

May 3, 1938.

W. M. SECOY

2,116,466

MACHINE FOR AND METHOD OF DECORATING WARE

Filed March 15, 1935

4 Sheets-Sheet 1

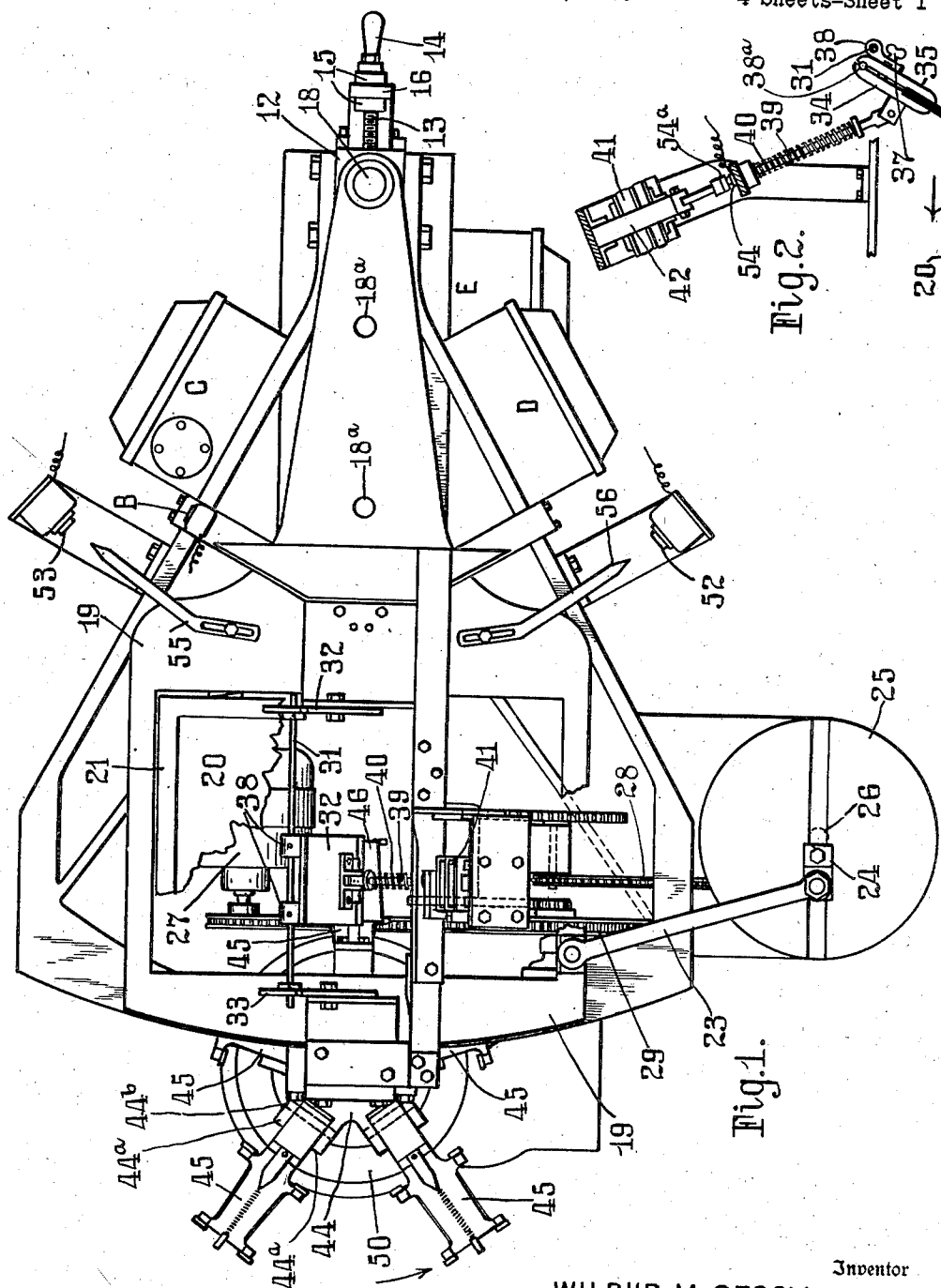


Fig. 1.

Fig. 2.

