

July 23, 1935.

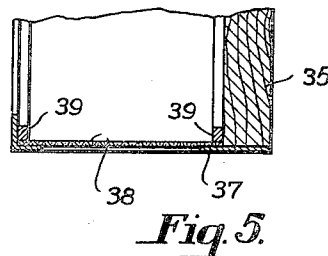
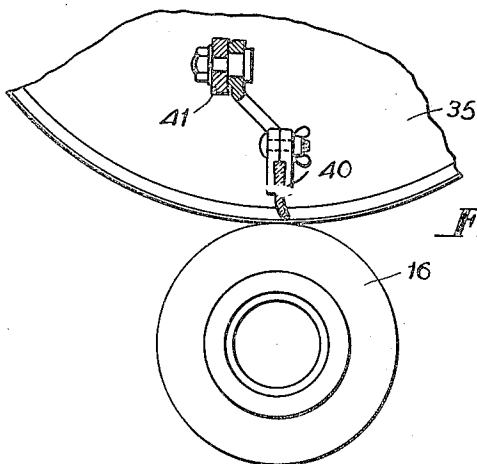
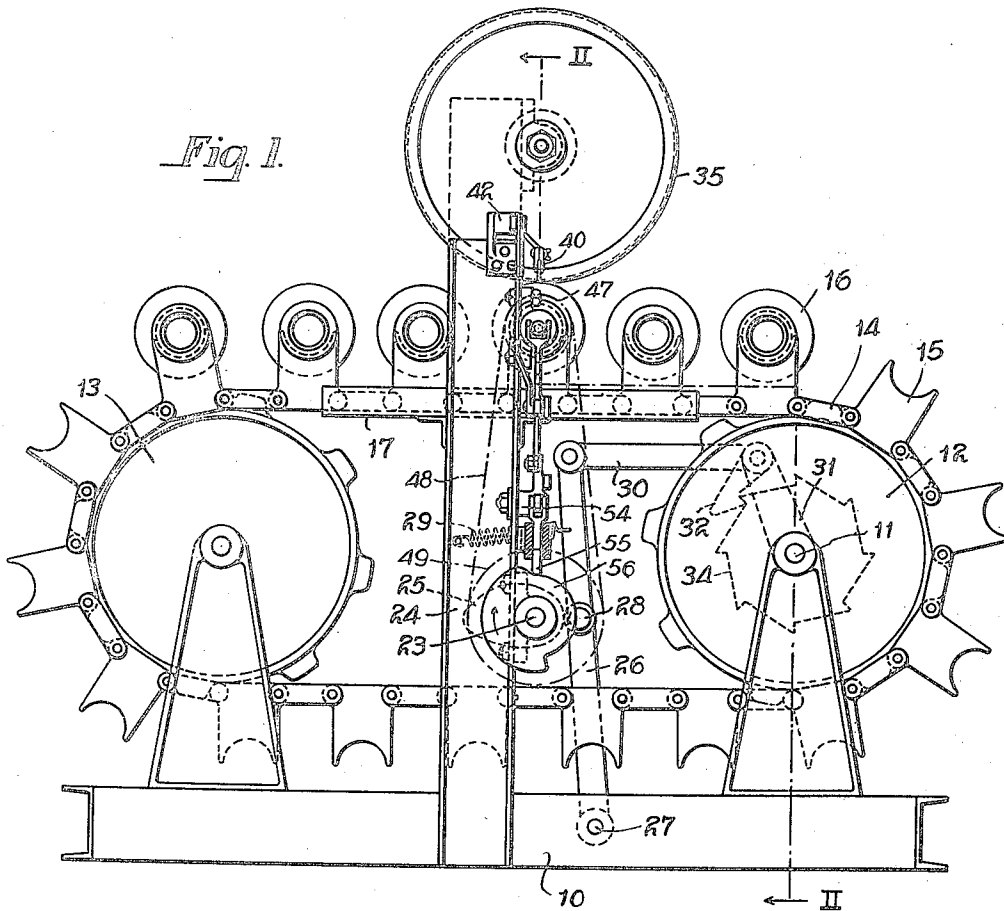
J. C. SMITH ET AL

