April 1, 1941. J. C. SMITH 2,237,168

STENCILING APPARATUS

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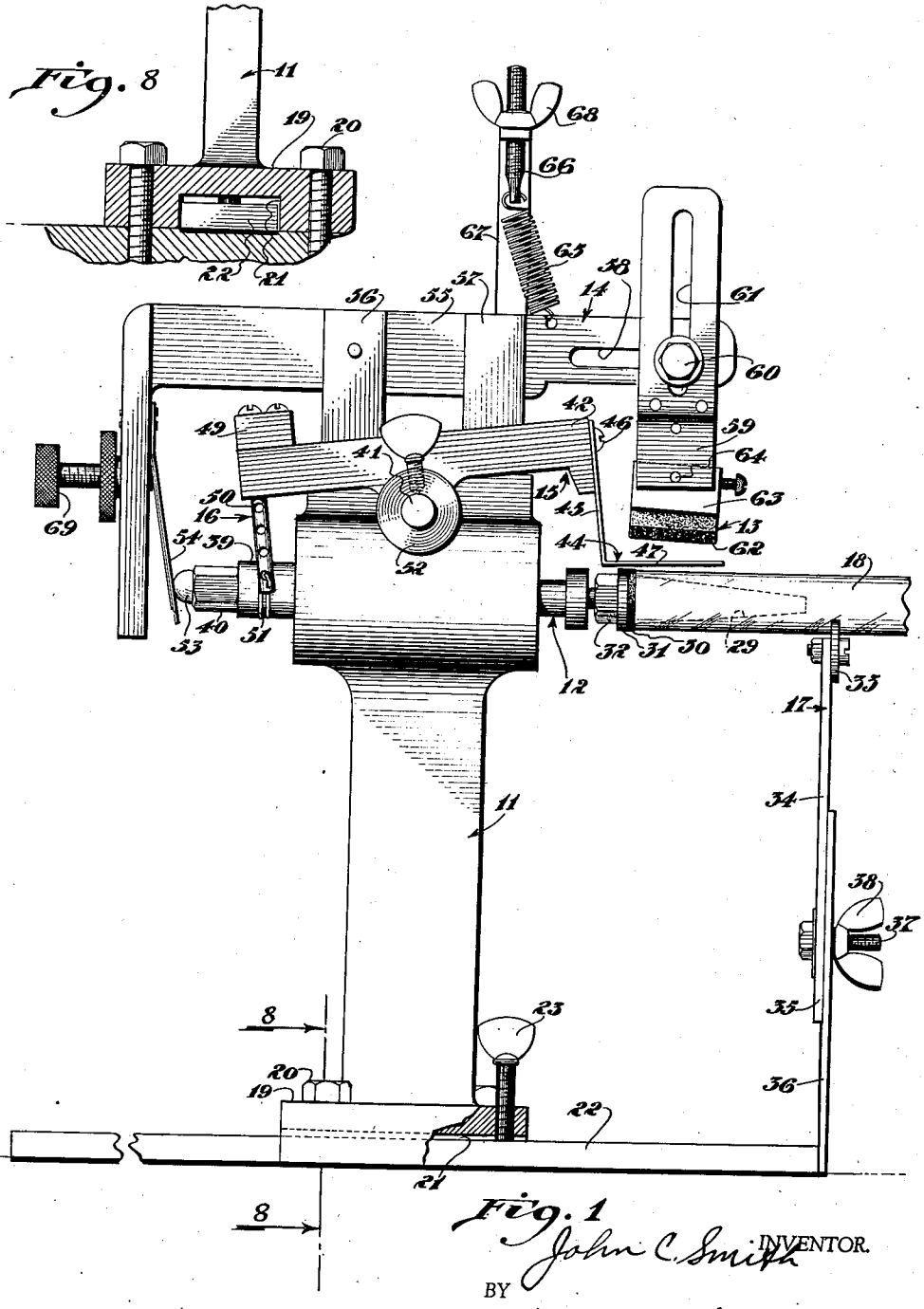


Fig. 1

John C. Smith INVENTOR.