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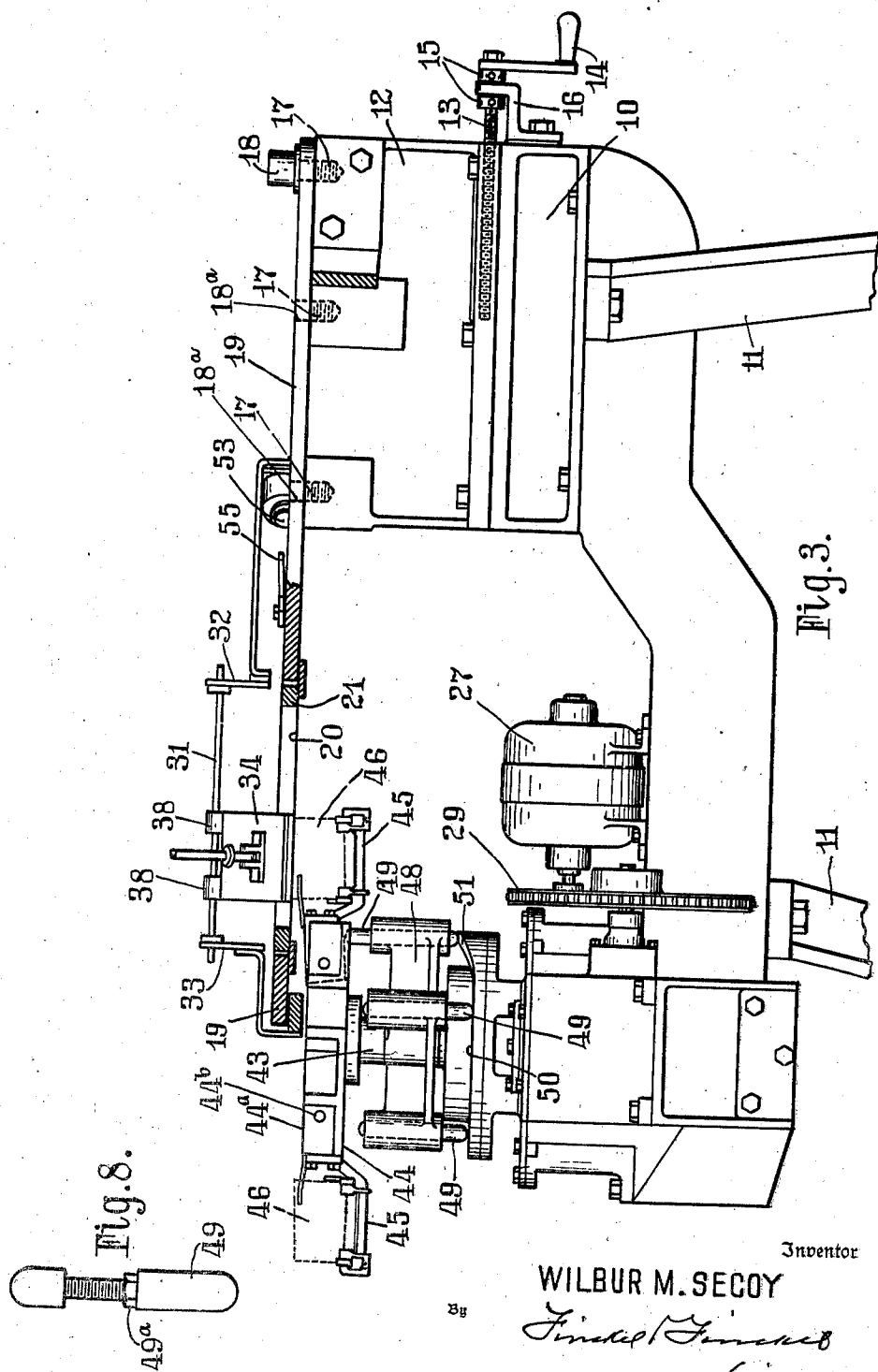
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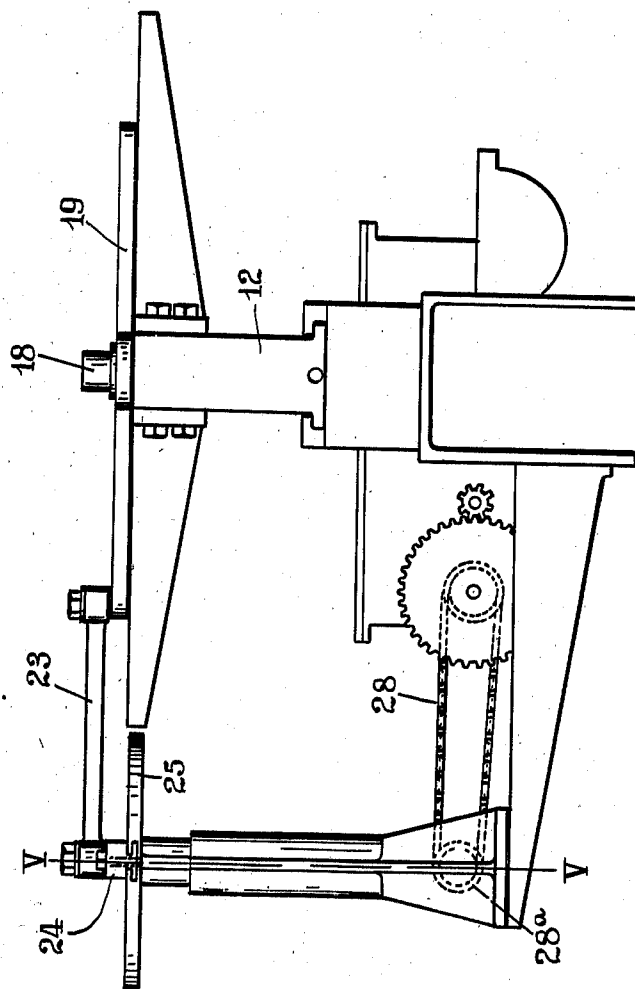


