

May 3, 1938.

W. M. SECOY

2,116,467

MACHINE FOR STENCILING WARE

Original Filed Aug. 22, 1935

5 Sheets-Sheet 2

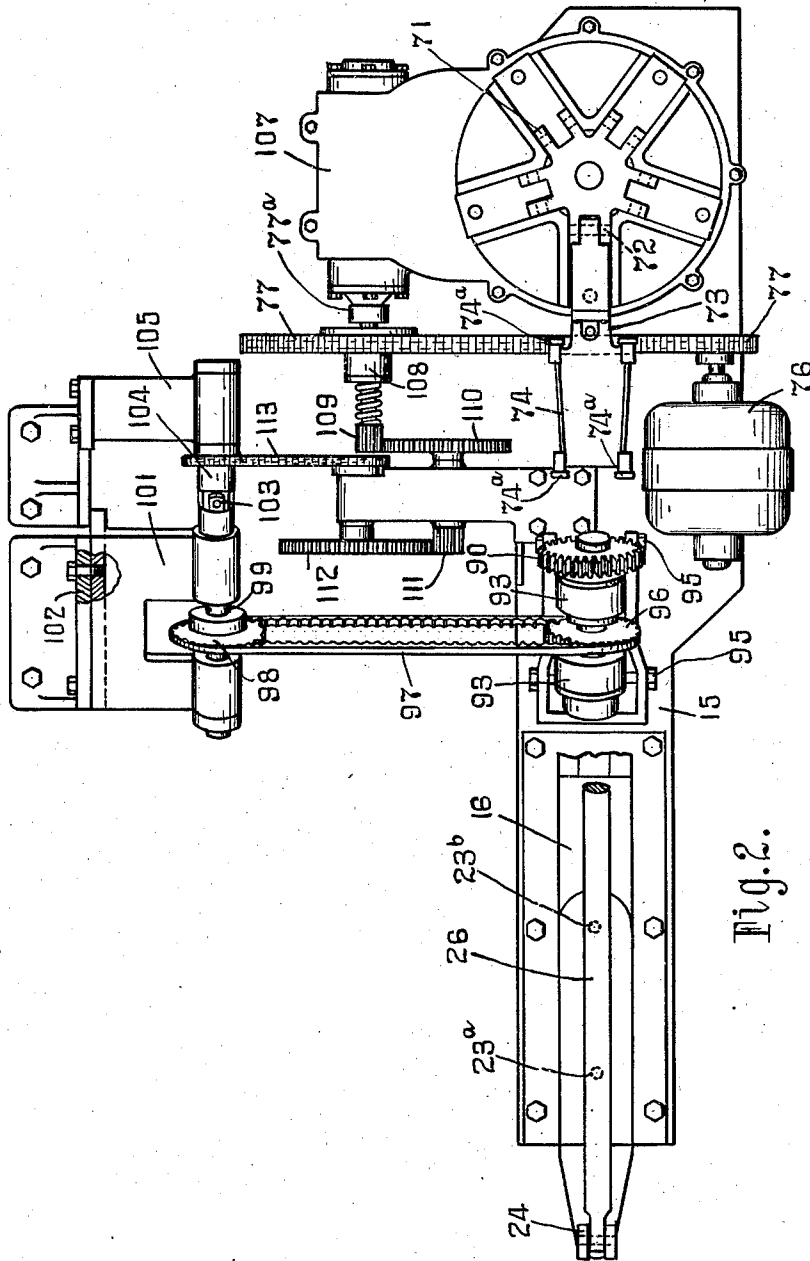


Fig. 2.

