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R. L. WALRATH
PAINTING APPARATUS

2,556,744

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3 Sheets-Sheet 3

FIG. 3

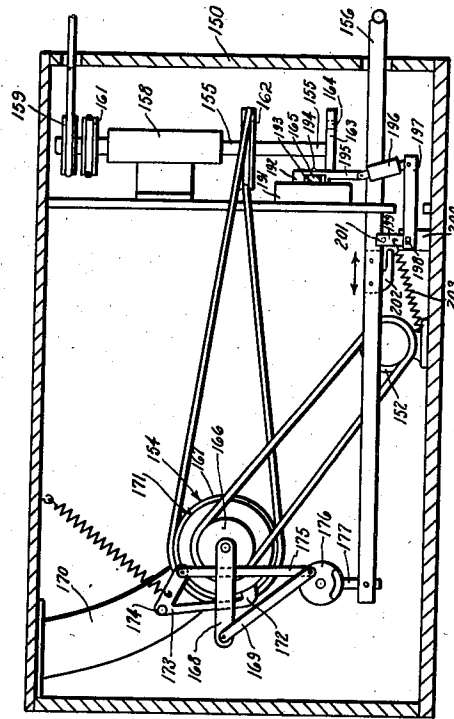
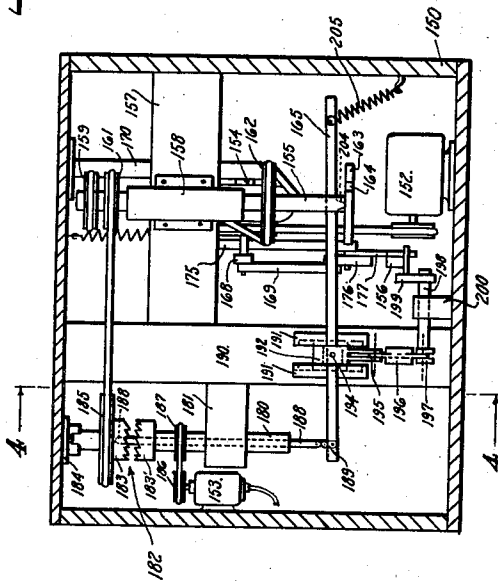


FIG. 10

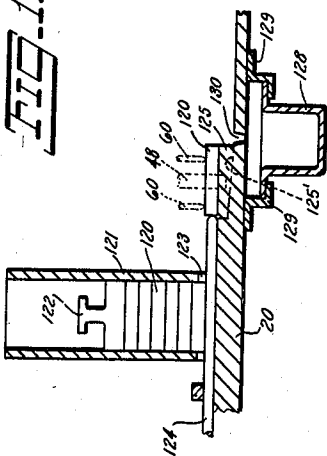


FIG. 11

FIG. 12

FIG. 13

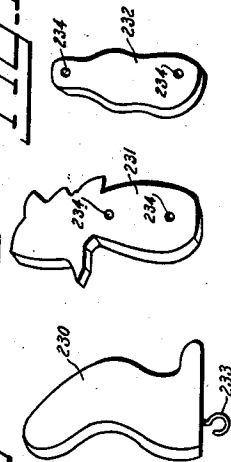


FIG. 4

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PAINTING APPARATUS

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33 Claims. (Cl. 91—42)

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This invention relates to painting and more particularly to a method and apparatus for painting articles. It has among its objects a reduction in the processing time and improvement in the resulting painted surface.

Other objects and advantages will become apparent in the following description and drawings, in which—

Fig. 1—A is a diagrammatic view of apparatus which illustrates a painting process in accordance with the invention;

Fig. 1—B is a diagrammatic view of the turntable or spinner in the raised position;

Fig. 1—C is a plan view of the turntable to illustrate the spinning and orienting operations;

Fig. 2 is a front elevation of apparatus for accomplishing a painting process in accordance with the invention;

Fig. 3 is a cross-sectional view of the spinning apparatus;

Fig. 4 is a cross-sectional view of Fig. 3 along the lines 4—4 thereof;

Fig. 5 is a fragmentary view along the line 5—5 of the apparatus shown in Fig. 2;

Figs. 6 and 7 illustrate alternative structures for holding a painted article during the spinning operation;

Fig. 8 shows the ejecting mechanism associated with the spinner;

Fig. 9 is an enlarged view of the work-holding tongs;

Fig. 10 is an enlarged front elevation of the magazine or work-feeding apparatus illustrated in Fig. 1; and

Figs. 11, 12 and 13 illustrate three typical articles that may be painted in accordance with the invention.

The invention relates to the painting of small articles such, for example, as the articles indicated in Figs. 11, 12 and 13. These particular articles illustrated are the parts of wooden toys of the animated type such as windmills, etc.