Fig. 4.

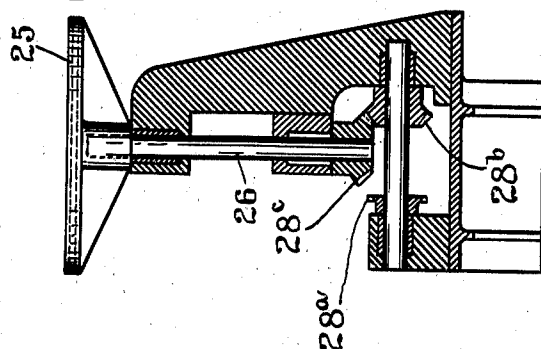


Fig. 5.

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4 Sheets-Sheet 4

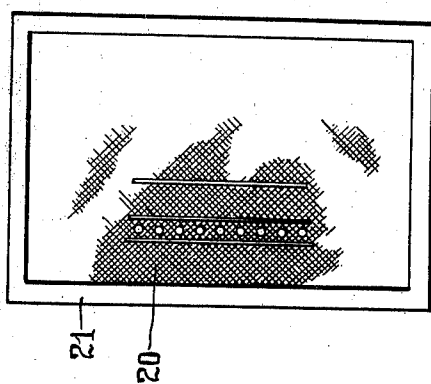


Fig. 6.

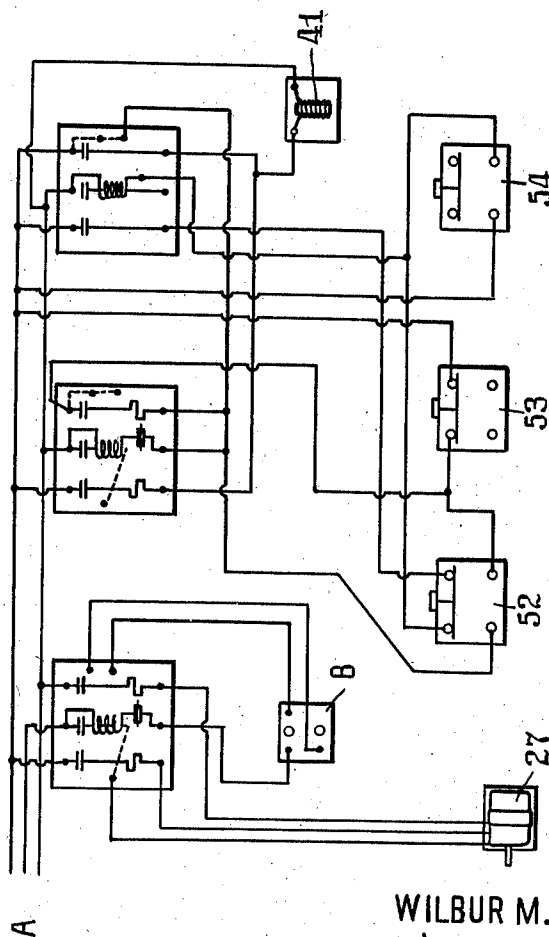


Fig. 7.