BY

Wood & Wood ATTORNEYS

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Fig. 2

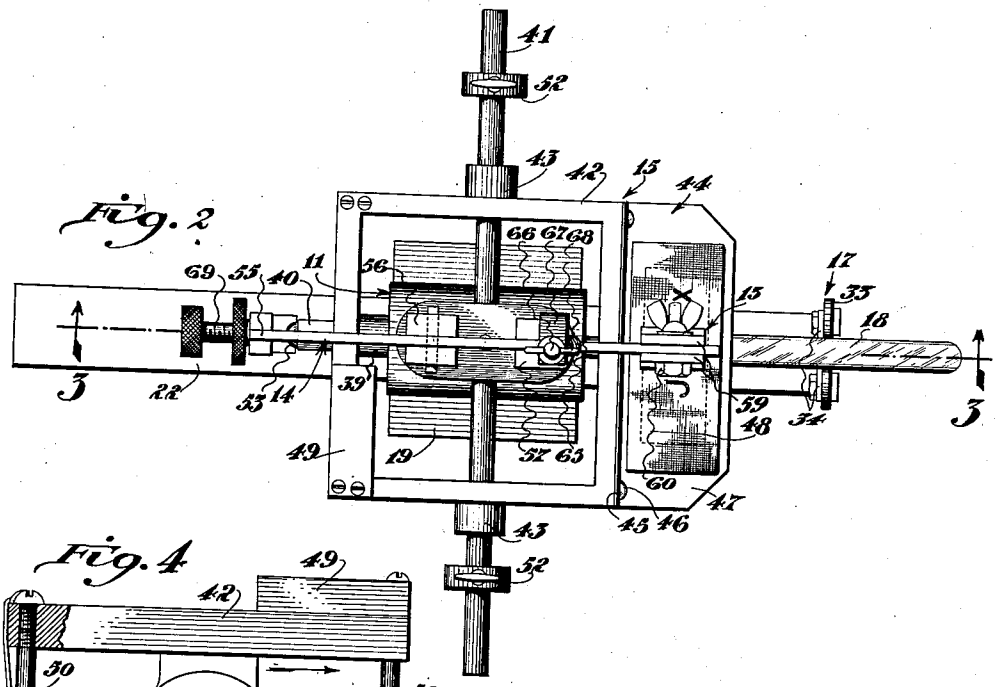


Fig. 4

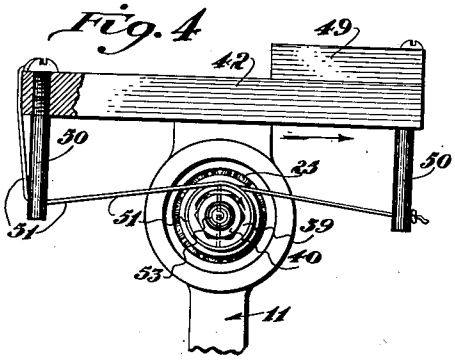
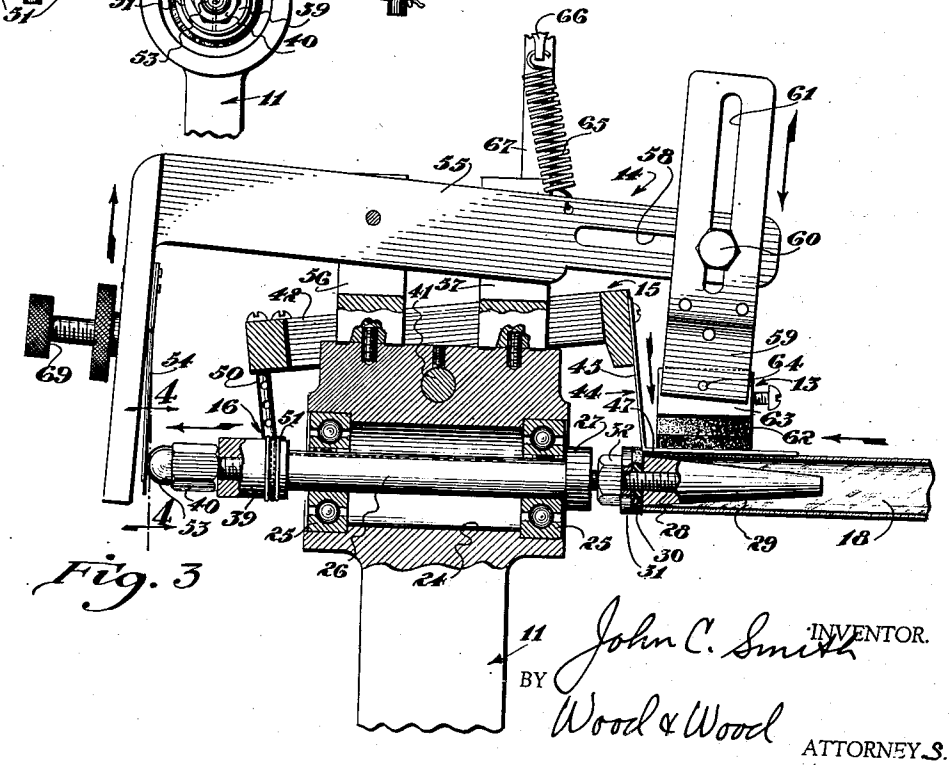


Fig. 3



INVENTOR.

