Feb. 11, 1941. L. D. SOUBIER 2,231,553

STENCILING APPARATUS

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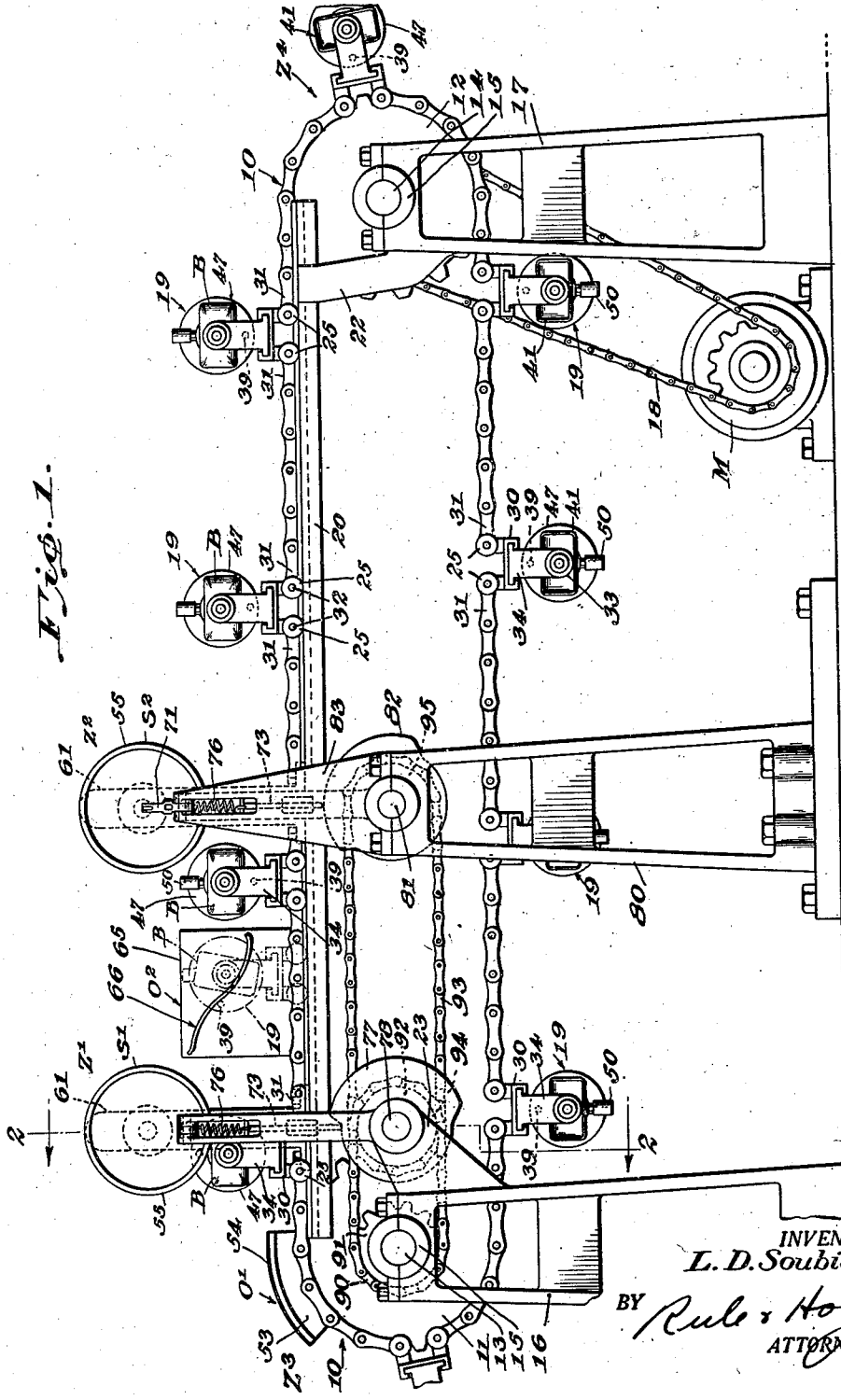


Fig. 1.