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UNITED STATES PATENT OFFICE

2,116,466

MACHINE FOR AND METHOD OF DECORATING WARE

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Application March 15, 1935, Serial No. 11,304

31 Claims. (Cl. 101—124)

The invention relates to a machine for and method of decorating or marking vessels or containers with figures or designs of paint or other coating material and more particularly tumblers.

5 Tumblers are usually wholly or partially frusto-conical or tapering in form and it has been the primary object of the invention to provide an improved machine that is especially adapted to apply quickly and neatly the decoration or marking to articles of that type.

10 It has been the further object of the present invention to provide an apparatus for delivering and pressing the articles to be decorated into frictional engagement with the screen in juxtaposition to the squeegee as the design portion of the screen traverses the squeegee, whereby the motion of the screen rotates the circular article to be decorated and the paint or the like is forced through the screen to decorate the article on substantially a line contact.

20 It is the further object of the present invention to provide control means for the squeegee whereby the squeegee may be elevated on the back stroke of the screen, during which time it is proposed that the screen will not be engaged by the article and is, therefore, unsupported.

25 It is a further object of the present invention to provide an improved conveyor or delivery means for successively bringing the articles to be stenciled into contact with the screen, including means for pressing the articles against the screen during the proper period, therefore contemplating a novel conveyor arrangement for rotatably and adjustably mounting the articles to be stenciled.

30 It is a further object of the present invention to provide an improved method of decorating tumblers or the like enabling the performance of a better stenciling operation by the correct co-ordination of the movements in relationship to the parts during the act of stenciling.

In the accompanying drawings—

35 Figure 1 is a plan view, with parts broken out, illustrating a machine according to the invention.

40 Fig. 2 is a detail view of the squeegee or paint applicator.

Fig. 3 is a view in elevation of the right hand side of the machine as viewed from the front of the point where the ware is fed to the machine, with parts in section and parts omitted.

Fig. 4 is a detail view in elevation looking from the rear of the machine to illustrate the mechanism for oscillating the stencil carrying frame.

Fig. 5 is mainly a vertical section on the line V—V Fig. 4, with pitman and connection omitted.

Fig. 6 is a plan view of the stencil containing a design over which the squeegee works.

Fig. 7 is a conventional diagram of the electric wiring where the operation of the machine is to be made automatic in some respects.

Fig. 8 is a detail, on a large scale, of a pin for elevating the chucks.

In the views 10 designates a stationary frame that is supported by suitable legs 11, fractions only of which are shown. On the rear end of said frame is slidably supported a second frame member 12 that is adjustable by means of a screw 13 operated by a handle 14, there being stops 15 on said screw 13 to engage the opposite sides of a bracket 16 fixed on said frame 10 to secure the sliding frame 12 in a position to which adjusted by the screw.

The adjustable frame 12 has in its upper portion three threaded sockets 17, any of which receives the threaded pivoting pin 18 to constitute a fulcrum for a horizontally oscillating frame 19, called a "banjo", for receiving and carrying a stencil, as shown. By shifting the pin 18 from one socket to another through the corresponding hole 18^a in the banjo the radius of oscillation of the banjo can be varied.

Said stencil, which is illustrated in Fig. 6, in the present instance, consists of a web of net-like silk fabric 20 coated on both sides with a suitable material, varnish or shellac and painted so as to leave a screen in the silk constituting the desired design for decorating or marking the ware and through which screen the paint is forced to the ware, said stencil being stretched and secured upon a wooden frame 21.

The banjo is oscillated by means of a pitman rod 22 pivotally connected at one end with the stencil carrier or banjo 19 and pivotally connected at its other end to a block 24 that is slidably connected by a tongue and groove connection with the disk 25 fixed to the upper end of a vertical spindle 26. The block 24 is provided with ordinary means whereby it can be clamped or fixed at different points in the diametrical groove of the disk and thereby vary the amplitude of oscillation of the banjo whatever be its radius of oscillation.