John C. Smith

BY

Wood & Wood

ATTORNEYS.

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Fig. 5

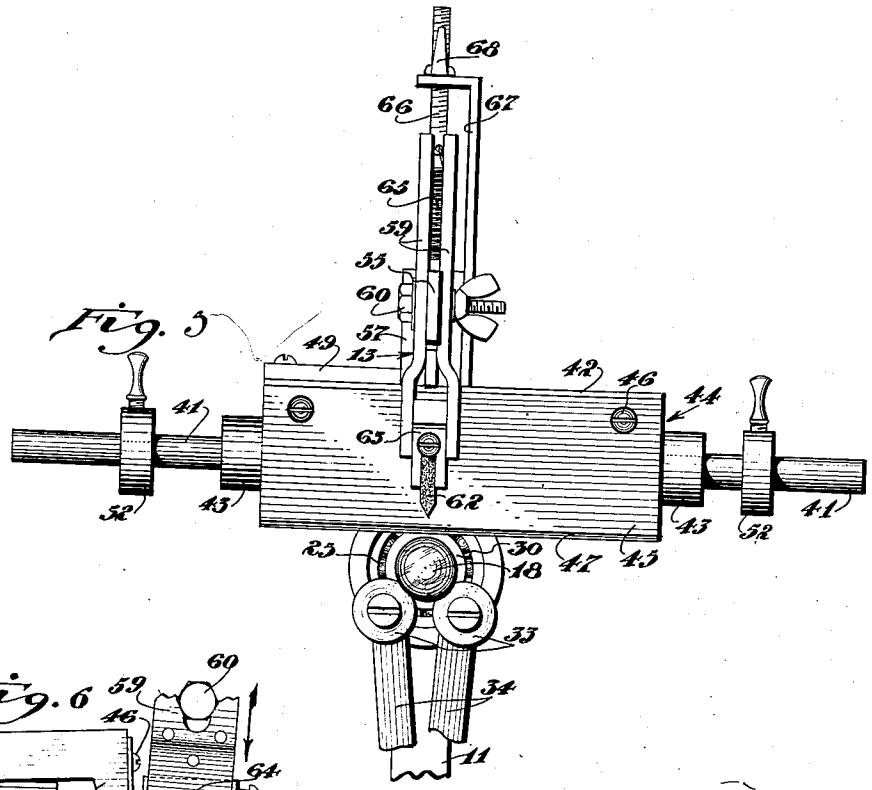


Fig. 6

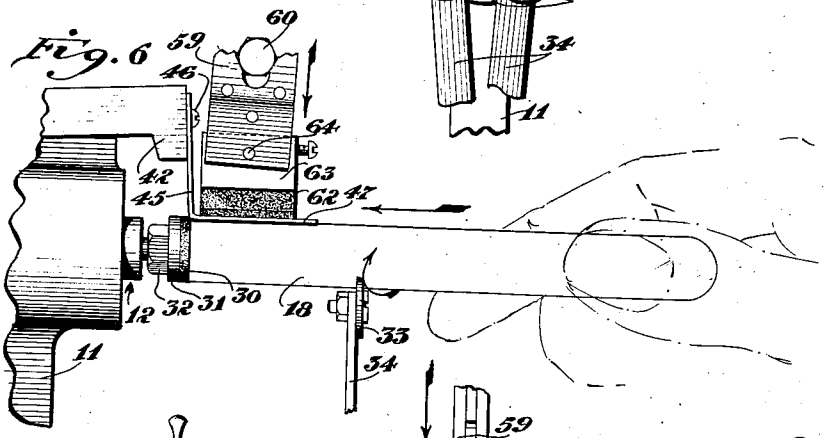
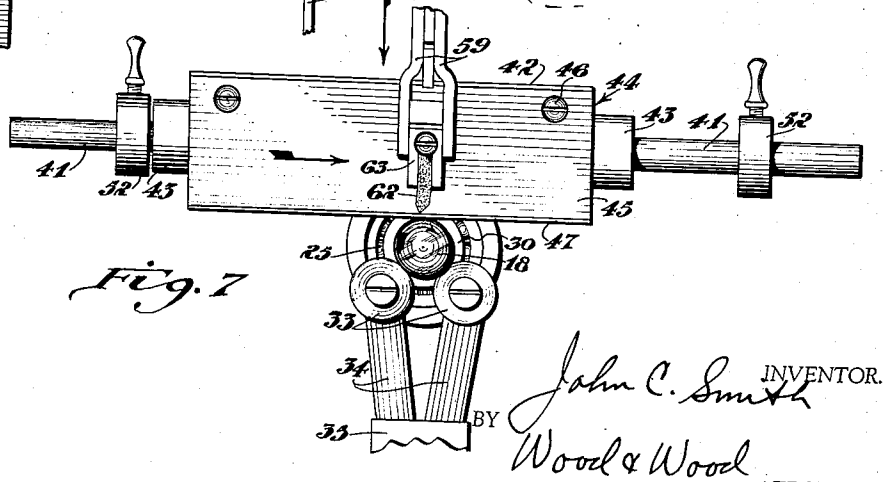