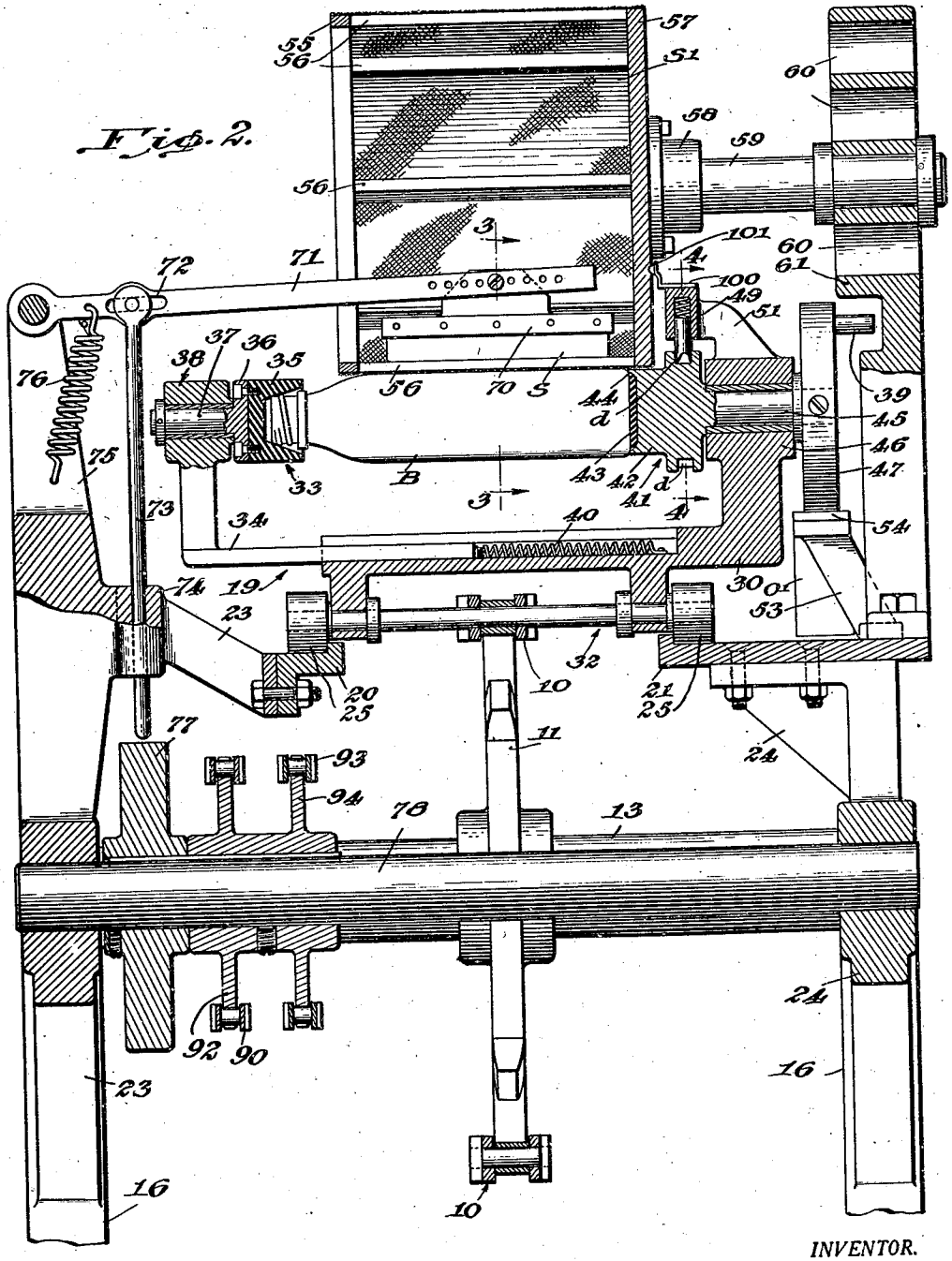
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Fig. 2.



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Fig. 3.

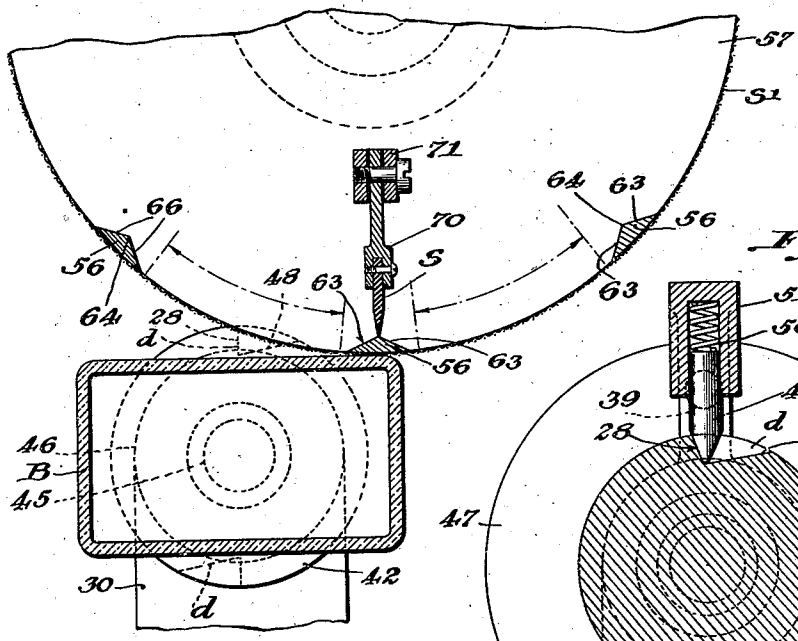


Fig. 4.