The spindle 26 is rotated by the electric motor 27 through suitable gearing including the driven sprocket chain 28, sprocket wheel 28^a and bevel gears 28^b and 28^c. Because the block 24 can be adjusted to and fixed in different positions in said diametrical groove in the disk 25 the oscillations of the stencil carrier 19 and stencil therein can be varied according to the circumference of the

article or portion thereof to be decorated or otherwise printed.

By combining in the same machine the means for varying the radius and varying the amplitude of the strokes of the banjo the machine is adapted to operate on runs of ware differing in their taper and circumference.

The paint applicator or squeegee, shown in Fig. 2, is hingedly supported by means of a shaft 31 loosely mounted at its ends in standards 32 and 33 secured to the frame. Said squeegee consists of a strip of sheet rubber or other suitable material adapted to spread paint, said strip being clamped between a pair of metallic plates 34 and 35, connected together and with hangers 36 to swing with the shaft 31 by a screw bolt and thumb nut 37, but the plates 34 and 35 can be directly connected to the shaft 31 at the opening 38. The squeegee is shown in Fig. 2 as hingedly connected with a rod 39 encircled by a coil spring 40 that tends to press the squeegee lightly against the stencil.

In order to automatically elevate the squeegee from the stencil in the non-working stroke of the banjo the rod 39 is provided at its upper end with an armature cooperating with a solenoid 41 mounted in a fixed frame 42 and energized electrically to withdraw the squeegee from the stencil at the end of the working or paint applying stroke of the banjo. When the squeegee is swung down to operating position its lower edge rests on the stencil 20 in an inclined position, as shown in Fig. 2, so that when the stencil is moved under it by the stroke of the banjo in one direction paint is squeezed or wiped from the upper surface of the stencil into and through the screen openings and onto the rotated ware below.

Supported on the main frame at the front end thereof is a turntable mechanism comprising a vertical rotary column 43 having secured thereto a suitable spider 44 hinged for upward movement at 44^a to arms 44^b of which are five chucks 45, each containing anti-friction rollers for supporting the ware (shown at 46) to be decorated. Said column 43 can be intermittently rotated by means of any suitable Geneva movement (not shown) operated by the electric motor 27 through gearing including chain 29 so as successively to place each of the articles to be decorated in proper temporary position axially below the stencil in the interval between the rotations of the spider by the Geneva movement. An illustration of the Geneva movement suitable for the machine, with obvious modification for the present purpose, is shown and described in the patent of the United States patented to Edward Miller No. 1,932,141, dated October 24, 1933.

Revolving with the rotatable column 43 below the tumbler or ware-carrying head is a wheel 48 carrying five vertically movable gravity actuated pins 49, one for each of the ware carrying chucks. Said pins (see Fig. 8) are each made of two parts united by screw threads so as to be adjustable as to length, the parts being held by a jam nut 49^a after adjustment. Because of this adjustability of the pin articles to be decorated of different taper can be elevated to make the proper line contact with the lower face of the stencil.

The lower ends of said pins 49 travel on a circular stationary ledge 50 provided at its inner or rear surface with an upwardly projecting inverted V-shaped cam 51 positioned so that it elevates the pin 49 and the chuck and the ware

thereon to a position to make a line of contact with the lower face of the stencil. This contact of the ware with the stencil is such that friction of the stencil, when swung by the banjo, causes the elevated ware to rotate in the chuck on the anti-friction rollers of the latter.

It will be observed that the machine thus described includes more importantly an oscillated stencil, a chuck or chucks for presenting specimens of the ware to the lower face of the stencil, the ware being rotated by the friction of the stencil on the ware upon an oscillation of the stencil, and a removable squeegee for applying paint through openings constituting the design of the marking or decoration. Such parts can be operated by hand.

In Fig. 7 there is shown diagrammatically means for electrically and automatically operating parts of the machine. In the diagram, as shown in Fig. 7, the power circuit comes in at A.

At 27 is the motor which operates the ware chuck carrier and also drives the shaft 26 for oscillating the banjo. At 52 is the contact of a circuit for lifting the squeegee from the stencil, at 53 is the contact of a circuit for lowering the squeegee to rest on the stencil, at 54 is a safety switch for causing the elevation of the squeegee in the event the attendant fails to place any ware on the chuck, thus preventing injury by the squeegee to the stencil, and at 41 is the solenoid for raising the squeegee.