Fig. 7



INVENTOR.
John C. Smith
BY
Wood & Wood
ATTORNEYS.

Patented Apr. 1, 1941

2,237,168

UNITED STATES PATENT OFFICE

2,237,168

STENCILING APPARATUS

John C. Smith, Beaver, Pa., assignor to Solar Laboratories Company, Beaver, Pa., a corporation of Pennsylvania

Application November 18, 1938, Serial No. 241,219

8 Claims. (Cl. 101—124)

This invention relates to the art of stenciling and is particularly directed to stenciling apparatus for applying decoration or lettering to articles of glass or ceramic ware. More specifically, the apparatus of the present invention is designed for applying decoration or lettering to long cylindrical articles. By the use of this apparatus, printing, such as trade identification, may be applied to test tubes or the like.

The apparatus of this invention applies the printing material or ceramic colors for identification or design by passing the material through a screen or membrane of foraminous material such as silk, tulle, or perforated metal. This screen which is rendered impervious in the areas bounding the design perforations, is mounted in a frame. It is brought into relationship with the surface to be decorated and ink, paint or some suitable coloring matter is pressed through the perforations constituting the design in the screen onto the surface of the article by means of an applicator or squeegee.

As will be readily apparent, the application of the principles of stenciling, as described above, to the decoration of test tubes or long cylindrical articles, or glass ware of small diameter, is difficult in that the articles provide sharply curved surfaces and, because of their shape and size, are difficult to handle.

It has been the object of the present inventor to provide an apparatus for quickly and conveniently applying ceramic colors or printing material to test tubes or the like, which makes it possible for a relatively unskilled workman to apply the material rapidly and neatly.

In the accomplishment of this main object, and as a result of the concept herein described, the following results are achieved; first, it is possible to actuate the apparatus with one hand merely by placing the cylindrical article or test tube upon a chuck and rotating the article; second, the support for the cylindrical article is adjustable and constitutes a cradle for facilitating rotation of the article; third, the squeegee is adjustable with respect to the screen; fourth, the range of travel of the screen, which is engaged across the surface of the article, is adjustably fixed; fifth, the chuck quickly receives the article for coupling rotation and is effective, upon translation, for moving the screen and squeegee into operating position and, upon rotation, for translating the screen in synchronism with the rotation of the article, so that rolling line contact is maintained with the result that the printing is not blurred, but is sharply delineated.

Other objects and certain advantages will be more fully apparent in the description of the drawings in which:

Figure 1 is a side elevation of the stenciling apparatus of this invention.

Figure 2 is a top plan view thereof.

Figure 3 is a sectional view taken on line 3—3, Figure 2, illustrating the details of the revolving chuck for holding the tube being stenciled.

Figure 4 is a fragmentary view illustrating the details of the connection of the stenciling screen to the revolving chuck.

Figure 5 is a fragmentary front view of the invention.

Figure 6 is a fragmentary diagrammatic view showing the operation of stenciling a tube.

Figure 7 is a view taken similar to Figure 5, but illustrating the apparatus in the operation of stenciling.

Figure 8 is a sectional view taken on line 8—8, Figure 1 detailing the attachment of the body of the device to the base.

Referring to the drawings, the device consists primarily of a body 11 including a revolving chuck 12, a squeegee 13, means 14 for operating the squeegee, a stenciling screen 15, means 16 for operating the screen, and a suport 17 for the tube 18 being stenciled.