2,009,098

APPARATUS FOR STENCILING WARE

Filed Jan. 8, 1934

4 Sheets-Sheet 1



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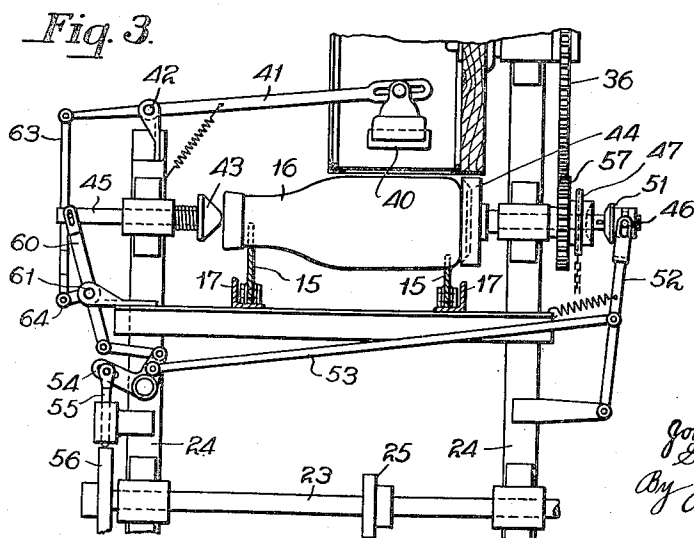
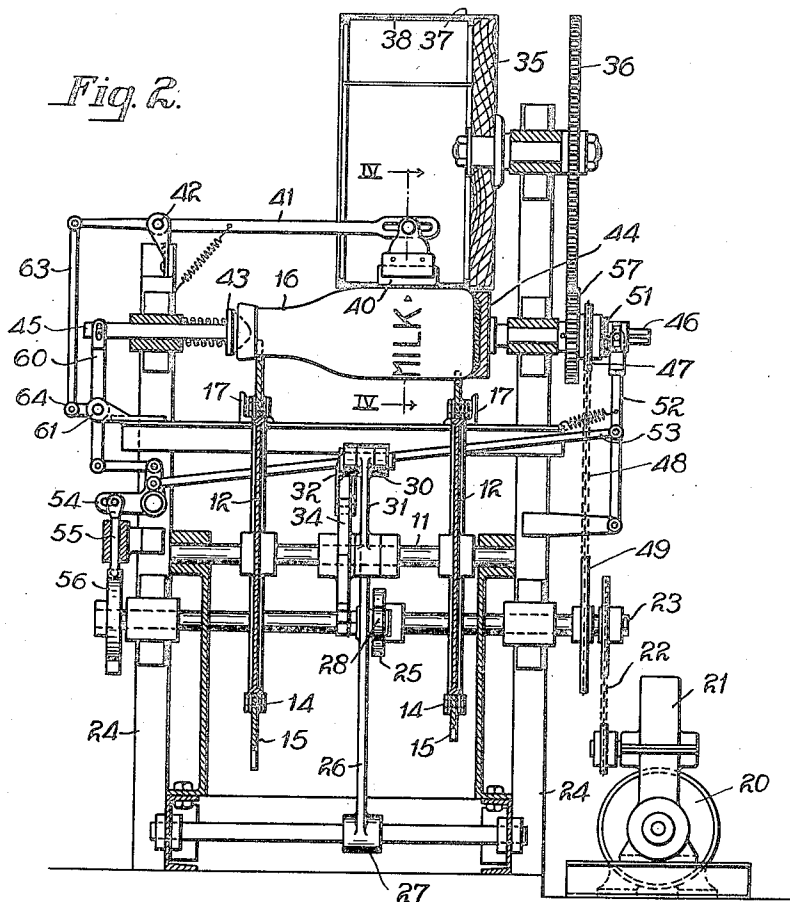
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APPARATUS FOR STENCILING WARE