In operation the motor is started by closing a switch at B. Through the train of gearing and sprocket chains driven by the motor the ware holding chucks are rotated with a step by step movement to present and hold a tumbler to the lower side of the stencil and the stencil carrying frame oscillated. Adjustably fixed on the oscillating frame are electric switch operating fingers 55 and 56 which alternately operate the switches 52 and 53 to cause the automatic raising and lowering of the squeegee. One of said switches energizes the solenoid 41 to raise the squeegee from the stencil, and the other of said switches deenergizes said solenoid to permit the spring 40 to press the squeegee downward on the stencil to spread and force paint through the pattern to the ware below.

Attached to the solenoid frame 42 is the electric switch button 54 that is operated by a cross bar 54^a on the squeegee rod to energize the solenoid and raise the squeegee when there is an excessive downward movement of the squeegee which, as before stated, happens when the attendant fails to insert a tumbler on the chuck, thus preventing injurious pressure on the stencil.

In practice the ware is placed in the chuck by an attendant and after receiving the decoration is removed by another attendant, and the operating gearing is timed to hold the ware under the stencil and the squeegee down on the stencil during the paint applying swing of the banjo, the lifting of the squeegee from the stencil being effected upon the completion of the swing of the banjo and a fresh piece of ware positioned for printing at the close of the return stroke. The electrical circuit and apparatus are mainly for convenience and safety confined in the housings C, D and E with external wires leading thereto.

The term "decorate" and its derivations includes also the marking of ware with any desired characters for commercial purposes.

The forms of the parts can be changed without departing from the gist of the invention as claimed.

What I claim is:

1. In a machine for decorating ware with paint or similar material, an oscillating frame for carrying a stencil, a squeegee operating at one face of said stencil and a plurality of chucks on a rotatable column for supporting each piece of ware in succession at the opposite face of said stencil, said ware to receive paint fed through the stencil by said squeegee.

2. In a machine for decorating ware with paint or similar material, an oscillating frame for carrying a stencil, a squeegee to operate at one face of said stencil, and a rotatable column carrying a plurality of movable chucks for supporting the ware and means whereby ware in said chucks are successively presented to the opposite face of said stencil, said ware to receive paint fed through the stencil.

3. In a machine for decorating ware having a curved cross section with a paint or similar material, a swinging frame for carrying a stencil, a squeegee operating at one face of said stencil, a rotatable column carrying a plurality of chucks for said ware hinged thereto, and means whereby said chucks are successively elevated to cause a substantially parallel contact of the ware with the opposite face of said stencil.

4. In a machine for decorating ware with paint or similar material, an oscillating frame for carrying a stencil, a squeegee to operate at one face of said stencil, and a plurality of chucks mounted on a rotatable column for supporting the ware at the opposite face of said stencil, said ware to receive paint fed through the stencil upon the oscillation of said frame in one direction and means for causing the separation of the squeegee and stencil when said frame is oscillated in the opposite direction.

5. In a machine for decorating ware with paint or similar material, an oscillating frame for carrying a stencil, a squeegee to operate at one face of said stencil, and a chuck for supporting a piece of ware at the opposite face of said stencil, and means for oscillating said frame, said oscillating means incorporating a stroke adjustment device.

6. In a machine for decorating ware with paint or similar material, an oscillating frame for carrying a stencil, a squeegee to operate at one face of said stencil, and a chuck for supporting a piece of ware at the opposite face of said stencil, and means whereby the radius of oscillation of said frame can be varied.

7. In a machine for decorating ware with paint or similar material, an oscillating frame for carrying a stencil, a squeegee to operate at one face of said stencil, a chuck for supporting the ware at the opposite face of the stencil, means whereby the radius of oscillation of said frame can be varied and means whereby the amplitude of oscillation of said frame can be varied.

8. In a machine for decorating ware having a curved cross section with a paint or similar material, a swinging frame for carrying a stencil, a squeegee operating at one face of said stencil, a chuck for said ware, and means whereby said chuck is moved to cause a substantially parallel contact of the ware with the opposite face of said stencil, said contact causing rotation of the ware when the stencil is swung.

9. In a machine for decorating regularly tapered ware with a paint or similar material, a swinging frame for carrying a stencil, a squeegee operating at one face of said stencil, a chuck for rotatably supporting the tapered ware, and means whereby said chuck is moved to cause substan-

tially parallel contact of the ware with the opposite face of said stencil.