Fig. 5.

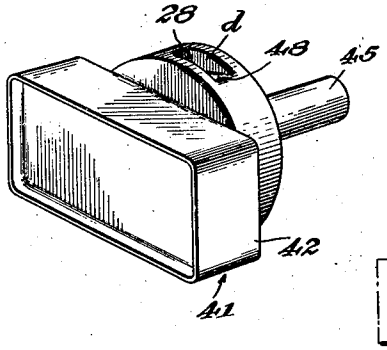
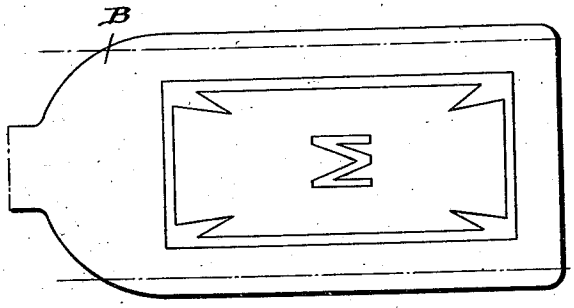


Fig. 6.



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2,231,553

STENCILING APPARATUS

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Application March 17, 1938, Serial No. 196,401

8 Claims. (Cl. 101—124)

The present invention relates to improvements in stenciling apparatus and more particularly to an apparatus for decorating, lettering, or otherwise marking the opposite sides of bottles or like articles having flat sides.

The principal object of the invention is to provide a stenciling apparatus which is fully automatic in its operation; which will receive the bottles or other articles in a receiving zone; orient the same for decorative contact of one face thereof with a stencil screen positioned in a decorating zone; convey the same, properly oriented, through said zone; orient the partially decorated bottles for decorative contact of the opposite face thereof with a stencil screen positioned in a second decorating zone; convey the same, properly oriented, through the second decorating zone; and finally convey the fully decorated bottles to an article removal zone for removal from the apparatus.

Another object of the invention, in an apparatus of the character set forth above, is to provide a novel and effective means for orienting the bottles received thereby prior to presentation thereof at the first decorating station.

Another object of the invention, in such an apparatus, is to provide a novel and effective means for orienting the bottles undergoing decoration between decorating operations.

A further object of the invention is to provide such an apparatus in which there is incorporated a novel form of stencil screen construction by means of which the decorations applied to the opposite faces of the bottles are uniformly centered thereon.

Other objects of the invention, not at this time particularly enumerated, will become apparent hereinafter.

In the accompanying drawings:

Fig. 1 is a side elevational view of a stenciling apparatus manufactured in accordance with the principles of the present invention;

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken substantially along the line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a base chuck employed in connection with the present invention; and

Fig. 6 is a plan view, diagrammatic in its representation, of the body portion of a bottle which has been decorated by the improved stenciling apparatus and illustrating the areas of contact between the squeegee and stencil screen during the decoration of the bottle.

The invention is illustrated as being embodied in a stenciling apparatus including an endless horizontal conveyor 10 (Fig. 1) supported upon sprockets 11 and 12 which are mounted upon horizontal shafts 13 and 14 rotatably supported in bearings 15 provided at the upper ends of pairs of front and rear standards 16 and 17 respectively. The conveyor 10 is driven by a motor M to which driving connection is effected by a chain 18 or like element.

The conveyor 10 carries a series of article holding units 19 which are adapted to support bottles B or other similar articles to be decorated in succession beneath a pair of stencil screens S^1 and S^2, the latter being arranged in series above the conveyor. Supporting rails 20 and 21 (see also Fig. 2) are supported at their rear ends from the standards 17 by means of a pair of similar brackets, one of which is shown at 22. The front ends of the rails 20 and 21 are supported from the standards 16 by means of brackets 23 and 24 respectively. The rails 20 and 21 and various supporting brackets all comprise a part of the stationary framework of the apparatus. The rails 20 and 21 assist in supporting the weight of the article holding units 19 which pass thereover.

The stencil screen S^1 is situated in a decorating zone Z^1 (Fig. 1) while the stencil screen S^2 is situated in a second decorating zone Z^2. In approaching the zone Z^1 an orienting mechanism O^1 causes the bottles to become oriented on the holding units 19 so that one flat face thereof assumes a horizontal position for proper presentation to and decorative cooperation with the stencil screen S^1 in the first decorating zone. In passing from the first decorating zone Z^1 to the second decorating zone Z^2, a second orienting mechanism O^2 positioned in the path of movement of the units 19 is designed for successive cooperation therewith to invert the bottles B and present the other face thereof to the stencil screen S^2 for decorative cooperation therewith.