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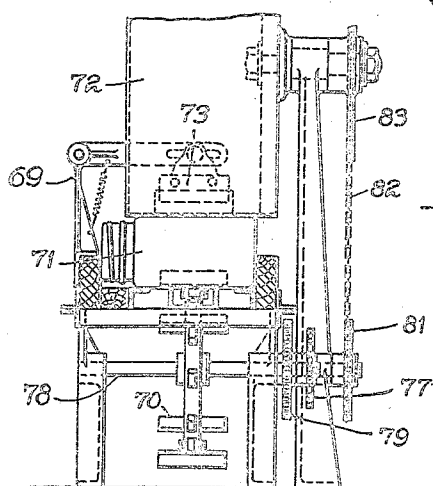
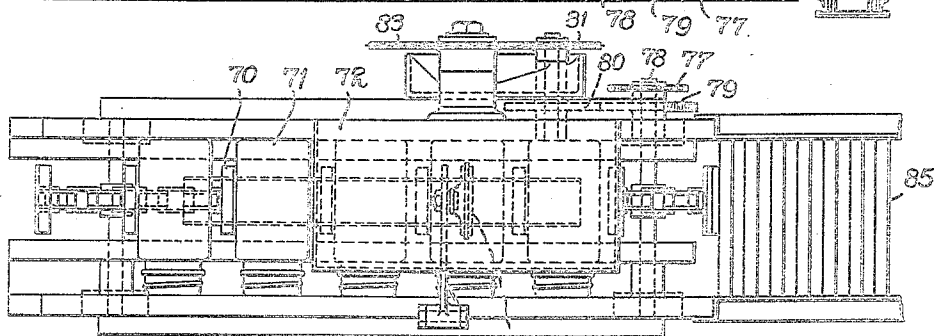
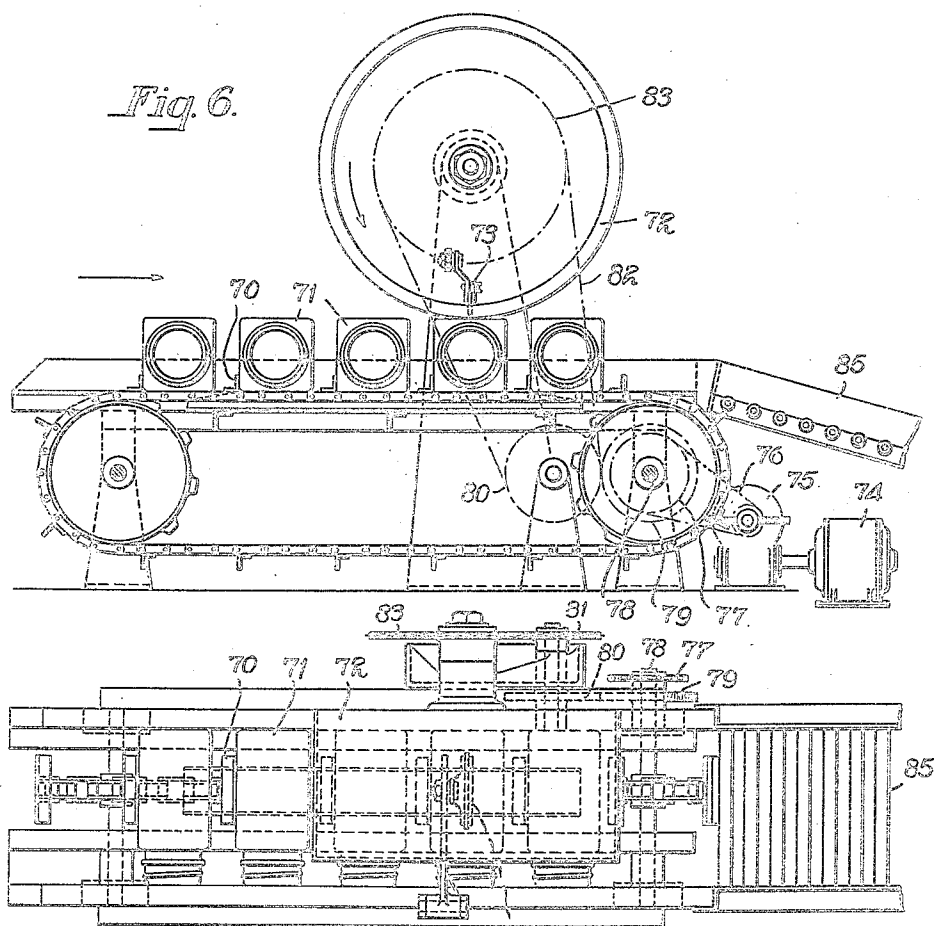
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APPARATUS FOR STENCILING WARE