10. In a machine for decorating regularly tapered ware with a paint or similar material, a swinging frame for carrying a stencil, a squeegee operating at one face of said stencil, a chuck for the tapered ware and means whereby said chuck is moved to cause substantially parallel contact of the ware with the opposite face of said stencil and said ware is caused to rotate by the stencil when the stencil is swung by its carrier.

11. In a machine for decorating ware with paint or similar material, a swinging frame for carrying a stencil, a squeegee operating at one face of the stencil, a chuck for supporting the ware at the opposite face of said stencil, said ware to receive paint fed by the squeegee through the stencil upon the oscillation of said frame, and means for automatically removing said squeegee from the stencil when the paint feeding operation is completed.

12. In a machine for decorating ware with paint or similar material, an oscillatable frame for carrying a stencil, a squeegee operating at one face of the stencil, a chuck for supporting the ware at the opposite face of said stencil, said ware to receive paint fed through the stencil upon the oscillation of said frame, power means for oscillating said frame, and means for automatically elevating said squeegee from the stencil upon alternate strokes of said oscillating frame.

13. In a machine for decorating ware with paint or similar material, a movable frame carrying a stencil, a squeegee operating at one face of said stencil, a chuck for supporting the ware at the opposite face of said stencil and means for restraining pressure of the squeegee on the stencil when unsupported by the ware below the stencil.

14. In a machine for decorating ware with paint or similar material, a frame carrying a stencil, a rotatable column, a ware supporting chuck hingedly supported for vertical movement on said column, a stationary cam member with reference to which said chuck is swung horizontally and an adjustable pin carried between said chuck and said cam member for actuating said pin to elevate said chuck and the ware thereon to cause a surface of said ware to be decorated to lie in parallel relation to said stencil.

15. The method of decorating a container having a conical exterior surface consisting in moving said container transversely of its axis to bring said surface into frictional contact with one face of a stencil, moving said stencil while in contact with the container and thereby rotating said container and applying a decorating material through said stencil to the container as the latter advances in contact with the screen.

16. A machine for decorating conical articles comprising, in combination, holding means for the article, rotatable means upon which said article is supported to rotate on its axis, a stencil device and means for oscillating the same on an axis inclined to said first mentioned axis, said stencil device having a screen and adapted to rotate said article by tractional engagement, and means for applying decorating material through said screen while the article is rotated by the stencil device.

17. A machine for decorating articles comprising, in combination, holding means for the article, an article support on said holding means permitting rotation of the article about an axis, a stencil, and means for oscillating said stencil about an axis inclined to said first mentioned axis,

said stencil having tractional engagement with said article, for rotating the same.

18. A machine for decorating the surface of an article comprising means for holding the article, means supporting the article for rotation about an axis, a screen frame, a screen carried thereby, means for oscillating said frame about an axis with the screen in rolling contact with said surface, said article rotated by said rolling contact, and means to apply decorating material through said screen to said surface.

19. In an apparatus for stenciling an article having a frusto-conical surface, means for supporting the article so that it is free to rotate about the axis of said surface, a flat stencil screen mounted in tangential contact with said surface for oscillation about an axis perpendicular to said screen, means for oscillating said screen, and means whereby the position of said screen may be adjusted along the line of contact between said screen and surface independently of the axis of oscillation of said screen.

20. In an apparatus for stenciling an article having a frusto-conical surface, means for supporting the article while permitting rotation of the same about the axis of said surface, a flat stencil screen mounted in a horizontal plane in tangential contact with said surface for oscillation about a perpendicular axis, means for oscillating said screen, and means for adjusting the position of said screen horizontally along the line of contact between said screen and surface independently of the axis of oscillation of said screen.

21. In an apparatus for stenciling an article having a frusto-conical surface, means for supporting the article so that it is free to rotate about the axis of said surface, a flat stencil screen mounted in tangential contact with said surface for oscillation about an axis perpendicular to said screen, means for oscillating said screen, a stationary squeegee in contact with said screen for forcing coloring matter through said screen, and means for adjusting the portion of said screen along the line of contact between said screen and surface independently of said squeegee.