The painting of such small parts and objects as done according to conventional methods is a tedious, unsatisfactory and comparatively expensive process. The conventional methods and means for painting such objects are unsatisfactory, among other things, because of the irregular and imperfect finishes obtained, the lack of effective seal of the pores, etc. The conventional practice is tedious, among other things, because of the lack of adequate method and means for painting such small and irregular articles, and expensive among other reasons because of the

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long drying time required, the multiple coats required, etc.

I have found that a very substantial improvement over the conventional practice may be effected by immersing the objects in the liquid paint and then momentarily spinning them at high speed, thereby driving off all excess paint and leaving a perfect and smooth finish which may be dried in a very substantially shorter time than with any conventional practice with which I am familiar. Moreover, I obtain this comparatively fast or quick drying without the necessity of using the fast-drying paints on the market. There is also a considerable saving in paint and I find that I can successfully use a paint of more viscous character than is generally employed without impairing the smooth finish or without waste of paint. Moreover, this invention is specially adaptable to the use of oil paints.

My invention includes the spinning and other means cooperating therewith which are diagrammatically illustrated in Figs. 1—A, 1—B and 1—C. The particular spinning means illustrated comprises a disc 15 disposed in a tank or shield 16 and provided with means for momentarily driving the disc at high speed with a part or parts thereon. Cooperating with the spinning means is a means 13 for picking up the parts to be painted, immersing them in the body of paint contained in a container 14 and transferring them after immersion to the spinning means. There is also a special means for quickly arresting the disc after the momentary spinning operation and a means correlated therewith and with the pickup means 13 and the disc 15 for returning the disc to a predetermined position after each spinning operation for cooperative functioning with the pickup means as indicated generally in Fig. 1—C. The invention also includes a disc of special construction embodying means for retaining the parts on the disc while being spun, and a cooperating means illustrated diagrammatically in Fig. 1—B for assisting in the removal of the painted and spun parts from the disc. Other important features of the invention will appear below.

Conventional methods of painting small articles made of wood, metal, or other similar materials, usually include means for dipping the article in paint and then supporting it in such manner that excess paint may drip free of the article during the drying process. To my understanding, this procedure is usually carried out by hand, making it an extremely tedious and expensive operation. Furthermore, by permitting excess

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paint to drip from the article while it is drying results in a pimpled and imperfect finish. The time for the drying process is manifestly governed by the rate of normal evaporation of the solvents from the paint, and unless unusually fast drying paints are employed, the drying time is of the order of twenty-four hours before the article can be handled without disturbing or marring the finish. Furthermore, an article treated according to my spinning process will not drip when suspended in a drying position.

The steps in my process are illustrated in Fig. 1—A. For simplicity, the articles 11 have been shown as simple rectangular blocks. A magazine 10 and feeder mechanism 12 cooperate to periodically advance a block from a position beneath the magazine 10 to a position immediately beneath pickup jaws 13. The feeder mechanism 12 is timed with the operation of the jaws 13 so that each time the jaws pick up a block from the table T the feeder mechanism advances another block in its place. The jaws 13 are supported and operated by suitable apparatus so that upon picking up one of the blocks 11 from the table it is raised vertically (arrow a) to the dotted line position immediately above the pickup point, whereupon it is then moved to the right, as indicated by the arrow b, until it arrives at a point immediately above a vessel 14 containing a supply of paint. The jaws 13 are then moved downwardly to dip the block or article 11 into the paint, whereupon it is retracted, as shown by the arrow c, to its initial point above the vessel 14. The jaws together with the block are again advanced to the right, as indicated by the arrow d, to its final position above a rotatable disc 15 positioned within a shield 16. At this point the jaws 13 are again lowered and opened to deposit the article 11 on the turntable 15. Upon the retraction of the jaws 13 the turntable 15 is rotated rapidly in order to forcibly remove all excess paint from the surface of the article 11. During the spinning operation the jaws 13 are returned to their initial position preparatory to picking up a second block 11 to duplicate the process. The spinning operation is completed just prior to the arrival of the jaws 13 with the second painted block, and the article can be removed from the turntable with suitable tongs and placed in a drying position without danger of marring the painted surface.

The turntable 15 may include article retaining means 18 and a sub-base 18', the latter adapted to be raised by a suitable rod and cam 15'. The raised position of sub-base 18' is illustrated in Fig. 1—B.

Actual tests have shown that an article painted and spun in this manner will bear little or no indication of jaw marks resulting from the dipping operation or the removal of the article from the turntable to be placed in a drying position. It has also been found that even with the use of relatively slow-drying oil paint the spinning operation accelerates the drying to such an extent that the jaws used in the removal of the article from the turntable do not materially affect the finish. Furthermore, the drying time required for the article after it has been treated in accordance with the present invention is considerably reduced over that time required for the same type of paint in the ordinary drying operation.