Filed Jan. 8, 1934

4 Sheets-Sheet 3



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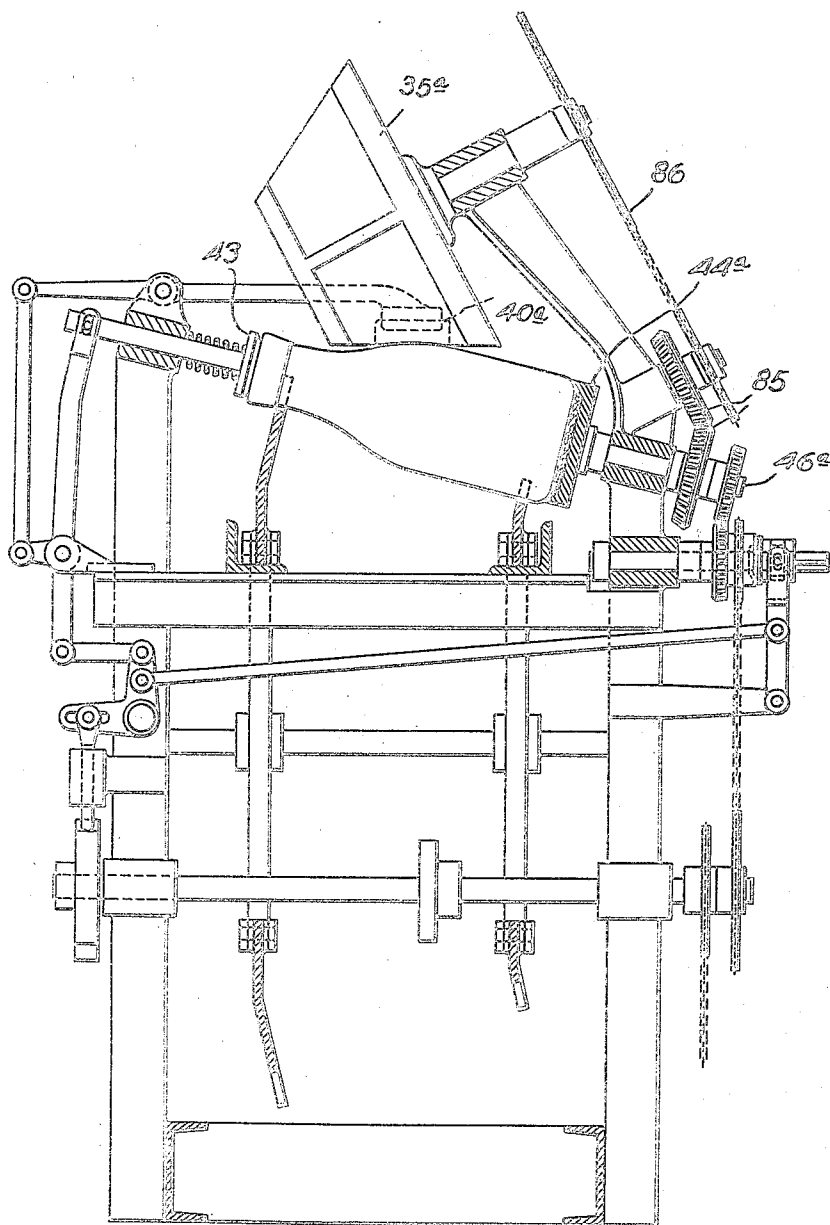
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APPARATUS FOR STENCILING WARE

Filed Jan. 8, 1934

4 Sheets-Sheet 4



*Fig. 9.*

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## UNITED STATES PATENT OFFICE

2,009,098

## APPARATUS FOR STENCILING WARE

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Application January 8, 1934, Serial No. 705,678

9 Claims. (Cl. 101—124)

Our invention relates to a stenciling method and apparatus, and particularly to the lettering and decorating of articles of glassware and various other objects.