22. In an apparatus for stenciling an article having a frusto-conical surface, a flat stencil screen mounted for oscillation about an axis perpendicular to the plane of said screen, means for forcing coloring matter through said screen, means independent of said first mentioned means for adjusting the position of said screen to lengthen or shorten the radius of oscillation of the same throughout an increment of its length, and means for positioning an article against said screen with its frusto-conical surface in contact therewith.

23. In a stenciling machine for applying paint or the like to articles of ware, an oscillating frame, a stencil on said frame, a squeegee adapted to engage and pass across one face of said stencil, a chuck for supporting a piece of ware at the opposite face of the stencil, a crank and pitman mechanism for oscillating said frame, and said mechanism including a stroke adjustment device.

24. In a stenciling machine, a stencil screen, means for applying paint or the like through said stencil screen, a turntable for receiving a series of articles of ware to be decorated, said turntable including a series of supports, the axes of which are radially disposed about the turntable axis, for supporting the articles of ware and movable for successively presenting said articles of ware to the stencil screen, and said supports and stencil screen related for causing the articles of ware to engage

the screen for receiving rotation from the screen.

25. In a stenciling machine, a stenciling means including a screen, means for applying paint or the like through the screen, a turntable for supporting articles of ware in circumferentially spaced supports, and means for moving said articles to and against the surface of the screen, said turntable moving on an axis substantially at right angles to the surface of the stencil screen engaging the successive articles of ware.

26. In a stenciling machine, a movable stencil screen and means for moving it, means for forcing paint or the like through the screen, and a rotatory table means, including supports, the axes of which are radially disposed about the axis of the turntable, for receiving and successively moving articles of ware to position adjacent the screen and means for bringing the article against the screen, said rotary table means including a driving means imparting intermittent motion to the table, said driving means timed with respect to the length of the design being applied whereby each article is engaged by the stencil screen and rotated thereby while the paint or the like is being applied and then moved away as the next succeeding article is brought up.

27. In a stenciling machine, a stencil screen, means for forcing paint or the like through the screen, a turntable for articles of ware for successively moving said articles to the screen, and means for moving the articles against the screen, said turntable including a plurality of radially disposed cradles adapted to support the articles of ware radially with respect to the axis of rotation of the turntable, said cradles including support rollers for permitting easy rotation of the articles of ware, said conveyor moving on an axis substantially at right angles to the surface of the stencil screen engaging the successive articles of ware.

28. In a stenciling machine, a movable stencil screen, a stationary squeegee mounted to engage the screen for forcing paint or the like through the screen, means for presenting a series of circular articles to be decorated to the screen and squeegee, said means comprising a turntable carrying a series of article holders, radially disposed, in which the articles to be decorated are freely rotatable, driving mechanism for moving the screen and turntable in synchronization with the motion of the screen so that the articles to be decorated are presented to the screen as the design portion of the screen traverses the squeegee, and means pressing each article to be decorated into frictional engagement with the screen in juxtaposition to the squeegee as the design portion of the screen traverses the squeegee, whereby the motion of the screen rotates the circular article to be decorated and the paint or the like is forced through the screen to decorate the article on substantially a line contact.

29. In a stenciling machine, a movable stencil screen, a stationary squeegee engageable with the screen for forcing paint or the like through the screen, a conveyor unit for successively presenting circular articles to be decorated to the screen and squeegee, said conveyor unit including a series of article holders, said holders including means for rotatably supporting the articles to be decorated, whereby they may be freely rotated, driving means for rotating the screen and moving the conveyor unit in synchronism, whereby the articles to be decorated are presented to the screen as the design portions of the screen traverse the squeegee, and means successively engaging the

article holders for pressing the articles to be decorated into frictional engagement with the screen immediately adjacent to the squeegee as the design portion of the screen traverses the squeegee, whereby the motion of the screen rotates the circular article to be decorated and the paint or the like is forced through the screen for decorating the article on substantially a line contact.

30. In a stenciling machine, a movable stenciling screen, a device for applying paint or the like through the screen, and a driven disc including cradles for rotatably supporting ware to be stenciled and for successively moving the articles of ware into position adjacent said screen, the

cradles being disposed with their axes radial to the axis of the disc, and means for bringing the articles and screen into contact with one another.

31. In a machine for decorating articles of ware, a printing member, a turntable for supporting articles of ware in circumferentially spaced supports, for engagement with the printing member, and means for moving said articles to and against the surface of the printing member, said turntable moving on an axis substantially at right angles to the surface of the printing member.

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