Fig. 1—C illustrates a method of orienting the turntable 15 after each spinning operation so

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that the article 11 upon being deposited on the turntable 15 will be aligned or properly oriented with the retaining means 18. In the first position the turntable is shown during the spinning operation. The center illustration shows a position of rest immediately following the spinning operation. Here the arrow 17 and the notch 19 indicate that the turntable did not stop in the proper position and must therefore be oriented. The third illustration shows alignment of notch 19 with arrow 17. This is the oriented position of the turntable for removal of one article 11 and the placement of the next successive article. Orientation is accomplished by suitable means associated with the turntable driving means as will be hereinafter described.

One form of the invention is illustrated in Fig. 2. It comprises a suitable table or supporting surface 20 having mounted thereon a magazine 21 for the supply of articles to be painted, a vessel 22 containing paint and a turntable or spinner 23 with a shield 23' to catch the excess paint removed from the article during the spinning operation. Spaced from the upper surface of the table 20 by suitable supporting members 24 is a pair of rails 24' which support the operating assembly or carriage 25 for movement longitudinally of the table. Beneath the table 20 is a cam assembly 26, a radial motion cam 27 and a positive motion cam 28 each directly coupled one to the other in any conventional manner and mounted for rotation about their respective axes 28', 27' and 23'. Suitable power means (not shown) is used to simultaneously drive the three cams for operation of the equipment. The cam assembly 26 includes an outer positive motion cam 29 and two smaller radial motion cams 30 and 31. Extending upwardly from the table 20 are a pair of supporting members 32—33 having discs 34—35 rotatably mounted on their upper ends. These discs support side rods 36—37 by suitable crank pins and operate to produce vertical displacement of the rods upon being rotated.

The article pickup and transporting assembly 25, illustrated in Figs. 1—A, 1—B, 1—C and 5, comprises a bed 40 having wheels 41 adapted to ride on the rails 24' for longitudinal movement. A small bracket 42 fastened to the under side of bed 40 is provided for the attachment of propelling means to be described. Two supporting members 43 extend upwardly from the bed 40 and support the transverse operating shafts 44 and 45 together with an L shaped bracket 46 having vertical and horizontal legs.

Beneath the bed 40 of the transporting assembly 25 are tongs 47 having a pair of jaws 48 pivotally mounted on a supporting plate 49 for outward movement one of the other. A cylindrical shaft 50, secured to the plate 49 by suitable collars 51, is slidably mounted in a second cylindrical supporting member 52 fixed to and extending upwardly from the bed 40. The shaft member 52 is fixed to the bed 40 by collars 53 and carries on its upper end a collar 54. Positioned within the cylindrical tong supporting shaft 50 is a tong operating rod 55 carrying a disc shaped cam 56 on its lower end for cooperation with the inwardly extending parts 57 of the tong jaws 48. When the tong operating rod 55 is forced downwardly under the action of the tong operating cam 56, the jaws 48 are separated against the action of the spring 59. Upon retroaction of the rod the jaws 48 close under action of the spring 59 to clamp the article to be painted. Disposed

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on either side of the tongs 47 are a pair of guide rods 60 which insure proper alinement of the article in the tongs 47 when the article is picked up and carried through the several operations.

Vertical motion of the shaft 50 and the tong assembly 47 is accomplished by means of a linkage operated by the shaft 44 journaled in the up-rights 43. The outer end of shaft 44 carries two collars 61 and 62 fixedly mounted on the shaft. To these collars are affixed levers 63 and 64 which constitute part of the aforementioned linkage. Interconnecting the outer ends of levers 63 and 64 and the trunnion or cross bar 68 are a pair of links 65 and 66. The cross bar 68 carries the tong operating cam 58 and is supported by two vertical posts 69 and 70 secured to the collar 71 on the upper end of the tong operating shaft 50. Rotation of the shaft 44 will therefore raise or lower the tongs 47 depending on the direction of such rotation. The inner end of shaft 44 includes a crank 73 having a roller 74 on its outer end. Roller 74 cooperates with and rides on the side rod 37. When the rod 37 is in the raised position, as shown by the solid lines in Fig. 2, the tongs 47 are raised, whereas when the rod 37 is in the lowered position accomplished by the rotation of discs 34 and 35 and indicated by the dotted lines in Fig. 2, the tongs are lowered. The side levation of the tong assembly 25 is shown in Fig. 5 in the lowered position. Securely fastened to the collar 71 is a downwardly extending rod 72 which slidably engages a suitable opening in the collar 54 associated with the shaft 52 and operates to fix the tongs 47 against rotation.

