

March 2, 1948.

W. H. EMERSON

2,437,224

DECORATING APPARATUS

Filed May 27, 1943

4 Sheets-Sheet 1

Fig. 2.

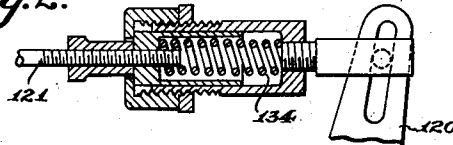
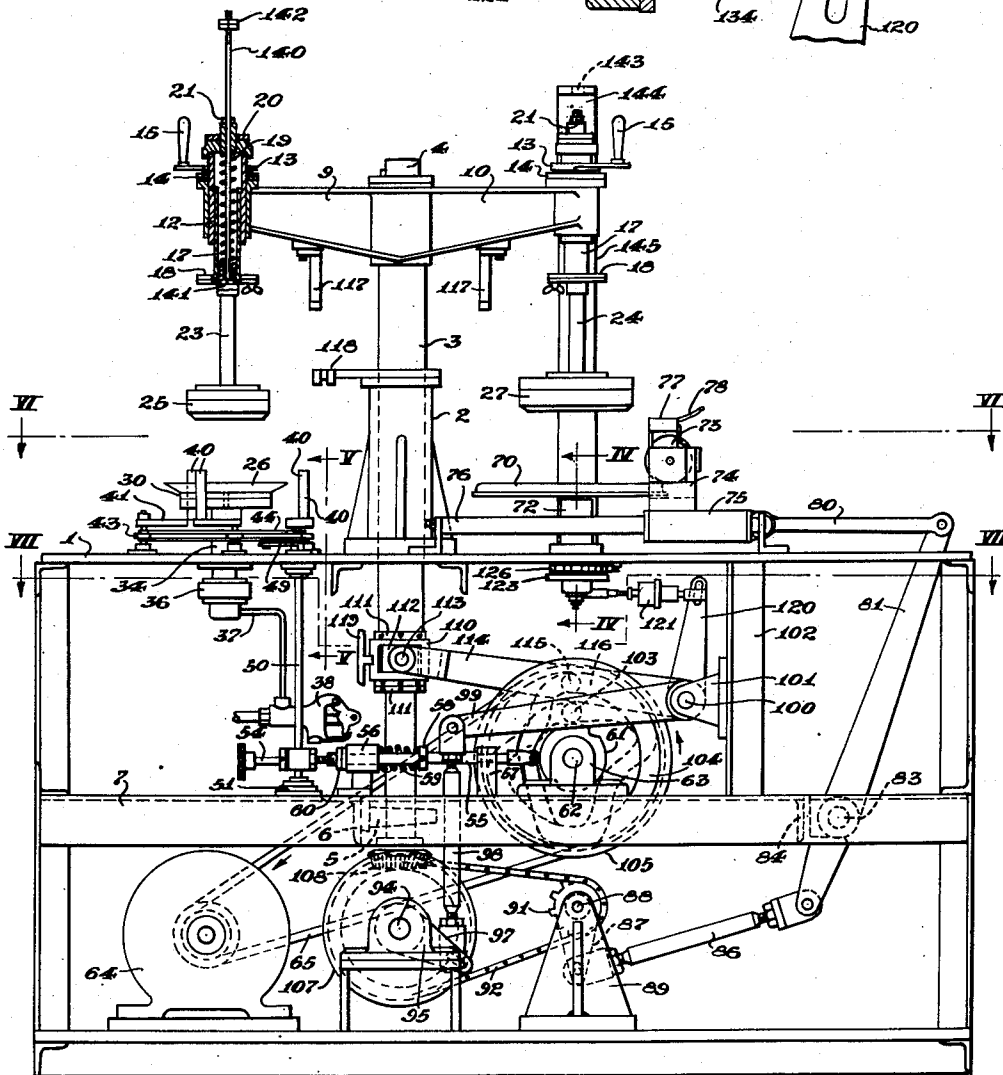


Fig. 1

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WITNESSES.
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4 Sheets-Sheet 2