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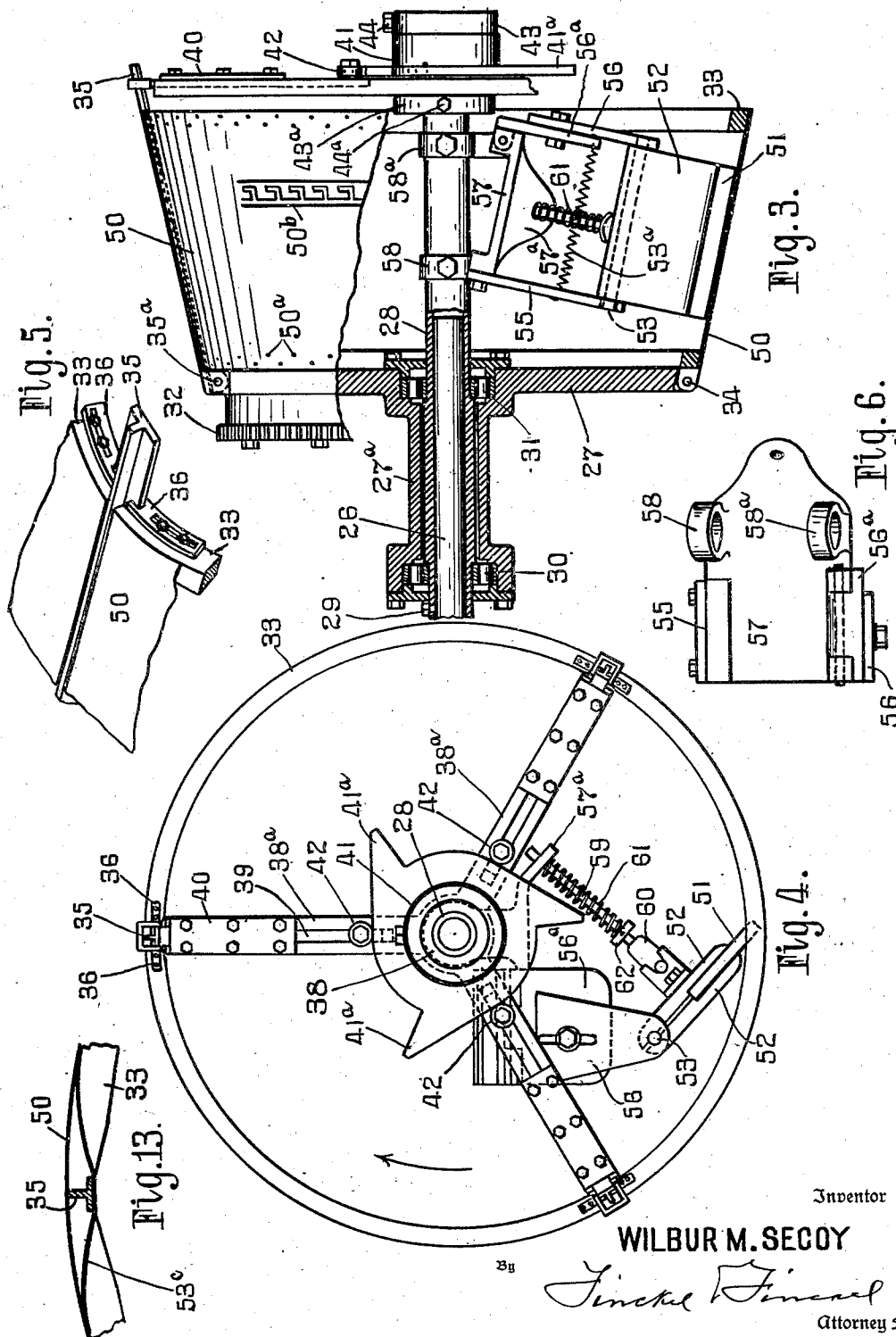
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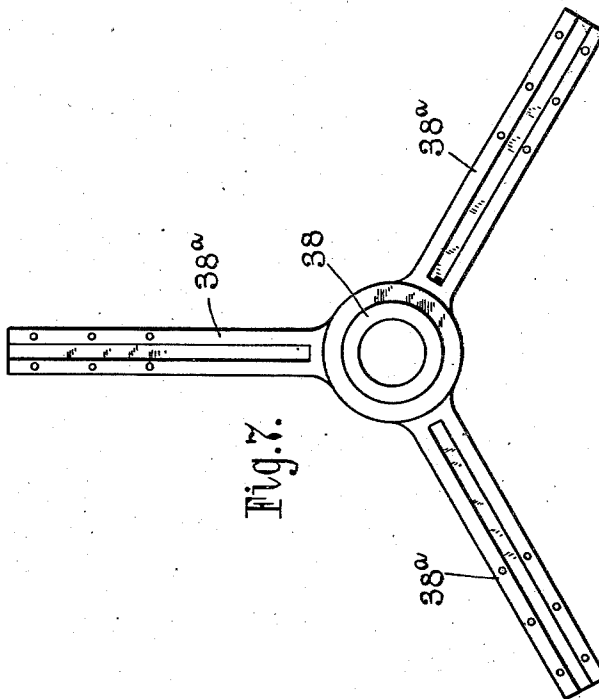
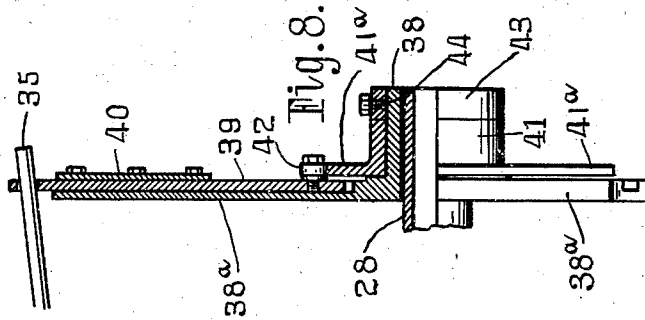
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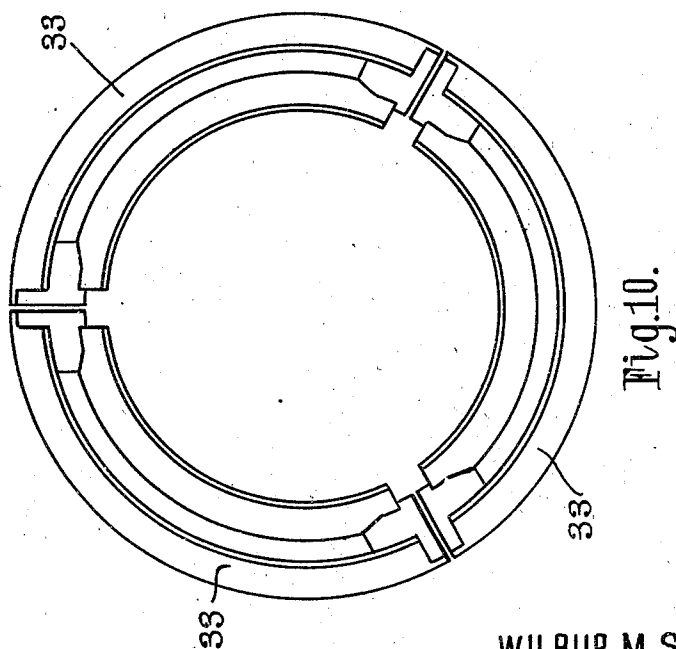