The operation of the tong jaws 48 through the operating rod 55 is accomplished by rotation of cam 58 by means of the rod 75 fixedly mounted on the cam. The movement of the rod 75 and cam 58 about the crossbar 68 is controlled by the transverse shaft 45 journaled in the uprights 43. One end of the shaft 45 carries an L-shaped crank 78 securely fastened thereto and having a rod engaging means 79 on its outer end. The inner end of shaft 44 is provided with a suitable collar 80 and downwardly extending rod 81. A third longitudinal side rod 82, slidably carried on the upper ends of the uprights 32 and 33 by brackets 83, is provided with two trip pins 83 for engagement with an actuation of the rod 81 to operate the tong jaws 48 as will be described. Rotational movement of the rod 75 about the cross bar 68 is limited in one direction by the shaft 44 and in the other direction by a stop 89 fastened to the L-shaped bracket 46 by suitable means such as screws 90.

Transportation of the tongs 47 and tong operating assembly 25 along the rails 24' is accomplished by the lever 91 cooperating with the positive motion cam 29 of the cam assembly 26. The lever 91 is pivoted at its lower end about a fixedly mounted shaft 92 and at its upper end is linked to the bed 40 of the assembly 25 through the link 93 and the bracket 42 (Fig. 5). As the cam 29 is rotated in a counter clockwise direction the cam follower 94, fastened to a point on the lever 91 generally midway between its ends, positively follows the track 96 in the cam 29 and causes the lever 91 to oscillate about its pivot 92. This action through the link 93, causes the assembly 25 to travel back and forth on the rails 24', pausing at each of the three positions as outlined in Fig. 1 to accomplish the desired steps in the process.

Rotation of the discs 34 and 35 is produced by the rotation of the radial disc cam 30 which is part of the cam assembly 26 previously described.

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This cam cooperates with a lever 97 pivoted at 98 to a bracket 99 extending downwardly from the table 20. A cam follower 100 is located between its ends to engage the surface of cam 30, and its outer end is connected to the disc 34 by the link 101. The cam 30 contains three depressions which are positioned relative to the cam 29 so that vertical movement of the tong assembly 47 is accomplished at the article pickup, dipping and spinning positions as previously outlined in connection with Fig. 1.

The radial disc cam 31, also part of the cam assembly 26, cooperates with a lever 102 to operate the longitudinal side rod 82 which in turn opens and closes jaws 48 of the tong 47 to pick up an article at the start of the process and to deposit the article on the turntable 23 after it has been dipped in the paint contained in the vessel 22. Lever 102 is pivoted at one end to the bracket 99 and its other end is linked to the rod 82 by link 103 and levers 104 and 105. Levers 104 and 105 are rigidly joined at their meeting ends and pivoted at 106 to a bracket 107 so that vertical movement of the free end of lever 102 in response to the cam follower 108 riding on the surface of cam 31 will produce longitudinal movement of the rod 82.

The operation of the jaw opening and closing assembly is as follows. When the carriage or tong operating assembly 25 is at the lefthand raised position as shown in Fig. 2, the jaws 48 are opened. The tongs are lowered to pick up an article 120 to be painted. Upon arrival at the dotted position, with the jaws embracing the article 120, the cam 31 operates to move the rod 82 to the right. This causes the lefthand pin 84 to engage the rod 81, moving it to the right to close the jaws 48 and clamp the article 120. The position of rod 81 when the jaws are closed is more clearly shown by the dotted line position of the carriage 25 above the vessel 22. When the carriage 25 arrives at the spinning position, the tongs are again lowered and the rod 82 is moved to the left. This causes the righthand pin 84 to again engage rod 81 and open the jaws 48, thus depositing the painted article on the turntable.

The article or work feeding assembly, illustrated in Figs. 2 and 10, comprises a vertical enclosure 121 arranged to receive a number of articles 120. A suitable weight 122 is provided to insure positive feeding of the articles as will be described. The magazine 121 is spaced from the table 20 to provide an opening 123 for operation of the feed lever 124 and the movement of its lowest article to the pickup position immediately beneath the tongs. Suitable runners 125 are provided at the pickup position for support of the article 120 so that ample space is available for that part of the tong jaws 48 that may extend beyond the lower surface of the article 120. Beneath the table 20 is mounted a container 128 slidably held by brackets 129 to receive paint that may drip from the tongs in the pickup position. An opening 130 in table 20, together with channels 125' between the runners 125, collect the paint drippings and direct them into the vessel 128. The channels 125' also accommodate the ends of the tongues 48 of the article pickup means during the pickup process.

The feeding mechanism includes a crank 135 mounted on and rotatable with the shaft 26' and three pivotally connected links 136, 137 and 138. The link 137 is pivoted midway between its ends to a bracket 139 extending from the table 20.

Rotation of the shaft 26' therefore produces longitudinal movement of the feed rod 138 and the movement of the next article 120 to the pickup position once in each revolution and in synchronism with the operation of the tongs 47.

The mechanism for operating the turntable 23 and contained within the enclosure 150 is shown in Figs. 3 and 4. This assembly comprises a housing or enclosure 151 including two sources of power such as electric motors 152 and 153, a clutch and brake assembly 154, a drive shaft 155 and an operating lever 156.