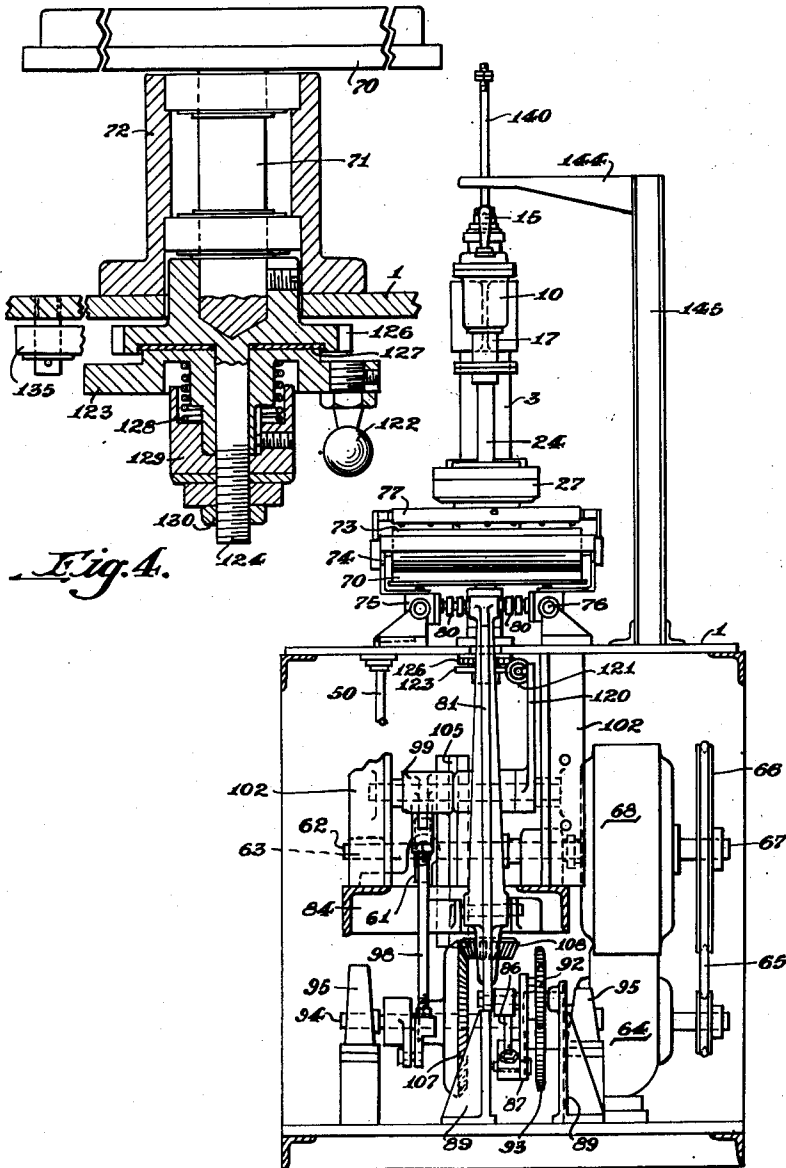


Fig. 3.

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4 Sheets-Sheet 3

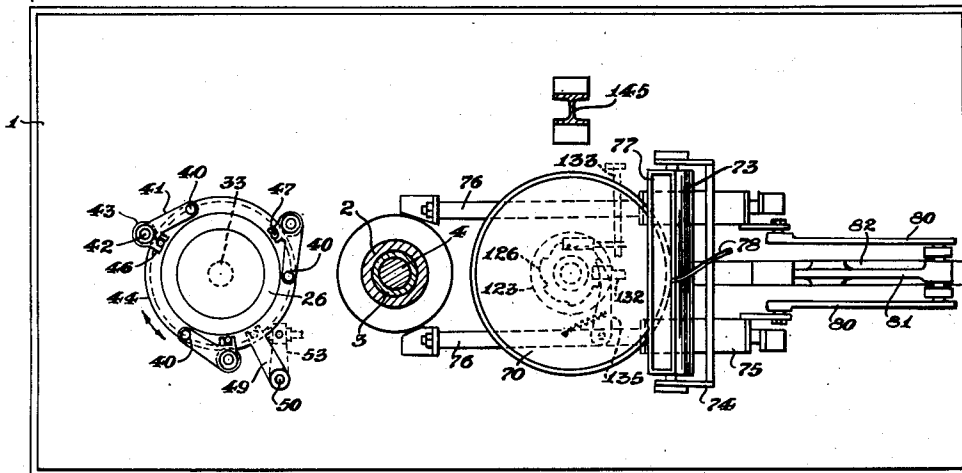


Fig. 6.

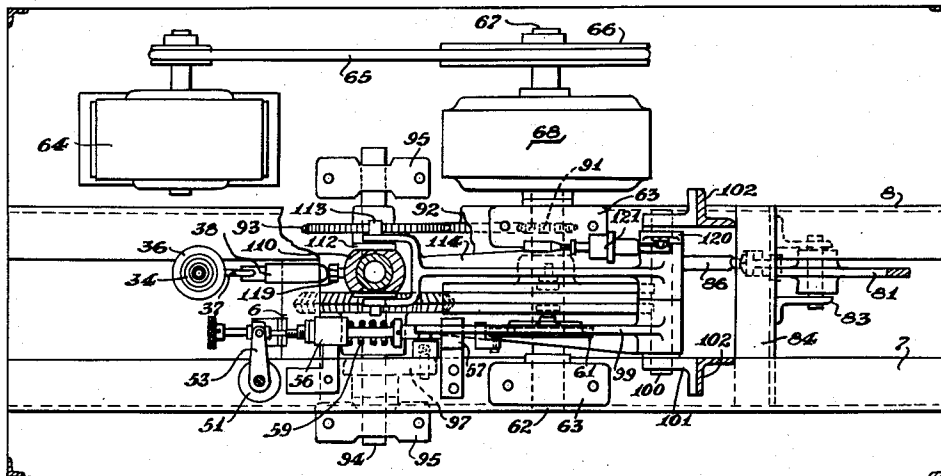


Fig. 7.