The invention as hereinafter described is employed more particularly in the stenciling of glass and other ceramic ware, by the use of ceramic colors which are afterwards fired on the article. It will be understood, however, that the invention may be employed in the lettering or decorating of other articles by the stenciling method, and by materials other than ceramic colors.

Another object of our invention is to provide an improved means for positioning articles beneath a screen or the like.

A further object of our invention is to provide an improved means for imparting relative rotative movement as between the article to be decorated and an implement for causing the application of decorative material thereto.

Still another object of our invention is to provide a stenciling and decorating apparatus of generally simplified and improved form, and which may be operated more rapidly than various types of apparatus heretofore employed.

Some of the ways in which our invention may be practised are shown in the accompanying drawings wherein Figure 1 is a side elevational view of a stenciling machine, partially in section; Fig. 2 is a view taken on the line II—II of Fig. 1; Fig. 3 is a view showing a portion of the structure of Fig. 2, with certain of the parts in other positions; Fig. 4 is a view taken on the line IV—IV of Fig. 2; Fig. 5 is a detailed view showing a manner in which a stenciling sheet may be mounted in a drum; Fig. 6 is a side elevational view of a modified form of machine; Fig. 7 is a plan view thereof; Fig. 8 is a cross-sectional view, and Fig. 9 shows still another modification.

Referring now to Figs. 1 to 5, the invention, broadly speaking, includes a conveyer for moving articles such as bottles beneath a rotatable stenciling drum, together with chucks for rotating the articles on the surface of the drum during the stenciling operation.

The conveyer is shown as mounted on a framework 10, and includes a shaft 11 which carries a pair of sprockets 12, and a pair of idler sprockets 13. Conveyer chains 14 pass around the sprockets and carry racks or cradles 15 for supporting bottles or other articles 16. Rigidly-mounted guide rails 17 are provided for supporting the upper flight of the conveyer.

A motor 20, operating through a reduction drive 21 and a chain 22, drives a shaft 23. The shaft

23 is supported in uprights 24 of the framework, and has secured thereto a cam 25 which serves to oscillate a lever 26. The lever 26 is pivoted at 27 to the framework. The cam 25 operates against an anti-friction roller 28 on the lever 26, and the roller is held in contact with the cam by a spring 29, so that as the shaft 23 rotates, the lever 26 will be rocked on its pivot 27. A link 30 is connected to the upper end of the lever 26 and to a rocker arm 31 which is loosely mounted on the shaft 11. A pawl 32 is pivotally connected to the arm 31 and engages the teeth of a ratchet wheel 34, which is secured to the shaft 11.

It will be seen that as the shaft 23 is driven, the pawl 32 will be oscillated to effect step-by-step movement of the conveyer.

A stenciling drum 35 is journaled on the upright 24 and has a gear wheel 36 associated therewith. The drum has a peripheral wall 37 which is cut away at intervals to expose portions of a stencil sheet 38. The stencil sheet may be detachably mounted in the drum 37 as by clamping rings 39. The sheet 38 may be of the silk screen type having closely-spaced perforations which define the field of the characters or letters to be imprinted on the bottles. The coloring material is introduced into the drum in front of a squeegee blade 40 that is carried by an arm 41 which is pivotally mounted at 42. The squeegee, during rotation of the drum, of course, forces coloring material through the stencil sheet against the articles to be decorated.

Chuck members 43 and 44 are carried by chuck shafts 45 and 46, respectively, which are journaled in the uprights 24 of the framework. The chuck elements 43 and 44 are tapered somewhat so that when they are brought into engagement with the top and bottom of a bottle, it will be elevated slightly from the racks 15, so as to permit of convenient rotation thereof.

A sprocket wheel 47 is loosely mounted on the chuck shaft 46 and is constantly driven by a chain 48 from a sprocket wheel 49 which is secured to the shaft 23. A friction clutch 51 is periodically moved into engagement with the sprocket wheel 47 to effect driving connection between said wheel and the shaft 46. The clutch 51 has rotatable connection with a shifting yoke 52 that is operated by means of a link 53 which is connected to a bell crank lever 54. The bell crank lever is operated by a push rod 55 and a cam disc 56, the cam disc being secured to the shaft 23.