The drive shaft 155, fastened to a cross member 157 in the housing 151 by means of the journal 158, carries the main drive pulley 159 which is belt-coupled directly to the turntable pulley 160 (Fig. 2), a positioning or orienting pulley 161, and a driving pulley 162. On the lower end of the shaft is a circular cam 163 having a slot 164 which, in cooperation with lever 165 and motor 153, operates to return the turntable 23 to its starting position after each spinning operation.

The spinning operation is accomplished by the motor 152, belt-coupled to the drive shaft 155 by means of clutch pulleys 166 and 167 and driving pulley 159. The clutch 154, operable by levers 158 and 169 to mechanically couple the clutch pulleys 166 and 167, is mounted on the housing 151 by a suitable bracket 170. Associated with the pulley 167 is a shoulder 171 adapted to receive the brake shoe 172 and carried on the lower arm of a bell crank 173. The bell crank is pivoted to the clutch mounting bracket 170 at 174 and is spring loaded so that the brake 172 is normally in the applied position. A link 175 couples the bell crank 173 to the brake and clutch operating disc 176 which is pivoted at its center to the housing 151.

Extending downwardly from the disc 176 is an operating arm 177 pivoted to the lever 156. Movement of the lever 156 leftwardly from the position shown in the drawing rotates the disc 176 and moves the links 169 and 175 downwardly to engage the clutch 154 and release the brake 172. This action transmits power from the motor 152 to the drive shaft 155 for the spinning operation. With lever in the central or neutral position shown in Fig. 4, the clutch 154 is disengaged and the brake 172 is applied.

The turntable positioning means comprises in addition to the lever 165, disc 163 and motor 153, a second shaft 180 journaled in a bracket 181 and a toothed clutch 182. The upper section 183 of the clutch 182 is journaled for vertical displacement to the housing 151 at 184 and carries a pulley 185 belted to the positioning pulley 161 on the main shaft 155. The lower section 183' of the clutch 182 is mounted on the upper end of shaft 180 which is constantly driven by motor 153 through pulleys 186 and 187. A rod 188 extends through the shaft 180 and is pivotally received in a suitable recess 188 in the upper clutch section 183. The lower end of rod 188 is pivotally joined to the lever 165 at 189.

The position operating lever 165 is pivoted to the vertical bracket member 190 by a sliding pivot arrangement consisting of channels 191 and a block 192 slidably retained therebetween. The lever 165 is retained within an opening 193 in the block 192 and pivoted therein by suitable means such as screw 194. A downwardly extending fork 195 on block 192 is connected to a lever 197 by link 196, the lever 197 forming with the transverse shaft 198 and lever 199 a bell crank

with the respective arms at a space angle of 90°. The shaft 198 is journaled in a suitable bracket 200. The bell crank lever 199 is provided with an outwardly extending operating pin 201 which cooperates with the slotted bracket 202 mounted on the main operating lever 156.

Assuming now that the spinning operation has been completed as described and that the turntable has stopped in a position other than the desired one such as indicated by the slot 164 in the disc 163. The operating lever 156 is moved to the right engaging the slotted member 202 with the operating pin 201. Further movement rotates levers 199 and 197 against the action of spring 203 which is connected to the lever 199. This rotary movement causes the block 192 through link 196 to be moved downwardly engaging a shoe 204 on the rod 165 with the surface of the disc 163. Since the slot 164 in the disc 163 is not aligned with the shoe 204, continued downward movement of block 192 rotates the lever about the shoe 204 and against the action of spring 205, retracting rod 188 from the clutch member 183. The clutch members 183 and 183' then become engaged to transmit power from motor 153 to the shaft 155 through pulleys 185 and 161. When the disc 163 is rotated to the point where slot 164 becomes aligned with shoe 204, the spring 205 acts to rotate the lever 165 about its slidable pivot 194, moving rod 188 upwardly to disengage clutch 182 and stop rotation of the main shaft 155. The turntable is now positioned for the next operation and the operating lever 156 is returned to its neutral position shown in the drawing.

In normal operation, the spinning and positioning equipment above described may be operated by the positive motion cam 28 driven by any suitable means in synchronism with the main cam assembly 26. When the spinning and positioning or orienting operations are completed a cam 27, also synchronized with the other apparatus shown in Fig. 2, operates to elevate a work holder or sub-base 23a associated with the turntable 23 to permit easy removal of the painted and spun article or workpiece. This is accomplished by a slidable rod 206 (Fig. 2) disposed within the turntable operating shaft 207 which carries the drive pulley 160 and the turntable 23. The workholder 23a may be of any desired shape and is provided with a series of pins 209 to space the article from the surface of the workholder during the spinning operation while a wire basket 210 retains the work on the workholder 23a. When the cam 27 is positioned so that the rod 206 is in its downward-most position the disc or workholder 23a contacts the upper surface of the turntable 23 and may be suitably locked against relative rotation therewith by the provision of splines, pins, etc.