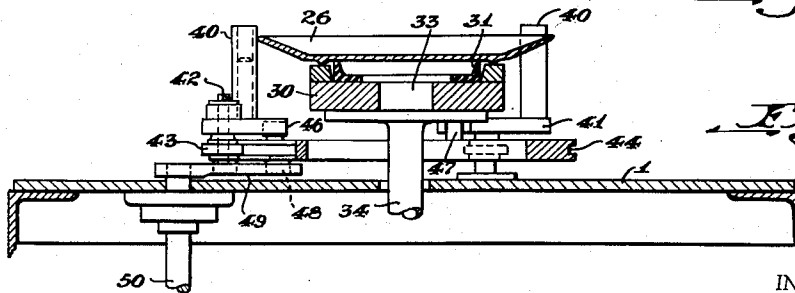


Fig. 5.

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4 Sheets-Sheet 4

Fig. 10.

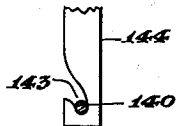
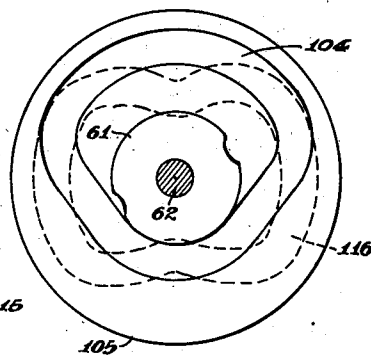


Fig. 9.

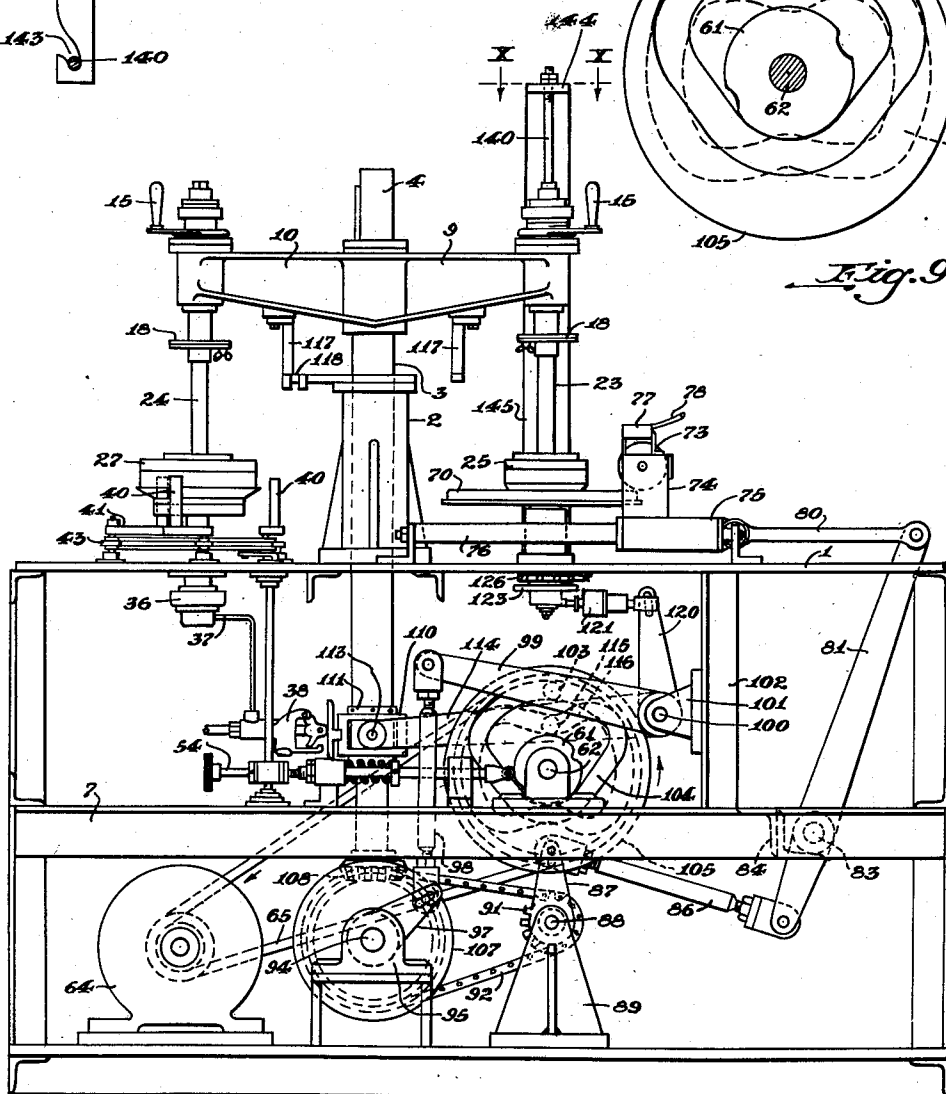


Fig. 8

WITNESSES.
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UNITED STATES PATENT OFFICE

2,437,224

DECORATING APPARATUS

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Application May 27, 1943, Serial No. 488,651

16 Claims. (Cl. 101—41)

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This invention relates to potteryware decorating apparatus, and more particularly to apparatus for stamping decorations on articles of dinnerware.