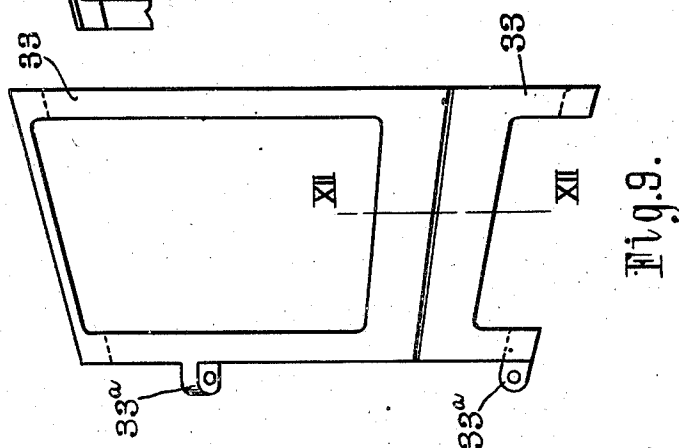
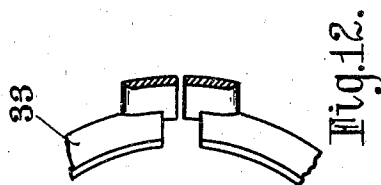
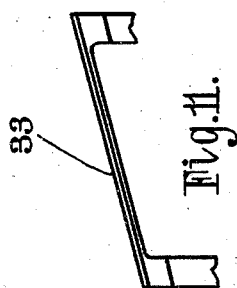
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MACHINE FOR STENCILING WARE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