Figs. 6 and 7 illustrate alternate structures for the article retaining means on turntable 23. The form shown in Fig. 7 has a series of pins 210 to retain the workpiece, whereas in Fig. 6 a horizontal wire 210' is fastened to the upper ends of pins 210 to lend added rigidity to the structure. The discontinuities in the horizontal wire 210' are provided to permit access for the jaws 48 of the tongs 47.

Fig. 8 illustrates the turntable 23 with the workholder 23a in the raised position for the removal of the work after the spinning and positioning operation has been completed. To illustrate one method of locking the workholder 23a to the turntable 23, a spline 212 on shaft 206 is provided

which cooperates with a companion groove within the shaft 207.

Figs. 11, 12 and 13 represent three articles 230, 231 and 232 that may be painted in accordance with the described process and apparatus. The article 230 representing the legs of a toy farmer is provided with a hook 233 for supporting it on a suitable wire or rod during the drying period. The remaining articles representative of the body and arms of the farmer each have holes 234 piercing them. With articles of these latter types, a suitable hook is passed through one of the holes after completion of the painting operation for supporting it while drying.

Although specific apparatus has been described to illustrate one method of carrying out the present invention, it is to be understood that other forms may be used and modifications made without departing from the scope or spirit thereof.

I claim:

1. In an apparatus for painting miniature articles of different shapes, the combination of supporting means for said articles which is momentarily spinnable at high speed, a tank for paint, magazine feeding means for feeding the articles one by one to a pick-up point, means for picking up the articles one by one from said point, lifting them up above the level of the paint tank, conveying them to a point above the tank, lowering and dipping them into the paint, moving them again above the level of the paint tank, moving them to a point above the spinnable means and then lowering and dropping them on the spinnable means, lifting said pick-up means above the level of the paint tank and moving said pick-up means back to the initial starting position without dipping in the paint tank, braking means for arresting rotation of said spinnable means, means for rotating the spinnable means to a predetermined position after each spinning operation, means for elevating the spinnable supporting means after each spinning operation to permit ready removal of the spun miniature articles, and means operating and coordinating the different operations.

2. In an apparatus for painting miniature articles of different shapes, the combination of supporting means for said articles which is momentarily spinnable at high speed, painting means, magazine feeding means for feeding the articles one by one to a pick-up point, means for picking up and transporting the articles one by one from said pick-up point to said painting means for coating said articles with paint and transporting them to a point above the spinnable means and depositing said articles on the spinnable means, means for transporting said pick-up means back to the initial starting position, braking means for arresting rotation of said spinnable means, means for elevating the spinnable supporting means after each spinning operation to permit ready removal of the spun miniature article, and means operating and coordinating the different operations.

3. In an apparatus for painting miniature articles of different shapes, the combination of supporting means for said articles which is momentarily spinnable at high speed, a tank for paint, magazine feeding means for feeding the articles one by one to a pick-up point, means for picking up the articles one by one from said point, lifting them up above the level of the paint tank, conveying them to a point above the tank, lowering and dipping them into the paint, moving them again above the level of the paint tank,

moving them to a point above the spinnable means and then lowering and dropping them on the spinnable means, lifting said pick-up means above the level of the paint tank and moving said pick-up means back to the initial starting position without dipping in the paint tank, braking means for arresting rotation of said spinnable means, means for elevating the spinnable supporting means after each spinning operation to permit ready removal of the spun miniature articles, and means operating and coordinating the different operations.

4. In an apparatus for painting miniature articles of different shapes, the combination of supporting means for said articles which is momentarily spinnable at high speed, a tank for paint, magazine feeding means for feeding the articles one by one to a pick-up point, means for picking up the articles one by one from said point, lifting them up above the level of the paint tank, conveying them to a point above the tank, lowering and dipping them into the paint, moving them again above the level of the paint tank, moving them to a point above the spinnable means and then lowering and dropping them on the spinnable means, lifting said pick-up means above the level of the paint tank and moving said pick-up means back to the initial starting position without dipping in the paint tank, braking means for arresting rotation of said spinnable means, means for rotating the spinnable means to a predetermined position after each spinning operation to facilitate removal of the spun articles, and means operating and coordinating the different operations.

5. Apparatus for painting articles comprising in combination article holding means, a vessel containing paint, rotatable means, means for moving said article holding means to successively dip each article into said paint and deposit said dipped article on the rotatable means, means rotating said rotatable means to forcibly remove excess paint and means for stopping the rotatable means in a predetermined position.

6. Apparatus for painting articles comprising in combination article feeding means, means for coating said articles with paint, spinning means, means for repeatedly picking up and moving successive articles to coat them with paint and deposit them on said spinning means to forcibly remove excess paint therefrom and means to stop the spinning means in a predetermined position after the spinning operation.