The shaft 46 carries a gear wheel 57 that meshes with the gear wheel 36 for the purpose of

rotating the drum 35. The chuck shaft 45 has rotatable connection with a shifting fork 60 that is pivotally mounted on the framework at 61, and has link connection with the bell crank 54.

5 It will be seen that as the shaft 23 rotates, the chuck ends 43 and 44 will be periodically moved together to engage the ends of a bottle and lift it slightly from the cradles 15, while at the same time, the clutch 51 will effect driving engagement between the sprocket 47 and the shaft 46, so that the chuck and the drum will be simultaneously rotated, and the bottle will have rolling movement on the periphery of the drum.

10 During said rolling engagement between the article and the drum, the squeegee 40 occupies the position shown in Fig. 2 and serves to force the coloring material through the screen and against the surface of the bottle. The squeegee is raised and lowered by a link 63 which is connected to the arm 41 and to a crank-like extension 64 of the lever 60. When the bottle 16 is disengaged from the chuck as shown in Fig. 3, the squeegee is in elevated position relative to the stencil sheet, so that the sheet is relieved of pressure, and there is less danger of smearing the bottles during their movement to and from stenciling position.

The step-by-step movement of the conveyer is, of course, in timed relation to the operation of the chuck and the rotative movements of the stencil drum, so that the conveyer will be stationary during the actual stenciling operation.

The drum 37 ordinarily will not make a complete revolution for each bottle, but the stencil sheet may have a plurality of insignia distributed circumferentially of the drum, and which may be duplicates or of different designs. For example, one bottle may be stenciled with a given character and a succeeding bottle may be stenciled with another character, or all bottles may be decorated alike.

Referring now to Figs. 6, 7 and 8, I show apparatus for stenciling flat-sided ware. In this structure, a chain conveyer is provided with flights or stop members 70 against which articles 71 rest while being advanced beneath a drum stencil 72. The stencil drum 72 may be of substantially the form of the drum 35, and is provided with a squeegee 73 that is supported from an upright 69 and extends into an open end of the drum.

The conveyer is driven by a motor 74 operating through transmission gearing 75, a drive chain 76, a sprocket 77 and a shaft 78 which carries the sprocket wheel that drives the conveyer chain.

A gear wheel 79 is secured to the shaft 78 and drives a gear wheel 80 that is secured to the shaft which carries a sprocket wheel 81. The sprocket wheel 81, through a drive chain 82, drives a sprocket wheel 83 that is carried by the stencil drum shaft. The gearing is such that the peripheral speed of the stencil drum will be equal to the linear speed of the conveyer.

65 The squeegee 73 is, of course, stationary so that as the drum 72 rotates, color will be forced through the stencil sheet and against the upper surfaces of the bottles 71. The characters on the stencil sheet are so spaced peripherally of the drum that they will sequentially be brought into engagement with the bottles carried beneath the drum. The bottles are discharged to a chute or conveyer 85 from whence they may be transferred to a firing chamber, if desired.

70 If desired, means could be provided for raising the squeegee 73 slightly upon the approach of a bottle, and then lowering it into engagement with the stencil sheet immediately after the forward corner of the bottle has entered beneath the drum, but ordinarily this would not be necessary, since the forward corners of the bottles will first engage with the wall of the peripheral drum at areas which are not cut away to expose the stencil sheet, and therefore are sufficiently far in advance of any deflections of the stencil sheet by pressure of the squeegee.

5 The stencil drums of Figs. 1 and 6 could, of course, be operated by other mechanism. If operated by hand, for example, they would not need to be given complete rotations, but could be oscillated about their axes in proper relation to the carrier or conveyer. The tapered wall surfaces or shoulders of ware can be stenciled by having the article tilted somewhat as by raising or lowering one of the chucks of Fig. 2, or by having the axis of the stencil drum tilted or inclined.