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MACHINE FOR STENCILING WARE

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Application August 22, 1935, Serial No. 37,346
Renewed August 19, 1937

23 Claims. (Cl. 101-124)

This invention relates to stenciling apparatus and it is particularly directed to apparatus of this character for decorating the surfaces of articles which have circular or curved surfaces, or which are frusto-conical.

It has been the objective of the present inventor to provide a machine or apparatus of this character employing a frusto-conical rotary stenciling means which incorporates an adjustment means for varying the taper of the screen for decorating articles of different taper or diameter. The inventor has also contemplated a general adjustment for adjusting the machine relative to the axis of the support for the article being stenciled.

It has been a further objective of the present inventor to provide an apparatus for stenciling tumblers or the like, which employs a stenciling screen in the form of a drum and includes within the drum an internally supported squeegee, which is readily adjustable for accommodating the adjustments of the drum.

It has been a further objective of the present inventor to provide a rotary type stenciling means to which the tumbler or other article to be stenciled is delivered in an improved conveyor of rotary type which supports the tumbler for rotation when engaged by the rotary stenciling screen.

These objectives have been achieved in the present invention. A preferred embodiment of the invention, as disclosed, may include a driven stenciling drum and a rotary or turntable type of delivery or conveyor means for rotatably supporting the articles to be stenciled and successively bringing them into contact with the exterior of the screen. The squeegee in the further development of the invention may be located within the drum. In its application to the problem of stenciling tapered or frusto-conical articles, the drum may be frusto-conical, and means is included for adjusting the angular relationship of the axes of the drum and the article to be stenciled. Additionally, means is provided for adjusting the angularity of the sides of the drum, in other words for changing the taper of the drum.

Other objects and further advantages will be more fully apparent from a description of the accompanying drawings in which:

Figure 1 is a view in side elevation, with a small part in section, of a machine according to the invention.

Fig. 2 is a top plan view with the stencil carry-

Fig. 3 is a side view on a larger scale with parts broken out and parts in section on the stencil carrying frame showing the squeegee therein.

Fig. 4 is a view in elevation on the larger or right hand end of the stencil carrying frame, as shown in Fig. 3, this view also showing the squeegee therein.

Fig. 5 is a perspective view of a fraction of the stencil carrying frame showing some details thereof.

Fig. 6 is a view looking down on the upper end of the squeegee holder shown in Fig. 3.

Fig. 7 is a front view of the frame for supporting the adjusting parts of the stencil carrying frame, said adjusting means not appearing thereon.

Fig. 8 is a combined edge and sectional view of the supporting frame shown in Fig. 7 with adjusting and adjustable parts in connection therewith.

Fig. 9 is a view in side elevation of segments included in the screen carrying frame.

Fig. 10 is a view of the segments of the screen carrying frame looking to the left of Fig. 6.

Fig. 11 is a fractional end view of one of the segments of the screen carrying frame.

Fig. 12 is a section on the line XII-XII of Fig. 9.

Fig. 13 is a detail showing a bridging means for the junction between the segmental screen frames.

In the views 15 designates the main frame upon which a larger portion of the mechanism is supported. At the rear end of said main frame is slidably mounted a supplemental frame 16 to which is pivoted a non-rotatable shaft 26 for supporting the screen drum, said supplemental frame being adjustable longitudinally on the main frame by means of a feed screw 17 threaded into the lower portion of said supplemental frame. The feed screw and supplemental frame are held from longitudinal movement by means of stops 18 and 19 on the screw and between an upwardly extending arm of a bracket 20 fixedly bolted to the rear end of the main frame.

The supplemental frame 16 is provided with sockets at 23, 23^a and 23^b, any one of which can receive a bifurcated pivoting member 24 for the screen drum supporting shaft 26, said pivoting member having a pin to enter such socket and be fastened therein by a set screw at 25. By this means the screen drum can be given a gross initial inclination of its axis from which a nicer inclination of the working face of the screen can be made by other means herein set forth. A

relatively shorter shaft can be readily substituted for shaft 26 if necessary in making the initial or gross inclination, or the shaft 26 can be shifted in or through the axis of the screen drum.

5 The screen drum includes a base or rear member 27 provided with a central hollow rearward hub extension 27^a. Extending through said hub 27^a is a sleeve or tube 28 fixedly secured by a set screw 29 to the non-rotating shaft 26.