7. Painting apparatus for articles, comprising article transporting means, a vessel containing paint, a turntable, means for operating said article transporting means to successively pick up each article, dip it in the paint and deposit it on said turntable, driving means for spinning said turntable to remove excess paint from the article, and orienting means for returning said turntable to its starting position for removal of the spun article and receipt of the next successive article.

8. Apparatus according to claim 7, including means on said turntable for raising said article after said orienting operation to facilitate removal of the spun article.

9. Apparatus according to claim 7 wherein

means are provided to feed successive articles to said pickup point.

10. Apparatus for painting articles comprising a horizontally movable carriage, article holding means mounted on said carriage for movement in a vertical plane, a vessel containing a supply of

paint, a turntable and means for moving said carriage and article holding means to successively dip said articles in the paint and deposit them on said turntable.

11. Apparatus for painting irregularly shaped articles comprising in combination a carriage movable in a horizontal plane, article carrying tongs mounted on said carriage for vertical reciprocation, feeding means including a magazine for holding a supply of articles to be painted, said feeding means being operable to periodically position an article to be picked up by said tongs, a vessel containing a supply of paint, a turntable including power means for periodically rotating it, means for stopping said turntable at the starting position after each spinning operation, and means for lifting said article from the turntable upon completion of the orienting operation to facilitate the removal of said article, and means including a cam assembly for moving said tongs and carriage to successively pick up each article, dip it in the paint and deposit it on said turntable for the forcible removal of excess paint therefrom and acceleration of the drying process.

12. Apparatus for spinning irregularly shaped painted articles to forcibly remove excess paint therefrom and accelerate the drying process comprising a turntable, power means including a clutch for driving said turntable, a secondary power means including a cam operated clutch connecting said secondary power means to the turntable for orienting said turntable with reference to a predetermined starting position and means including supporting and retaining pins for retaining the painted article on the turntable during the spinning operation.

13. Apparatus according to claim 12 wherein means are included for raising the article from said turntable upon completion of its spinning operation to facilitate its removal therefrom.

14. A turntable for spinning painted articles to forcibly remove excess paint therefrom and expedite the drying process comprising a circular disc, article retaining means extending from one surface of said disc and positioned to conform to the outline of the article to be spun, a sub-base on said turntable conforming in shape to the article, and a second series of pins extending from the upper surface of said sub-base to support and space the painted article from the surface of the sub-base.

15. A turntable according to claim 14 wherein said retaining means comprises a wire basket shaped to conform to the article to be spun.

16. A turntable according to claim 14 wherein means are provided for raising said sub-base and article above said retaining means to facilitate removal of the spun article.

17. Apparatus for supporting and rotating painted articles comprising a rotatable base, means including stops engaging the edge of each article for retaining the article on the base during the spinning operation and means for holding the article in spaced relation to the base.

18. Apparatus for spinning painted articles comprising a base, means on said base for holding the article in spaced relation thereto and article retaining means including pins extending from the surface of the base to engage the edge of said article and retain it on the base and in said spaced relationship thereto during the spinning operation.

19. Apparatus for spinning articles according to claim 18 wherein means are provided for raising the first said means for moving the article out

of engagement with the article retaining means after the spinning operation.

20. In an apparatus for painting miniature articles of different shapes, the combination of supporting means for said articles which is momentarily spinnable at high speed, including article retaining means conforming to the outline of the article to be spun and engaging the edge of the article during the spinning operation, a tank for paint, magazine feeding means for feeding the articles one by one to a pick-up point, means for picking up the articles one by one from said point, lifting them up above the level of the paint tank, conveying them to a point above the tank, lowering and dipping them into the paint, moving them again above the level of the paint tank, moving them to a point above the spinnable means and then lowering and dropping them on the spinnable means, lifting said pick-up means above the level of the paint tank and moving said pick-up means back to the initial starting position without dipping in the paint tank, braking means for arresting rotation of said spinnable means, means for rotating the spinnable means to a predetermined position after each spinning operation, means for elevating the spinnable supporting means after each spinning operation to move the article out of engagement with said retaining means and permit ready removal of the spun miniature articles, and means operating and coordinating the different operations.

21. In an apparatus for painting miniature articles of different shapes, the combination of supporting means for said articles which is momentarily spinnable at high speed, including article retaining means conforming to the outline of the article to be spun and engaging the edge of the article during the spinning operation, a tank for paint, magazine feeding means for feeding the articles one by one to a pick-up point, means for picking up the articles one by one from said point, lifting them up above the level of the paint tank, conveying them to a point above the tank, lowering and dipping them into the paint, moving them again above the level of the paint tank, moving them to a point above the spinnable means and then lowering and dropping them on the spinnable means, lifting said pick-up means above the level of the paint tank and moving said pick-up means back to the initial starting position without dipping in the paint tank, braking means for arresting rotation of said spinnable means, means for elevating the spinnable supporting means after each spinning operation to move the article out of engagement with said retaining means and permit ready removal of the spun miniature articles, and means operating and coordinating the different operations.

