for engagement at predetermined times with the short arm of the rocker lever to depress the same and to elevate the said long arm and thereby successively move said conveyor end portion into said second and third positions, means cooperating with said rotatably mounted elements to lock said short lever arm and thereby to hold said long arm and conveyor in said second and third positions comprising a pivotally mounted vertical lever having means to successively engage said short lever arm, and means to release said short lever arm to return said ball conveyor end portion from said third position to said first position.

20. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; and means to return said conveyor arm end portion from said third position to said first position, the said several means comprising a rocker lever pivotally mounted at a point intermediate the ends and nearer one end than the other thereof for oscillation in a vertical plane and having a long lever arm and a short lever arm, means connecting the long arm of the rocker lever to the ball conveyor to raise the conveyor end portion upon elc-

vation of the said long arm, a pair of elements rotatably mounted and angularly spaced for engagement at predetermined times with the short arm of the rocker lever to depress the same and to elevate the said long arm and thereby successively move said conveyor end portion into said second and third positions, means cooperating with said rotatably mounted elements to lock said short lever arm and thereby to hold said long arm and conveyor in said second and third positions comprising a pivotally mounted vertical lever having means to successively engage said short lever arm, and means to release said short lever arm to return said ball conveyor end portion from said third position to said first position comprising an element rotatably mounted to move said vertical lever out of engagement with said short lever arm after movement of said conveyor end portion into said third position.

21. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination substantially as shown of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion and a ball carried thereby through a predetermined first path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; means to remove the ball from said conveyor end portion in said third position to a fourth position through a predetermined second path transverse to said first path; means to invert the ball while moving through said second path to cause distribution of coating liquid; means to deliver another ball to said conveyor end portion; and means to cause said several means to act in consonance to dip and drain the ball prior to drying thereof.

22. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion and a ball carried thereby through a predetermined first path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface; means to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; means to move the ball from said third position to a fourth position through a predetermined second path transverse to said first path comprising a pair of pivotally mounted levers slidably mounted for conjoint movement in said transverse path; and means to invert the ball while moving through said second path to cause distribution of coating liquid.

23. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion and a ball carried thereby through a predetermined first path in a vertical plane from a first station where it is beneath the surface of the lacquer in the container to a third station where it is above said surface and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second station above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; means to remove the ball from said conveyor end portion in said third station to a fourth station, where it is dried, through a predetermined second path transverse to said first path; and means to invert the ball while moving through said second path to cause distribution of coating liquid prior to drying.

24. In a machine for recoating used golf balls by a dipping, draining and drying operation the combination of a container adapted to hold coating liquid to a predetermined depth therein; a conveyor arm having a ball supporting end portion; means to move said end portion through a predetermined first path in a vertical plane from a first position where it is beneath the surface of the lacquer in the container to a third position where it is above said surface and to interrupt the movement of said end portion through said path and to maintain said portion for a predetermined period of time at a second position above said surface and intermediate the above mentioned first and third positions to permit draining of lacquer from said ball; means to move the ball from said third position to a fourth position through a predetermined second path transverse to said first path; means to invert the ball while moving through said second path to cause distribution of coating liquid; and means to rotate said ball rapidly while at said fourth position to cause drying of the coating liquid thereon; and means to cause said several means to act in consonance to dip, drain and dry a ball; the said several means comprising a main shaft, a rocker lever pivotally mounted at a point intermediate the ends thereof and nearer one end than the other and having a long arm and a short arm the long arm being connected to said conveyor arm, a pair of elements angularly disposed about the axis of said shaft, means to successively engage said elements with the short arm of said rocker arm to actuate said conveyor, a pair of pivotally mounted levers slidably mounted for conjoint movement through the above mentioned transverse path, a cam on said main shaft to operate said levers in consonance with the movement of said angularly disposed elements and conveyor arm, gripping jaws rotatably mounted on said levers, a pulley mounted on said gripping jaws and operatively arranged to rotate said jaws in one extreme position of their transverse movement, a secondary shaft operatively connected to said main shaft, a pulley on said secondary shaft, and means to operate said main shaft, cam and angularly disposed elements to move a ball through the above mentioned paths to dip and drain the ball and to bring the pulley mounted on the gripping jaws in contact with the pulley mounted on said secondary shaft to rotate the ball rapidly, subsequent to the draining operation, to dry the ball.

25. In a machine for coating golf balls by a dipping operation, ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said conveyor being located in spaced relation to the ball delivering

mechanism, said ball delivering mechanism including means for delivering the ball to the conveyor by gravity, said conveyor including means for receiving the ball from the ball delivering mechanism at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation, and means for effecting movement of the conveyor and the ball in a vertical plane contained in the lacquer container to dip the ball on the conveyor into the lacquer in the container.