10 The screen drum is rotatably supported by suitable roller bearings at 30 and 31 on said stationary sleeve or tube 28. At its rear the base or rear end of the screen drum has attached to a flange thereon a large annular gear 32. The portion of 15 the screen drum that receives the stencil screen is shown as of three equal frusto-conical segmental open frames 33, each provided with an ear 33^a whereby it is pivoted, as shown at 34, to the base or rear member 27 so as to form the structure by which the screen stencil fabric can be 20 secured. Also pivotally connected at 35^a with the rim of the base member 27 are three bars 35 of T-cross section. These bars 35 are equidistantly spaced in their pivotal connections with the rim 25 of the base 27 so as to intervene the segmental frames; and said bars are engaged with said segmental frames by means of slidable latches 36, each of said latches having a bifurcated end that embraces one leg of the head of the T-bar 35.

30 By moving the T-bars on their pivots the segmental frames can be either spread or contracted to some extent and to such extent as is permitted by the transverse dimensions of the T-bar to adjust the segmental frames and therefore the taper 35 of the frusto-conical screen frame or drum for the purpose of cooperating in securing a parallel contact of the stencil screen with the ware to be imprinted with paint.

The means for effecting the adjustment last 40 described includes a spider having a hub member 38 provided with three equally spaced radial arms 38^a and each of which arms is longitudinally grooved in its forward face to receive a bar 39 45 slidable in the groove, said bar very slightly exceeding in thickness the depth of the groove. At its upper end each bar 39 is provided with an orifice to receive for operating engagement the extended free end of the T-bar 35 (see Fig. 4). To retain each of said bars 39 in its groove the 50 arms 38^a are each provided at its upper end with a cover or clamping plate 40 bolted tightly thereto to secure and support the screen segments in adjusted position, the bolts of said plate 40 being released when an adjustment of said segments 55 is to be made.

The hub 38 of said spider is journaled loosely on the stationary tubular part 28; and telescoped on said hub of the spider is a sleeve 41 having 60 three identical cam arms 41^a, the cam edges of which each contact with a roller 42 on the bar 34 so that by turning said sleeve 41 to the left, as viewed in Fig. 4, the bars 34 are simultaneously forced outward and then held in the position to 65 which adjusted by tightening down the plates 40 with the bolts therein. The sleeve 41 of the cam device is retained on the hub of the spider by means of two collars 43 and 43^a provided with set screws 44 and 44^a binding said collars to the 70 hub.

The stencil screen 50, which is of the fabric or structure usual in decorating ware and having therein the design for application there-through of paint to the ware, is secured to the 75 exterior surface of each of the segmental frames

by wooden pegs, as indicated by dots at 50^a in Fig. 1, driven into drilled holes in the frame, or by any other suitable means. The design in the stencil screen frame, an example of which is shown at 50^b, can, of course, be diverse. 5

The junction between the segmental frames, when assembled with screens, is bridged at the inner side of the drum by means of a strip of fabric or tape 53^a pasted to the adjacent fabrics. 10

The squeegee is hung on the stationary tube 28 10 within the screen drum and so that its paint pressing member 51 contacts with the inner surface of the screen in the several screen segments as they are brought in succession under it by the rotation of the screen drum. It is proposed that 15 the screen segments shall each act on a separate piece of ware. In other words, that in one rotation of the screen drum it shall cause the decoration of three pieces of ware.

The squeegee includes a strip of rubber 51 20 clamped between two plates 52, said plates being pivoted by means of a shaft 53 carried in a frame including end members 55 and 56 secured to a hanger 57 provided with ears 58 and 58^a for attaching it to the stationary tube 28. The end 25 member 56 is slotted and slidably bolted to a second part 55^a that is hinged to the hanger 57, said parts 55 and 56 being held on the pin 53 by a connecting spring 53^a. The squeegee proper can be removed by this construction without re- 30 moving its hanger.

By these means also the inclination of the operating edge of the squeegee 51 can be varied to make it lie flush to the inner surface of the screen after the screen drum has been adjusted 35 to the taper of the ware to be decorated. The bearing for the pin 53 in the end member 55 is elongated and therefore loose to permit slight rocking in adjustment.

The hanger 57 has an extension at 57^a perforated to receive a rod 59, said rod having at its lower end a pressure head 60 engaging a bearing on the upper side of the squeegee clamping member 52, said rod and head being pressed by a 45 coil spring 61 between the extension 57^a and a stop 62 on the rod, so as to cause the squeegee 51 to be held with a sufficient but yielding pressure to force paint through the design on the screen.