The customary way of stamping decorations on dinnerware is by hand. Thus, a workman holds in his hand a rubber stamp which carries a short segment of the circular design that is to be stamped on a piece of ware. The workman inks the stamp and then presses it against the ware. This operation is repeated as he rotates the ware until enough segments of the design are printed to complete a circle. It will be seen that such a method is very slow and requires skilled labor to match the sections of the design, to make the design circular, and to print the design clearly without smearing it.

It is among the objects of this invention to provide potteryware decorating apparatus which stamps a complete design on a piece of ware in a single operation, which is automatic, which is rapid in operation, which accurately positions the design on the ware, and which does not require a skilled attendant.

In accordance with this invention a support is provided for the ware that is to be decorated, and a decorating stamp is mounted adjacent the support. Means is also provided for bringing the stamp into engagement with an inking member and then with ware on the support. Preferably the stamp is located above the ware and is adapted to be moved laterally as well as vertically so that it first can be brought down against the inking member and then down against the ware. Thus, the stamp may be mounted on the end of a horizontal arm which can be reciprocated vertically and oscillated horizontally from a position above the inking member to a position above the ware. In case it is desired to stamp a design on the upper surface of the bottom of the ware as well as on its brim, two arms projecting in opposite directions may be used with a stamp suspended from each arm. When the arms are swung to move either stamp over the inking member, the other stamp is moved into position over the ware, and when the arms are lowered, one stamp is inked while the other stamps the ware. The inking member is inked automatically while the stamps are raised, and means is provided to assure both stamps engaging the inking member with the same amount of pressure. Before it is stamped, the ware is centered on its support and is then held in central position, preferably by suction.

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illustrated in the accompanying drawings in which Fig. 1 is a side view of my machine with the stamps raised; Fig. 2 is an enlarged section through part of the linkage by which the inking member is indexed; Fig. 3 is an end view of the machine; Fig. 4 is an enlarged vertical section of the inking member taken on the line IV—IV of Fig. 1; Fig. 5 is an enlarged vertical section of the ware-supporting chuck taken on the line V—V of Fig. 1; Fig. 6 is a plan view of the machine taken on the line VI—VI of Fig. 1; Fig. 7 is a horizontal section taken on the line VII—VII of Fig. 1; Fig. 8 is a side view of the machine with the stamps lowered; Fig. 9 is an enlarged side view of the main cam that controls the vertical and horizontal movements of the stamps; and Fig. 10 is a fragmentary plan view taken on the line X—X of Fig. 8.

Referring to Fig. 1 of the drawings, the table top 1 of a frame supports a vertical sleeve bearing 2 rigidly mounted thereon. Extending through this bearing and the table is a hollow shaft 3 that is splined on a post 4 rotatably mounted near its lower end in a bearing 5. This bearing projects laterally from a cross member 6 attached to a pair of spaced beams 7 and 8 extending lengthwise of the frame about midway between its top and bottom. Rigidly mounted on the upper end of the shaft is a crosshead forming a pair of arms 9 and 10 projecting in opposite directions from the shaft.

The outer end of each arm is provided with a vertical opening in which a sleeve 12 is slidably mounted. Threaded on the upper portion of the sleeve is a ring 13 rotatably connected to the underlying arm by a collar 14. The ring can be turned by a handle 15 to adjust the sleeve vertically in the arm. Slidably mounted in the sleeve is a downwardly projecting tube 17 the lower end of which carries a flange 18. The tube is pressed downwardly by an inside coil spring 19 compressed between its lower end and a cap 20 screwed on the upper end of the sleeve. The cap is provided with a central opening in which a tubular nut 21 is threaded for adjusting the pressure on the coil spring.

Removably connected to the bottoms of flanges 18 are the upper ends of stamp-supporting members 23 and 24. Member 23 supports a stamp 25 for decorating the upper surface of the bottom of a dinner plate 26 or the like, while member 24 supports a stamp 27 that will stamp a design around the brim of the same plate. Member 23 is slightly longer than the other one because the center stamp engages the plate at a lower level.

The preferred embodiment of the invention is 55

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It will be seen that the stamps are cushioned by the springs 19 above them which permit the tubes 17 to be pushed up into the sleeves 12. The stamps therefore can properly engage the ware without danger of breaking it.