In Fig. 9 I show a structure similar to that of Figs. 1 to 3, but which differs therefrom principally in the mounting of the chuck and the stencil drum. The conveyer and chuck-operating mechanisms may be substantially the same as in Fig. 1. However, the axes of the chuck members 43a and 44a are tilted, so that the shoulder or tapering surface of the bottle will be brought to approximately a horizontal position at its line of contact with the stencil drum 35a. The drum 35a is of frustro-conical form, and it is driven from the chuck shaft 46a through gear wheels 85 and a sprocket chain drive 86. A squeegee 40a is preferably in the form of a rubber blade, so that it will have some flexibility and yieldability to press the stencil sheet into contact with the shoulder of the bottle, notwithstanding the slight curvature of the said shoulder.

25 Various types of stencil sheets may be employed including what is known as a screen stencil which has a series of perforations distributed over the field of the character to be produced. The stencil sheet is preferably flexible and of such thickness and the holes closely enough together, that when the sheet and the article are separated, the deposited drop-like particles of color will unite with one another to form a solid field of color.

40 We claim as our invention:—  
1. Stenciling apparatus comprising a stencil sheet, a conveyer for carrying articles beneath the sheet, means movable independently of the conveyer's traveling movement, for bringing each article and the sheet into engagement with one another, and means for forcing coloring material through the sheet and against the articles.

2. Stenciling apparatus comprising a stencil sheet, a conveyer for carrying articles beneath the sheet, means movable independently of the conveyer's traveling movement for bringing each article and the sheet into engagement with one another, means operable in timed relation to the conveyer movement for effecting rolling contact of the stencil sheet and the articles, and means for forcing coloring material through the sheet and against the articles.

3. Stenciling apparatus comprising a stencil sheet, a conveyer, means for imparting intermittent advancing movements to the conveyer, means operable when the conveyer is stationary, for rotating each article on the adjacent surface of the stencil sheet, and means for forcing imprinting material through the sheet.

4. Stenciling apparatus comprising a stencil sheet, a conveyer, means for imparting inter- 75

mittent advancing movements to the conveyer, means operable when the conveyer is stationary for rotating each article on the adjacent surface of the stencil sheet, a squeegee operable against the opposite side of the sheet for forcing coloring material therethrough, and means for lifting the squeegee during advancing movements of the conveyer.

5. Stenciling apparatus comprising a stencil drum, a conveyer, means for supporting the articles upon the conveyer in definitely-spaced relation to one another, means operable in timed relation to movement of the conveyer for effecting rolling contact between the periphery of the drum and the surfaces of the articles, a squeegee operable against the opposite side of the stencil drum for forcing coloring material therethrough, and means operable in timed relation to movement of the conveyer for raising and lowering the squeegee.

6. Stenciling apparatus comprising a stencil drum, a conveyer for carrying articles past the drum, means for intermittently advancing the conveyer, means operable between advancing movements for rotating the drum and the adjacent article, and means for forcing coloring material through the drum and against the articles.

7. Stenciling apparatus comprising a stencil drum, a conveyer for carrying articles past the drum, means for intermittently advancing the conveyer, means operable between advancing movements for lifting each article from the conveyer and for rotating the drum and the adjacent

article, and means for forcing coloring material through the drum and against the articles.

8. Stenciling apparatus for circular articles which are tapered, comprising a stencil sheet, a conveyer, means for imparting intermittent advancing movements to the conveyer, a chuck for rotating the tapered surface of each article on the adjacent surface of the stencil sheet, about an axis inclined with respect to the lines of contact of the article with the stencil sheet, means automatically operable when the conveyer is at rest, for rotating the chuck, and means for forcing imprinting material through the sheet.

9. Stenciling apparatus for circular articles which are tapered, comprising a stencil sheet, a conveyer, means for imparting intermittent advancing movements to the conveyer, a chuck for rotating the tapered surface of each article on the adjacent surface of the stencil sheet, about an axis inclined with respect to the lines of contact of the article with the stencil sheet, means automatically operable when the conveyer is at rest, for rotating the chuck, means for simultaneously moving the sheet in such angular direction that the portion of the sheet which makes contact with a larger circumferential surface of the article will have faster linear speed than those portions which engage the article at its points of smaller diameter, and means for forcing imprinting material through the sheet.

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