Supported in the main frame at the forward 50 end thereof is a turntable mechanism comprising a vertical rotary column 70 having removably connected therewith a suitable spider 71, said spider having hinged thereto at 72, for oscillation vertically, five chucks or cradles 74. Each of said cradles has suitably located anti-friction rollers 74^a for supporting the ware—for instance a tumbler—shown at 75 to be decorated. 55

Said column 70 can be intermittently rotated by means of any suitable mechanism, as for example a Geneva movement (not shown) operated by the electric motor 76 through gearing or a belt 77 so as to successively place each of the articles to be decorated in proper elevated position below the stencil for the intervals between 65 the rotations of the spider by the Geneva or similar movement. An illustration of a Geneva movement suitable for the machine, with obvious modifications for the present purpose is shown 70 and described in the United States patent to Edward Miller, No. 1,932,141, dated October 24, 1933.

Revolving with the rotatable column 70 below the tumbler or ware carrying head is a wheel 75

81 carrying five vertically movable gravity actuated pins 82 (see Fig. 1) one for each of the ware carrying chucks or cradles. These pins 82 are adjustable as to their length and can be lengthened or shortened according to the diameter of the ware to be decorated.

The lower ends of the pins 82 travel on a circular stationary ledge 84 provided at its inner or rear surface with an upwardly projecting inverted V-shaped cam 85 so positioned that it elevates each of the pins 82 and cradles with the ware thereon as carried thereto to put the ware in line contact with the exterior face of the stencil screen. This contact of the ware with the stencil screen is such that friction of the exterior surface of the screen when rotated causes the elevated ware to rotate in the cradle on the anti-friction rollers of the latter.

The weight of the stencil drum is primarily supported by means of a bracket 86 having at its upper end a pair of rollers at 87 between and on which rollers the lower side of the hub 27^a rests, said bracket being clamped and held between a pair of plates 88 adjustably secured by a bolt or bolts to the upper forward end of the supplemental frame.

The screen drum is driven by means of a small gear 90 engaging the larger gear 32 at the rear end of the stencil carrying drum. Because the small gear 90 should properly align with the larger gear 32 said small gear has a shaft 91 that is mounted in a movable frame 92 having spaced bearings 93 joined by a web 94, the structure being held clamped in the desired position by screw bolts 95.

The shaft carrying the small gear 90 for driving the stencil drum has secured to it a belt wheel 96 driven by a belt 97 taking power from another belt wheel 98 on a shaft 99. As the last mentioned wheel 98 should be aligned with the wheel 96 on the shaft 97 of the small gear said last mentioned wheel has its shaft 99 journaled on a frame 101 adjustable on a stationary base 102. The shaft 99 has coupled to it by means of a universal joint at 103 a power driven shaft 104 journaled in a stationary frame 105.

All the moving parts are driven by the electric motor 76. The belt 77 drives the primary shaft 77^a of the Geneva movement, said Geneva movement being confined in the housing 107. The hub of the belt wheel of said shaft of the Geneva movement drives, through a friction clutch at 108, a pinion 109 that engages gear 110, the shaft of which is provided with a pinion engaged with another gear 112, the shaft of which latter has a wheel carrying a belt 113 that drives the shaft 104.

In practice the paint to be applied to the ware is placed on the inner surface of the stencil screen. The tumblers or other ware are placed in the cradles, one at a time by an attendant and after being elevated and receiving the decorating paint the articles are removed by another attendant and thence to a Lehr to be fused. The mechanism is so timed for operation that the article to be decorated receives its paint from one of the three segmental frames, and a complete rotation of the screen drum effects the decoration of three of the articles. But this operation can be varied.

The forms and proportions 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, a stencil screen holder in-

cluding a drum having an axis of rotation, said drum composed of a base portion and segmental stencil receiving frames pivoted to said base portion and means for adjusting said frames to vary the inclination of the sides of the drum to the axis thereof.

2. In a machine for decorating ware with paint or similar material, a stencil screen holder including a drum having an axis of rotation, said drum composed of a base portion and segmental stencil receiving frames pivoted to said base portion and means for adjusting said frames to vary the inclination of the sides of the drum to the axis thereof, said adjusting means including a spider frame mounted at the axis of the drum, and means carried thereby engaged with the segmental frame, and a cam device mounted at the axis of the drum for simultaneously actuating the said means carried by the spider frame.