Disposed above the table at opposite sides of bearing 2 and directly below the two stamps in axial alignment therewith are inking and ware-supporting members. As shown in Figs. 1, 5, and 6, the ware-supporting member comprises a horizontal chuck 30 provided with a central recess in which a flexible suction cup 31 is disposed. The top of the cup must be tightly engaged by the bottom of the plate 26 before the foot of the plate can rest on the chuck. The center of the cup and chuck have a passage 33 opening into the upper end of a vertical pipe 34 on which the chuck is rigidly mounted. The pipe extends down through table 1 and is supported by a coupling 36 secured to the bottom of the table and connecting the pipe with a tube 37. This tube is connected through a valve 38 to a suitable source of suction (not shown). When the valve is opened, the air pressure between the suction cup and the plate is reduced so that the plate is drawn down tightly onto the chuck and held there against displacement during stamping.

Just before valve 38 is opened, the plate is centered on the chuck by three vertical centering fingers 40 mounted on the ends of arms 41. The opposite ends of the arms are pivotally mounted on the upper ends of pins 42 secured to the top of the frame at equally spaced intervals around the chuck and at uniform distances from its axis. Rotatably mounted on each pin below arm 41 is a roller 43 that projects into a peripheral groove in a horizontal ring 44. The ring is rotatably supported by the rollers. The pivoted end of each arm has a bifurcated lateral projection 46 that straddles a pin 47 projecting from the top of the ring. It will thus be seen that if the ring is turned, pins 47 will swing the arms and cause the centering fingers either to engage and center a plate mounted on the chuck or to move away from the plate, depending upon which way the ring is turned.

For turning ring 44, a pin 48 projecting from its bottom is engaged by the bifurcated end of an arm 49 rigidly mounted on the upper end of a shaft 50 that is journaled in table 1 and in a bearing 51 on beam 7 below. The lower end of the shaft carries a laterally projecting arm 53 (Fig. 7) that is periodically swung back and forth by an actuating member. This member includes a screw 54 to which arm 53 is pivotally connected and which is screwed into one end of a rod 55 slidably mounted in bearings 56 and 57 mounted on beam 7. Mounted on the rod between these bearings is a collar 58 between which and bearing 56 a coil spring 59 is compressed for urging the rod toward the right. The movement of the rod in that direction is limited by lock nuts 60 screwed on the end of the rod and abutting against bearing 56. The other end of the rod engages a notched cam 61 (Figs. 1 and 7) rigidly mounted on a horizontal cam shaft 62 journaled in bearings 63 supported by beams 7 and 8. Every time one of the cam notches reaches the adjoining end of the rod, spring 59 moves the rod toward the axis of the cam and thereby turns shaft 50. If the plate is engaged by all three centering fingers before rod 55 stops moving, the plate will not be broken because the spring is not strong enough for that.

Shaft 62 is driven continuously from an elec-

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tric motor 64 mounted in the base of the frame. The motor is connected by a belt 65 to a pulley 66 on one end of a shaft 67 which drives the cam shaft through a speed reducing unit 68, all as shown in Figs. 1, 3, and 7.

As shown in Figs. 1, 4, and 6, the inking member on the side of sleeve bearing 2 opposite to the chuck includes a circular disc or platen 70 rigidly mounted on the upper end of a shaft 71 journaled in a bearing 72 mounted on table 1. The platen is periodically inked with gold, silver or other ceramic color by a roll 73 journaled in brackets 74 mounted on sleeves 75. The latter are slidably mounted on horizontal rods 76 supported by the table below the platen on opposite sides of bearing 72. The desired color may be supplied to the inking roll from a small tank 77 supported above it. The color is forced out of small openings in the bottom of the tank at the desired rate by air pressure which is supplied through a flexible hose 78 from a suitable source (not shown).

The color-carrying roll is rolled back and forth across the platen by a pair of links 80 pivotally connected to sleeves 75 and to the upper end of a lever 81 that moves in a longitudinal slot 82 in the table. The lower portion of the lever is pivotally mounted in a bearing 83 supported by a cross member 84 attached to beams 7 and 8. The lower end of the lever is pivotally connected by a link 86 to the outer end of an arm 87 projecting from a shaft 88 journaled in pedestal bearings 89 on the bottom of the frame. This shaft is oscillated by a sprocket 91 mounted thereon and connected by a chain 92 to a sprocket 93 mounted on a shaft 94 journaled in bearings 95 supported by the frame. Shaft 94 is oscillated by an arm 97 the outer end of which is pivotally connected by a vertical link 98 to the outer end of a lever 99. The opposite end of this lever is pivotally mounted on a horizontal shaft 100 journaled in bearings 101 connected to the side of upright members 102 extending from the table down to beams 7 and 8. The central portion of lever 99 carries on one side a roller 103 that projects into a groove 104 in a cam disc 105 (Fig. 9) rigidly mounted on cam shaft 62. Thus, as the cam shaft rotates, the lever is raised and lowered, which oscillates sprocket 93. Shaft 94 also carries a bevel gear 107 that meshes with a bevel pinion 108 on the lower end of post 4, whereby the post is turned when shaft 94 is rotated. The relation of the gear teeth to the pinion teeth is such that for each oscillation of the gear, the post is rotated 180°. Likewise, the ratio of sprockets 91 and 93 is such that for each oscillation of the larger sprocket, arm 87 is swung 180° to cause the inking roll to make one trip across platen 70 and back.