22. A turntable for spinning painted articles to forcibly remove excess paint therefrom comprising a base member, article retaining means on one surface of said member and positioned to conform to the outline of the article to be spun, a sub-base on said member conforming in shape to the article and means on said sub-base to hold the article in spaced relationship thereto during the spinning operation.

23. A turntable for spinning painted articles comprising a rotatable base, article retaining means on said base to engage and hold the article during the spinning operation, a sub-base on the first said base, and means on the sub-base for holding the article in spaced relationship thereto and to said base.

24. Apparatus for painting articles comprising article holding means operable to grasp and release articles to be painted, a paint tank, spinning means, and means for moving said holding means to grasp an article to be painted, then moving said holding means with the article being held to a paint tank, dipping the article into the paint and then lifting the article out of the paint and moving it to the spinning means and discharging the article onto said spinning means, and then directly moving the article holding means to pick up the next article to be painted.

25. Apparatus for painting articles comprising article holding means operable to grasp and release articles to be painted, a paint tank, spinning means including means for orienting the spinning means relative to the article holding means, and means for moving the holding means to pick up an article to be painted, moving the said holding means together with the article to the paint tank and immersing the article in the paint and then lifting the article out of the paint and moving it to and discharging it onto the oriented spinning means and then directly moving the article to pick up the next article to be painted.

26. Apparatus for painting articles comprising feeding means for feeding the articles to a pickup point, a paint tank, means for spinning the articles and means for picking up each article fed to the pickup point, moving it to the paint tank and immersing the article in paint, removing the article from the paint tank and moving it to and discharging it onto the spinning means and then returning directly to the pickup point to pick up the next article fed to the pickup point by the feeding means.

27. Apparatus according to claim 26, including means for orienting the spinning means with the article pickup means prior to the receipt of an article to be spun.

28. Apparatus for painting articles comprising non-spinnable means for picking up the articles to be painted and separate spinner means for receiving the painted articles from the pickup means, including means for orienting the spinner relative to the non-spinnable article pickup means prior to the receipt of an article from said pickup means.

29. In apparatus for painting articles, a magazine for holding a plurality of articles to be painted, means for feeding the articles one by one to a pickup point, means for picking up the articles, and means at said pickup point including channels therein to accommodate the article pickup means during the pickup process, and means communicating with said channels including a receptacle for preventing the accumulation of paint at the pickup point.

30. Means for rotating and orienting a spinner for spinning painted articles comprising a main shaft coupled to the spinning means, means including a main clutch for driving said shaft, separate power means including a secondary clutch coupled to said shaft for orienting the shaft, a

cam on said shaft and a cam follower for operating the secondary clutch, and a lever coupled with the main clutch and cam follower, said lever in one position effecting disengagement of the secondary clutch through the cam follower and engagement of the main clutch and in another position disengagement of the main clutch and engagement of the secondary clutch whereupon said separate power means operates to rotate the main shaft until the cam follower engages a predetermined part of the cam to open said secondary clutch and halt further rotation of said shaft.

31. Apparatus for painting irregularly shaped articles comprising in combination a magazine including feeding means for placing articles successively at a pickup point, a vessel containing a supply of paint, spinnable means, tongs for picking up and transporting articles individually, means for operating and moving said tongs to pick up each article, dip it in said paint and deposit it on said spinnable means, means for spinning said spinnable means and means including a rotatable cam for raising said spinnable means to facilitate removal of the spun article and means for stopping the spinnable means in a predetermined position after each spinning operation and prior to the removal of the spun article.

32. Apparatus for painting irregularly shaped articles comprising a horizontally movable carriage, article holding means mounted on said carriage for movement in a vertical plane, a vessel containing a supply of paint, a turntable and means for moving said carriage and article holding means to successively dip said articles in the paint and deposit them on said turntable, means for arresting rotation of said turntable and means for rotating it to a predetermined position after each spinning operation.

33. Apparatus for painting irregularly shaped articles comprising spindle means, power means including a main clutch for driving said spinning means, secondary power means including a secondary clutch for moving said spindle means to a starting position after each spinning operation and means coupled with said clutches and operable in one position for engaging said main clutch and disengaging said secondary clutch and operable in another position to disengage the main clutch and engage the secondary clutch.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
300,037	Baker	June 10, 1884
548,767	Vuillier	Oct. 29, 1895
1,199,963	Butcher	Oct. 3, 1916
1,343,887	Slocum	June 15, 1920
1,589,711	Martinez	June 22, 1926
2,044,077	Jones	June 16, 1936
2,079,615	Holt et al.	May 11, 1937