3. In a machine for decorating ware with paint or similar material, a stencil screen holder including a drum having an axis of rotation, said drum composed of a base portion and segmental stencil receiving frames pivoted to said base portion and means for adjusting said frames to vary the inclination of the sides of the drum to the axis thereof, said adjusting means including a spider frame mounted at the axis of the drum, and means carried thereby engaged with the segmental frame, and a cam device mounted at the axis of the drum for simultaneously actuating the said means carried by the spider frame and devices for locking said actuating means carried by the spider frame.

4. In a machine for decorating ware with paint or similar material, a stencil screen holding means including a drum having an axis of rotation, said drum composed of a base portion, segmental stencil receiving frames pivoted to said base portion, and means for adjusting said frames to vary the inclination of the sides of said drum to the axis thereof, and means for presenting ware to be decorated to said sides to form a line contact with the screen.

5. In a machine for decorating ware with paint or similar material, a stencil screen holding means including a drum having an axis of rotation, said drum composed of a base portion, segmental stencil receiving frames pivoted to said base portion, and means for adjusting said frames to vary the inclination of the sides of said drum to the axis thereof, adjustable means for presenting ware to be decorated to said sides to form a line contact with the screen when the drum is adjusted.

6. In a machine for decorating ware with paint or similar material, a rotatable stencil screen drum including a base, a plurality of segmental frame members pivoted upon the base and means for adjusting the frame members to vary their angular relation to the axis of rotation of the drum, a relatively stationary tube upon which said drum rotates and means whereby the angular relation of said tube and the axis of the drum to the horizontal can be varied.

7. In a machine for decorating ware with paint or similar material, a rotatable stencil screen drum including a plurality of segmental frame members pivoted upon a base and means for adjusting said frame members to vary their angular relation to the axis of rotation of the drum, a relatively stationary tube upon which said drum rotates, means whereby the angular relation of said tube and the drum to the horizontal can be varied, a squeegee supported upon

said tube within said drum and means for adjusting the operating member of said squeegee to press paint through the stencil.

8. In a machine for decorating ware with paint or similar material, a stencil carrying drum having an axis of rotation, a main frame upon which the same is supported, a supplemental frame adjustable upon said main frame, a non-rotatable shaft having means for adjustably connecting the same with said supplemental frame for changing the angle of the axis of rotation of said drum, a stationary tube mounted on said shaft extending through said drum and on which said drum rotates, and a squeegee carried by said tube.

9. In a machine for decorating ware with paint or similar material, a supporting frame, a frusto-conical stencil carrying drum having an axis of rotation, a non-rotatable shaft on said supporting frame carrying a non-rotatable tube within which said shaft is longitudinally adjustable and fixable to adapt the stencil to the ware to be decorated, said stencil drum mounted to rotate on said tube, and a squeegee carried by said tube.

10. In a machine for decorating ware with paint or similar material, a supporting frame, a stencil carrying drum having an axis of rotation, a non-rotatable shaft secured on said supporting frame carrying a non-rotatable tube within which said shaft is longitudinally adjustable and fixable to adapt the stencil to the ware to be decorated, said stencil drum mounted to rotate on said tube and a squeegee carried by said tube having its paint operating member adjustable into parallel relation to said screen.

11. In a machine for decorating ware with paint or similar material, a supporting frame, a stencil carrying drum composed of movable segments, said drum having an axis of rotation, a non-rotatable shaft connected with said base for supporting said drum, a non-rotatable tube within which said shaft is longitudinally adjustable, said stencil drum mounted to rotate on said tube, and means for varying and fixing the angular relation of said movable segments to the axis of motion of the drum.

12. In a machine for decorating ware with paint or similar material, a supporting frame, a non-rotatable shaft pivoted to said frame for angular adjustment, a tube secured non-rotatably on said shaft, a frusto-conical stencil carrying drum rotatably mounted on said tube and a squeegee within the drum stationarily supported in operation by said tube.

13. In a machine for decorating ware with paint or similar material, a supporting frame, a non-rotating shaft and means whereby said shaft can be connected at different points on said supporting frame, a tube secured non-rotatably on said shaft, a stencil carrying drum rotatably mounted on said tube, and a squeegee within the drum stationarily supported by said tube.