In order to reciprocate the stamps so that they will engage plate 26 and the inking platen, a cylindrical bearing 110 is loosely mounted on the lower end of hollow shaft 3 between a pair of collars 111. Opposite sides of this bearing are recessed to provide parallel flat areas against which blocks 112 are reciprocable transversely of the shaft as shown in Figs. 1 and 7. These blocks are pivotally connected by pins 113 to the forks of the bifurcated end of a lever 114. The opposite end of the lever is pivotally mounted on shaft 100, while one side of its central portion carries a roller 115 that projects into a groove 116 in the side of cam disc 105 opposite to groove 104. Consequently, as the cam raises and lowers the lever, hollow shaft 3 is moved up and

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down on post 4 with which the shaft can rotate in bearing 110. When the shaft descends, axial alignment of the stamps with the ware on chuck 30 is assured by guide fingers 117 projecting downwardly from crosshead arms 9 and 10 and which slide into the bifurcated end of a guide member 118 projecting laterally from the top of sleeve bearing 2. Lateral movement of the stamps during stamping is thus prevented. Also, as the stamps descend, a valve tripper 119 projecting from the side of bearing 110 opens valve 38 in suction line 37 and holds it open until after the stamps have risen away from the ware.

Every time the stamps are moved downwardly the inking platen is rotated a few degrees by an upright lever 120 rigidly connected at its lower end to lever 114. The upper end of the lever is connected by a compressible link 121 (Fig. 2) to a pin 122 (Fig. 4) depending from an annular clutch plate 123. This plate is oscillatably mounted on a stud 124 projecting down from the center of a ratchet 126 having a hub projecting up through an opening in table 1 and rigidly fastened to the lower end of platen shaft 71. Between the ratchet and the clutch plate there is a ring 127 of friction material against which the clutch plate is tightly pressed by a coil spring 128 compressed between it and a collar 129 held on stud 124 by a nut 130 threaded on the stud. Thus, when the clutch plate is rotated by link 121, the friction ring 127 causes the ratchet and platen to turn with it so that color is distributed over it uniformly. The distance that they can be turned is limited, as shown in Fig. 6, by a stop 132 projecting from the clutch plate and engaging the end of a stop rod 133 fastened to the bottom of the table. The platen is thus brought to rest before a stamp engages it, but if lever 120 is still in motion when the clutch plate is stopped, no harm will result because spring 134 in link 121 will absorb the excess motion.

To prevent the ratchet from being pulled back to its original position when lever 120 reverses its movement, a spring-pressed dog 135 is pivotally mounted on the bottom of the table with its free end engaging the ratchet teeth, thereby permitting the ratchet to move in only one direction. The clutch plate slides against the ratchet on the return stroke of lever 120.

As mentioned before, the center stamp is necessarily disposed with its stamping surface at a lower level than that of the brim stamp 27. It therefore will be seen that unless something is done to prevent it, the center stamp will engage the inking platen sooner than the other one does and thus press against it with considerably greater force. This would be harmful to the stamp and would apply too much color to it so that it would smear the design on the ware. Accordingly, to keep the center stamp from engaging the platen with any more force than the brim stamp, the downward movement of the center stamp is positively limited. This preferably is done by means of a vertical rod 140 slidably mounted in the tubular nut 21 above the center stamp. The rod extends down through the spring 19 and has a head 141 at its lower end that engages the bottom of flange 18. The rod also projects above nut 21 a considerable distance and its upper end is threaded and carries lock nuts 142.

When the crosshead is rotated and the center stamp is swung around into position above the inking platen, rod 140 enters a lateral notch 143 (Fig. 10) in the end of a horizontal arm 144 pro-

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jecting over the crosshead from a vertical column 145 mounted on table 1. As the crosshead is lowered, the rod slides downwardly in notch 143 until nuts 142 strike the top of arm 144 as shown in Fig. 8. This prevents any further downward movement of the center stamp, so the continued downward movement of crosshead arm 9 slides the adjoining sleeve 12 down on tube 17 while spring 19 is further compressed inside. Of course, the crosshead moves down only far enough to press the brim stamp 27 against the ware. Nuts 142 are so positioned on rod 140 that the center stamp is stopped as soon as it engages the inking platen with the desired amount of pressure.