The body includes a foot portion 19 fastened to a supporting surface by means of screws 20. The foot portion is slotted, as at 21, along its bottom and a horizontal extension 22 of the tube support is slidably engaged within the slot. A set screw 23 traverses the base and engages this extension (see Figures 1 and 8).

The body includes a horizontal bore 24 having ball bearings 25, 25 at its respective ends set in counterturned portions of the bore. A chuck supporting shaft 26 is rotatably and translatably mounted in the ball bearings. The forward end of the chuck carrying shaft 26 includes a head 27 adapted to abut the adjacent ball bearing to limit the movement of the shaft and carries a screw-threaded extension 28 upon which the chuck is mounted. The main chuck element 29 of the chuck 12 is cone shaped and engages a felt or rubber friction washer 30 against another washer 31. These washers in turn are engaged by a nut 32 whereby, when the nut and chuck element are screwed upon the washers, the entire assembly is fixed.

The tube 18, to be stenciled, is engaged upon the chuck at its open inner end and rests upon spaced rollers 33 journalled in the upper ends of arms 34 extending from an adjustable support

plate 35. This plate is adjustably attached to a vertically disposed plate 36, by means of a screw 37, traversing both parts held by a wing nut 38.

The rear end of the shaft 26 carries a timing and actuating drum 39 fixed against a shoulder of the shaft by means of a nut 40 screw-threaded on the shaft. The drum is a part of the means 16 for translating the screen 15.

The stencil screen unit, indicated generally at 15, is mounted on a support rod 41, fixed through the body of the apparatus at right angles to and above the shaft 26. The stencil screen support consists of a rectangular frame 42 providing hubs 43 at the respective sides, slidably mounted upon the support rod 41. An angular plate 44 includes a vertically disposed portion 45 fixed to the forward face of the frame by means of screws 46, and a horizontally disposed portion 47 carrying the stenciling screen 48. The latter portion is poised just above a chuck. The frame is mounted directly centrally, and, for this reason, a weight 49 is fixed on the rear end thereof for offsetting the weight of the screen and its plate.

From each rear corner of the frame 42, studs 50 extend downwardly and form terminals for the respective ends of an operating cable 51 wound several times around the drum 39. This cable passes through a diameter hole of the drum for attachment. Thus, when the chuck is rotated, the operating cable is wound and unwound from the drum, moving the stenciling screen frame back and forth within the limits defined by stop collars 52 fixed on the respective ends of the support rod 41.

The shaft, carrying the chuck, is not only rotatable, but is translatable as well, and, by translation, is effective for moving the squeegee against the face of the screen. For this purpose, the nut 40, at the rear end of the shaft, provides a rounded end 53 having contact with a leaf spring 54 fastened to a depending arm of the squeegee operating unit 14. The unit 14 consists mainly of a horizontally disposed bar 55 pivoted on a bracket 56, attached to the top of the body. This bar is guided within the slot of a slotted member 57 also fixed at the top of the body in front of the pivot bracket. The forward end of the bar is longitudinally slotted, as at 58, and a squeegee carrying arm 59 is adjustably attached thereto by means of a bolt 60 traversing a vertical slot 61 of the squeegee arm and the horizontal slot of the bar.

The rubber element or blade 62 of the squeegee 13 is fixed in the conventional manner in a U-shaped element 63, pivoted on a pin 64 in the slotted lower end of the squeegee carrying arm. Thus, the squeegee is free to adjust automatically to the plane of the stencil screen.

Normally, the squeegee is held in poised position above the screen by means of a coil spring 65 under tension between the bar and a terminal screw 66, screwed into the upper end of a post or standard 67. A wing nut 68 fixes the terminal screw in position after the tension of the spring has been adjusted. A set screw 69, which is engaged into the depending arm in the back of the bar, engages the leaf spring 54 for varying the spacing of the lower end of the leaf spring and the depending arm of the bar. Thus, the squeegee is adjusted toward and from the stencil screen. The leaf spring also provides a yielding contact and the squeegee engages the stencil screen at a predetermined pressure.

In the operation of the apparatus, the operator, holding the test tube 18 with its open end inwardly, pushes the test tube onto the chuck against the friction washer 30. This motion forces the shaft rearwardly, the squeegee down against the stenciling screen, and the stenciling screen against the test tube. Rotation of the test tube translates the screen by means of the operating cable connection. Since the stenciling screen is moved by the action of rotating the article, a rolling contact of the tube with the screen is assured, and blurring is prevented. In other words, the movement of the tube and screen are synchronized through the operating cable connection.