14. In a machine for decorating ware with paint or similar material, a rotatable frusto-conical drum carrying a stenciling screen, a relatively stationary shaft about which said drum is rotatable on its axis, a squeegee supported within the said drum by said stationary shaft and means whereby said squeegee can be adjusted in angular relation to the axis of said shaft.

15. In a machine for decorating ware with paint or similar material, a rotatable frusto-conical drum carrying a stenciling screen, a relatively stationary shaft about which said drum

is rotated, a tube secured to said shaft within the drum and a squeegee within the drum supported by said tube.

16. In a machine for decorating ware with paint or similar material, a rotatable frusto-conical drum carrying a stenciling screen, a stationary tube supported within said drum around the axis of the drum and a squeegee within said drum supported by said tube.

17. In a machine for decorating ware with paint or similar material, a supporting frame, a non-rotating shaft connected with said supporting frame and angularly adjustable with respect thereto, a tube secured non-rotatably on said shaft, a frusto-conical stencil carrying drum rotatably mounted on said tube and adapted to have the angle of its axis varied by adjustment of said shaft, a squeegee within the drum stationarily supported by said tube, an annular gear on said drum, a driving gear for said annular gear, an angularly adjustable shaft on which said gear is fixed and an adjustable power driven means for aligning the same with the driving gear for said annular gear when the axis of the stencil carrying drum is changed.

18. In a machine for decorating ware with paint or similar material, a supporting frame, an angularly adjustable axle connected with said frame, a stencil carrying drum rotatably mounted on said adjustable axle whereby the axis of rotation of the drum in respect to said frame can be varied, an annular gear fixed on said drum, a driving gear engaging said annular gear, an adjustable shaft on which said drum driving gear is mounted, and a power operated means adjustable for alinement with said last named gear.

19. In a machine for decorating ware with paint or similar material, a supporting frame, an angularly adjustable axle connected with said frame, a stencil carrying drum rotatably mounted on said adjustable axle whereby the axis of rotation of the drum in respect to said frame can be varied, and an annular gear fixed on said drum, a driving gear engaging said annular gear, an adjustable shaft on which said drum driving gear is mounted, and a power operated means adjustable for alinement with said last named gear, said last named means including a driven shaft composed of two parts connected for universal movement, one of which parts carries a driven sprocket wheel and a sprocket belt operatively connecting said shaft part with a sprocket wheel on the shaft of the said drum driving gear whereby said gears can be aligned when the angular position of the stencil is changed.

20. In a machine for decorating ware with paint or similar material, a main supporting frame, a supplemental frame adjustable on said main frame, a drum supporting shaft and means whereby it can be connected at different points with said supplemental frame for changing the angular relation of said shaft in respect to said main frame, a frusto-conical stencil drum composed of a base portion and segmental stencil carrying frames adjustable on the said base portion to vary the inclination of the sides of the drum to the axis thereof, said drum rotatably supported at its axis on said shaft.

21. In a machine for decorating ware with paint or similar material, a main supporting frame, a supplemental frame adjustable on said main frame, a drum supporting shaft and means whereby it can be connected at different points with said supplemental frame for changing the angular relation of said shaft in respect to said

main frame, a frusto-conical stencil drum composed of a base portion and segmental stencil carrying frames adjustably connected with said base, said drum rotatably supported at its axis on said shaft, a squeegee, and adjustable means for supporting the said squeegee with its paint operating member in substantially parallel relation to the inner surface of the stencil.

22. In a stenciling machine, a rotatable stenciling means including a circular stencil screen, means for applying paint or the like to the stencil through the screen, a conveyor for successively moving articles of ware to be stenciled to the surface of the screen, and means for bringing the articles into contact with the screen, said conveyor moving on an axis substantially at right angles to the axis of the stenciling screen.

23. In a stenciling machine, a rotatable stenciling means including a circular stencil screen, means for applying paint or the like to the stencil through the screen, a conveyor for successively moving articles of ware to be stenciled to position adjacent the screen, said conveyor including a plurality of radially disposed cradles adapted to support the articles of ware radially with respect to the axis of rotation of the conveyor, 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 axis of the stenciling screen and means associated with the conveyor for bringing the articles of ware and the screen into contact.

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