26. In a machine for recoating used golf balls by a dipping operation, ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said conveyor being located in spaced relation to the ball delivering mechanism, said mechanism including means for dropping the ball on to the conveyor, said conveyor including means for receiving the ball from the ball delivering mechanism at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation, and means for effecting movement of the conveyor and the ball in a vertical plane contained in the lacquer container to dip the ball on the conveyor into the lacquer in the container.

27. In a machine for recoating used golf balls by a dipping operation, the combination comprising ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said ball delivering mechanism including means to deliver a ball at a predetermined time to said conveyor by a downward movement of the ball, said conveyor including means for receiving the ball from the ball delivering mechanism at the above mentioned predetermined time and at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation.

28. In a machine for recoating used golf balls by a dipping operation, the combination comprising ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said ball delivering mechanism including means to deliver a ball at a predetermined time to said conveyor by a downward movement of the ball, said conveyor being located subjacent to the ball delivering mechanism and including means for receiving the ball from the ball delivering mechanism at the above mentioned predetermined time and at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation.

29. In a machine for recoating used golf balls by a dipping operation, the combination comprising ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said ball delivering mechanism including means to drop a ball at a predetermined time on to said conveyor, said conveyor being located subjacent to the ball delivering mechanism and including means for receiving the ball from the ball delivering mechanism at the above mentioned predetermined time and at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation.

30. In a machine for recoating used golf balls by a dipping operation, the combination comprising ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said ball delivering mechanism comprising means to deliver a ball at a predetermined time to said conveyor by a downward movement of the ball including a rotatably mounted disc having an opening therethrough, said conveyor being located subjacent to the ball delivering mechanism and including means for receiving the ball from the ball delivering mechanism at the above mentioned predetermined time and at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation.

31. In a machine for coating articles with a lacquer, the combination comprising means for coating an article with a lacquer, including a conveyor for the articles to be lacquered, means for delivering articles to said lacquering means including a delivery chute for dropping articles dispensed by the delivery means on to the conveyor of the lacquering means and control means for said delivery means including several control elements each operative to effect partial operation of the delivery means, means for effecting successive operation of said control elements, and means for actuating one of said control elements in accordance with the operation of the article conveyor.

32. In a machine for coating the entire surface of articles with lacquer, the combination comprising a lacquer container, a movable cover for the lacquer container, a conveyor arm for supporting the article to be lacquered, means for delivering an article on to the conveyor, means for moving the conveyor substantially vertically in a plane containing the lacquer container to immerse the article in the lacquer and remove the article from the lacquer, means for moving the cover of the lacquer container to open the lacquer container, and means for coordinating the lacquer container cover-moving means and the means for effecting vertical movement of the conveyor.

33. In a machine for coating golf balls by a dipping operation, ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said conveyor being located in spaced relation to the ball delivering mechanism, said ball delivering mechanism including means for delivering the ball to the conveyor by gravity, said conveyor including means for receiving the ball from the ball delivering mechanism at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation, and means for effecting movement of the conveyor and the ball in a vertical plane contained in the lacquer container to dip the ball on the conveyor into the lacquer in the container and to raise the ball on the conveyor out of the lacquer; means to harden the coating on the ball after it is raised out of the lacquer and means to remove excess lacquer from the ball before subjecting the ball to the lacquer-hardening step and after raising the ball out of the lacquer in the container.

34. In a machine for coating golf balls by a dipping operation, ball coating mechanism including a lacquer container, ball delivering mechanism and a conveyor, said conveyor being located in spaced relation to the ball delivering mechanism, said ball delivering mechanism including means for delivering the ball to the conveyor by gravity, said conveyor including means for receiving the ball from the ball delivering mechanism at a predetermined position in respect to the conveyor and for maintaining the ball in that position during the coating operation, and means for effecting movement of the conveyor and the ball in a vertical plane contained in the lacquer container to dip the ball

on the conveyor into the lacquer in the container and to raise the ball on the conveyor out of the lacquer; means to rapidly rotate the ball after it is raised out of the lacquer to harden the coating thereon, and means to drain excess lacquer from the ball before rapidly rotating it and after raising it out of the lacquer.

35. In a machine for recoating used golf balls, ball delivering mechanism having a ball delivering opening the center of said opening lying in a vertical plane; a lacquer container located subjacent to said ball delivering mechanism and having an opening containing said plane; means to drop a ball from said ball delivering mechanism into said lacquer container through a vertical path identified by a vertical line lying within said vertical plane; means to raise said ball out of said container through the said vertical path; means to drain excess lacquer from said ball; means to remove the ball from said path to permit another ball to drop through the same path; and means to rapidly rotate the ball after draining said excess lacquer therefrom.

MAYNARD F. HOLT.
SIGMUND N. LIPOWSKI.