It will be seen that the operation of stenciling an article involves two simple acts. First, a longitudinal movement places the article on the chuck and moves the chuck rearwardly for bringing the squeegee against the stencil screen and the screen against the surface to be decorated. Second, a rotative movement, immediately following the translating movement, translates the screen and places the stenciling material on the article. Thus, stenciling of this type of article may be accomplished at a high rate of speed, and the machine, therefore, lends itself readily to production methods.

Having described my invention, I claim:

1. In a stenciling apparatus, a body, a chuck rotatably and translatably mounted in said body, said chuck adapted to receive a cylindrical article of glassware and be engaged therewith whereby rotation of the article rotates the chuck and pressure against the chuck translates the same, means for supporting the outer end of the article of glassware, a stencil screen pivotally mounted on the body, a squeegee pivotally mounted on the body and disposed adjacent the screen, means operated by translation of the chuck for moving the squeegee against the screen and the screen against the article of glassware, and driving means operated by rotation of the chuck for translating the screen in synchronism with the rotation of the chuck.

2. In a stenciling apparatus, a body, a chuck rotatably and translatably mounted in said body, said chuck adapted to receive a cylindrical article of glassware and be engaged therewith whereby rotation of the article rotates the chuck and pressure against the chuck translates the same, a stencil screen mounted on the body, a squeegee mounted on the body and disposed adjacent the screen, said chuck adapted to move the squeegee against the screen and the screen against the article of glassware, and driving means operated by the chuck for translating the screen in synchronism with the rotation of the chuck.

3. In a stenciling apparatus, a frame, a chuck rotatably mounted thereon and adapted to receive an article of glassware, a stencil screen supported on the body of the stenciling apparatus and adapted to be translated across the surface of the article to be decorated, means slidably supporting said screen, translating means for said screen, a squeegee engaging said screen, and means operated by the chuck for engaging the screen against the article.

4. A stenciling apparatus comprising a horizontal reciprocable stenciling screen, a chuck adapted to support a cylindrical body beneath the screen in tangential rolling line contact therewith, a squeegee for the screen positioned above the same and normally out of contact therewith, said squeegee being movable into decorating contact with the screen, chuck controlled means for

moving the squeegee into such contact, and means for reciprocating the screen.

5. A stencilling apparatus comprising a horizontal reciprocable stencil screen, a chuck adapted to support a cylindrical body beneath the screen in tangential rolling line contact therewith, a squeegee for the screen positioned above the same, said squeegee being movable toward and away from the screen into and out of decorating contact therewith, means normally maintaining the squeegee out of contact with the screen, and means for moving the squeegee into decorating contact with the screen and for maintaining the same in such contact therewith, said first mentioned means operable in the absence of a body on the chuck for rendering said last mentioned means inoperative.

6. A stenciling apparatus comprising a horizontal reciprocable stencil screen, a chuck adapted to support a cylindrical body beneath the screen in tangential rolling line contact therewith, a squeegee for the screen positioned above the same, said squeegee being movable toward and away from the screen into and out of decorating contact therewith, spring means normally maintaining the squeegee out of contact with the screen, and chuck operated means for moving the squeegee into decorating contact with the screen and for maintaining the same in such contact therewith.

7. In a decorating apparatus of the character described, a horizontally reciprocable stenciling screen, a chuck adapted to support a cylindrical body beneath the screen in tangential rolling line contact therewith, a squeegee for the screen positioned above the same, said squeegee being movable toward and away from the screen into and out of decorating contact therewith, spring means normally urging said squeegee out of contact with the screen, means for moving the squeegee into decorating contact with the screen and for maintaining the same in such contact against the action of said spring means, said first mentioned means operable in the absence of a body on the chuck for rendering said last mentioned means inoperative.

8. In a stenciling apparatus, a chuck, a support rotatably and translatably mounting said chuck, said chuck including a centering element adapted to receive a cylindrical article of glassware, a friction washer on said chuck, said tube adapted to engage said washer when pressed thereagainst for providing a frictional drive connection between the tube and chuck, a stenciling screen including a squeegee, a translating connection between said screen and said rotatable chuck for passing the screen across the tube in line contact therewith, and a pivotally mounted element carrying said squeegee, said element engaged by said chuck for engaging the squeegee against the screen.

JOHN C. SMITH.