In using this machine for decorating dinner plates, for example, an operator stands at the left end of the machine as viewed in Fig. 1. He takes a plate 26 from a pile beside him and places it on chuck 30 while the stamps are raised. Just as cam 105 starts to swing lever 114 downwardly to thereby lower shaft 3 and the stamps, the cam 61 permits spring 59 to push rod 55 to the right. This operates to swing centering fingers 40 inwardly against the plate to center it on the chuck. Before the fingers are retracted, downwardly moving valve tripper 119 opens valve 38 so that the plate is held by suction in centered position on the chuck. Cam 61 swings the centering fingers out of the way before the plate is stamped. At the same time that the plate is stamped by one stamp, the other stamp engages and is inked by the inking platen. Lever 114 is then raised by cam 105 to lift the stamps to the position shown in Fig. 1. The plate in that figure has just been decorated by center stamp 25.

It will be observed that as cam 105 in Fig. 1 continues to be rotated in a counterclockwise direction by continuously rotating shaft 62, lever 114 remains in its upper position while the cam lifts lever 99 to the position shown in Fig. 8. This swings arm 97 upwardly and thereby rotates shaft 94 which in turn, through gear 107 and pinion 108, turns post 4 to swing inked stamp 27 in a horizontal plane to a position over the plate and to swing center stamp 25 over the inking platen. Shaft 94 also rotates shaft 86 to swing arm 87 180° from its lower position in Fig. 1 to its upper position shown in Fig. 8. This movement of the arm swings lever 81 on its pivot which thereby moves the inking roll across the platen and back while the stamps are changing places.

Cam 105 then keeps the stamps in their new positions for a short time while it swings lever 114 downwardly to lower the stamps against the ware and inking platen. The positions of the elements of the machine at this moment are shown in Fig. 8. As explained previously, rod 140 connected to stamp 25 will slide downwardly in notch 143 in arm 144 until it is stopped by nuts 142 which prevent the center stamp from pressing too hard against the platen.

As lever 114 is swung downwardly, it swings upright lever 120 to the left, which, through the clutch shown in Fig. 4, rotates the platen a few degrees before a stamp engages it. When lever 114 is raised again, which happens before lever 99 rotates post 4 180° back to its original position, lever 120 is swung back to the right, but the dog and ratchet prevent the platen from turning backward. As shaft 3 rises, the valve tripper 119 closes suction valve 38 which thereupon admits atmospheric pressure to the underside of the plate to release it from the chuck. Immediately

thereafter, cam 105 lowers lever 88 and thereby swings the stamps back to their original positions with the center stamp ready to stamp a new piece of ware as soon as it has been centered on and affixed to the chuck by suction.

With decorating apparatus constructed in accordance with this invention, any person who can place ware on the chuck and remove it therefrom can decorate the ware more perfectly and much faster than has been possible heretofore. An entire design is stamped in a single operation on automatically centered ware by an automatically inked and actuated stamp. The result is lower cost and better decoration with losses due to imperfect decorations reduced to a minimum.

According to the provisions of the patent statutes, I have explained the principle and construction of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A potteryware decorating machine comprising a support for ware being decorated, a decorating stamp spaced from the support, means for centering ware on said support relative to the stamp, means for holding said ware in centered position, means for releasing said centering means from the ware as soon as the ware becomes held by said holding means, and means for effecting relative movement between said support and stamp to stamp decoration on the ware.

2. A potteryware decorating machine comprising a vacuum chuck for supporting ware being decorated, a decorating stamp spaced from the chuck, automatic means for centering ware on said chuck, means for effecting relative movement between said chuck and stamp to stamp decoration on the ware, and means for releasing said centering means from the ware before it is stamped.

3. A potteryware decorating machine comprising a horizontal support for ware being decorated, a vertically reciprocable decorating stamp above the support, movable means for engaging the edge of and centering ware on said support relative to the stamp above it, resilient means for moving said centering means against the edge of the ware, means for holding the centered ware on the support, and means for moving said centering means away from the ware before said stamp engages the ware.

4. A potteryware decorating machine comprising a horizontal support for ware being decorated, a vertically reciprocable decorating stamp above the support, laterally movable members for engaging ware on said support and centering it thereon relative to the stamp above it, resilient means for periodically moving said members toward said support, and means for moving said members away from the support after ware has been centered thereon but before it has been stamped.

5. A potteryware decorating machine comprising a horizontal support for ware being decorated, a vertically reciprocable decorating stamp above the support, laterally movable members for engaging ware on said support and centering it thereon relative to the stamp above it, means for periodically moving said members toward and away from said support, means for holding the

ware in centered position on the support and means for lowering the stamp against ware on said support after said members have been withdrawn from said ware.

6. A potteryware decorating machine comprising a vacuum chuck for supporting ware being decorated, a decorating stamp above the chuck, a vertically reciprocable support for the stamp, means for centering ware on the chuck, means for inking the stamp, and means actuated by said support as it is lowered for reducing the air pressure between the chuck and centered ware resting thereon.

7. A potteryware decorating machine comprising a vacuum chuck for supporting ware being decorated, a decorating stamp spaced from the chuck, means for centering ware on the chuck, means for reducing the air pressure between the chuck and centered ware to hold the ware in fixed position, and means for effecting relative movement of said support and stamp toward each other to stamp decoration on the ware, said centering means moving away from the ware before it is stamped.

8. A potteryware decorating machine comprising a table, a support on said table for ware being decorated, an inking member on said table at one side of the support, a rotatable and vertically movable vertical shaft extending through the table between the support and inking member, a pair of arms projecting from the shaft over said support and member, a decorating stamp carried by each arm, means beneath the table for turning the shaft 180° in opposite directions to reverse the positions of the stamps, and means beneath the table for periodically lowering the shaft to alternately move each stamp down against the inking member and then against the ware to stamp it.

9. A potteryware decorating machine comprising a support for ware being decorated, an inking member at one side of the support, a pair of laterally spaced decorating stamps above said support and inking member, one of the stamps being smaller and lower than the other to stamp the bottom of the ware, means for periodically reversing the positions of the stamps over said support and inking member, means for lowering the stamps in both positions to ink them and to stamp the ware, and means for limiting the downward movement of said smaller stamp from its position above the inking member, whereby it engages the inking member with only the desired pressure.

10. A potteryware decorating machine comprising a support for ware being decorated, an inking member at one side of the support, a pair of laterally spaced decorating stamps above said support and inking member, a common support for the stamps, one of the stamps being smaller and normally disposed farther below said common support than the other, means vertically movable in the support and carrying the smaller stamp, means for periodically rotating the support 180°, means for lowering the support in both of its positions to ink the stamps and stamp the ware, and means for limiting the downward movement of said stamp-carrying means when it is above the inking member, whereby the smaller stamp engages the inking member relatively lightly.

11. A potteryware decorating machine comprising a support, a rotatable vertical post extending through said support, a hollow shaft splined on the post and journaled in said support, a pair of arms projecting in opposite direc-

tions from the top of the shaft, a decorating stamp suspended from each arm, a ware-receiving chuck below one of the stamps, an inking member below the other stamp, cam activated means below said support for periodically rotating the post to reverse the positions of the stamps, and cam actuated means below said support for periodically lowering said shaft to simultaneously move one stamp down against the inking member and the other stamp against the ware.

12. A potteryware decorating machine comprising a rotatable vertical post, a hollow shaft slidably mounted on the post, a pair of arms projecting in opposite directions from the top of the shaft, downwardly biased means connected to the outer end of each arm, a decorating stamp connected to the lower end of each of said means, one of said stamps being smaller and disposed lower than the other, a ware-receiving chuck below one of the stamps, an inking member below the other stamp, means for periodically lowering said shaft to simultaneously move one stamp down against the inking member and the other against the ware, and means for limiting downward movement of the downwardly biased means connected to said smaller stamp when above the inking member, whereby to limit the pressure with which that stamp engages the inking member.

13. A potteryware decorating machine comprising a support for ware being decorated, an inking member at one side of the support, a rotatable and vertically movable vertical shaft, an arm projecting from the shaft in a plane above the support and inking member, a pair of vertically disposed telescoping members mounted in said arm, a spring biasing said telescoping members apart, means for adjusting the telescoping members vertically in said arm, a decorating stamp carried by the lower telescoping member, means for turning the shaft to swing the stamp from a position above the inking member to a position above said support, and means for periodically lowering the shaft to move the stamp down against said inking member and then down against the ware to stamp decoration on it.

14. A potteryware decorating machine comprising a vacuum chuck for supporting ware being decorated, a decorating stamp above the chuck, a vertically reciprocable support for the stamp, means for engaging the edge of ware for centering it on the chuck, means for inking the stamp, and means for reducing the air pressure between the chuck and centered ware resting thereon, said centering means being released from the edge of the ware before it is stamped.

15. A potteryware decorating machine comprising a support for ware being decorated, an

inking member at one side of the support, a pair of laterally spaced decorating stamps above said support and inking member, one of the stamps being smaller and normally on a different level than the other, means for periodically reversing the positions of the stamps over said support and inking member, means for lowering the stamps in both positions to ink them and to stamp the ware, and means for limiting the downward movement of the normally lower stamp from its position above the inking member, whereby it engages the inking member with only the desired pressure.

16. A potteryware decorating machine comprising a support for ware being decorated, an inking member at one side of the support, a pair of laterally spaced decorating stamps above said support and inking member, one of the stamps being smaller and normally on a different level than the other, means for periodically reversing the positions of the stamps over said support and inking member, means for lowering the stamps in both positions to ink them and to stamp the ware, an arresting member adjacent the inking member, and means connected to said normally lower stamp for periodically engaging said arresting member to limit the downward movement of said lower stamp from its position above the inking member, whereby it engages the inking member with substantially the same pressure as the other stamp.

WALTER H. EMERSON.

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