Toward these ends, each article holding unit 19 (Fig. 2) comprises an elongated frame 30 positioned outside of the endless surface of the conveyor 10, and connected to and supported by adjacent conveyor links 31 by means of a pair of conveyor pintles 32. Rollers 25 mounted on the ends of the pintles 32 serve to tractionally support the frame 30 on the supporting rails 20 and 21.

The frame 30 of each holding unit 19 carries a

pair of cooperating chucks which are disposed at opposite sides of the conveyor 10. The head chuck 33 is mounted upon a slide 34 and includes an elastic cup 35 mounted upon a holder 36 which in turn is supported by a short shaft 37. The shaft 37 is mounted for rotation in a bearing 38 provided on the slide 34. A coil spring 40, connecting the inner end of the slide 34 and the frame 30, tends to move the entire head chuck assembly 33 to its innermost article-engaging position with the neck portion of the bottle B nested within the elastic cup 35.

A base chuck 41 supported at the opposite end of the frame 30 cooperates with the head chuck 33 in supporting the bottle B in position for decoration thereof. Toward this end, the base chuck 41 includes a rotary head 42 carrying a block or pad 43 of rubber or like material having a cavity 44 formed therein conforming substantially to the rectangular shape of the base of the bottle B. The head 42 includes a short horizontal shaft 45 journalled in a bearing 46 which constitutes an integral part of the frame 30. A disk 47 which is secured to the shaft 45 is provided with a projecting eccentric pin 39 designed for cooperation with the orienting mechanism O^2, while the disk itself is designed for cooperation with the orienting mechanism O^1 in a manner and for a purpose subsequently to be described.

The head 42 is cylindrical in form and is provided with a pair of diametrically opposed depressions *d* (Fig. 4) each of which has a relatively sharply inclined side 28 and a relatively gradually inclined side 48. A spring pressed holding detent 49 which is slidably guided in a socket 50 provided in a bracket 51 formed on the frame 30 and which overlies the head 42, bears against the cylindrical side of the head and is adapted to successively enter the depressions *d* upon successive reversals of the base chuck 41.

Referring now to Figs. 1 and 2, the article receiving zone is designated at Z^3 and is situated at the forward end of the conveyor 10 while the article removal zone Z^4 is situated at the rear end thereof. In placing the bottles in position on the article holding units 19 between the head chuck 33 and base chuck 41, the loading operator stationed at the receiving zone Z^3 engages the head chuck 33 with the neck of a bottle B and causes the slide 34 to be moved outwardly to permit the base of the bottle to clear the base chuck 41 for positioning thereon. The loading operator need not be concerned with the angular position of the individual base chucks, either at the time the empty chucks arrive in the receiving zone Z^3, or at the time the loaded chucks leave this zone and approach the first decorating zone Z^1. The orienting mechanism O^1 is positioned between the receiving zone Z^3 and the decorating zone Z^1 and is adapted to cooperate with each successive holding unit 19 in passing, and so orient the base chucks 41 that one flat face of the bottle carried thereby assumes a horizontal position for presentation to the stencil screen S^1.

Toward these ends, the orienting mechanism O^1 comprises a bracket 53 which is secured to the rear end of the supporting rail 21 and which is provided with a curved friction strip 54 designed for successive engagement with the disks 47 as the respective holders 19 pass the orienting mechanism O^1 in rounding the forward end of the conveyor 10. Thus, as each holder 19 approaches the first decorating zone Z^1, the disk 47 is rotated in a clockwise direction as viewed in Fig. 1 by tractional engagement with the friction strip 54 until such time as the holding detent 49 enters one of the depressions *d* provided in the periphery of the head 42. When this occurs, further rotation of the head is prevented. During the remainder of the travel of the holding unit 19 past the orienting mechanism O^1, the disk 47 slides or skids on the friction strip 54. With the detent 49 in holding engagement with the head 42 in the manner just described, one surface of the bottle B supported in the base chuck 41 assumes a horizontal position after it has rounded the forward end of the conveyor and thus the bottle B becomes properly oriented for decorating cooperation with the stencil screen S^1 in the first decorating zone Z^1.

Inasmuch as the depressions *d* formed in the periphery of the head 42 are diametrically opposed to each other, and in view of the fact that the pin 39 which is eccentrically disposed on the disk 47 lies on the same axial plane as the plane of the depressions *d*, the pin 39 assumes its uppermost position on the disk 47 and remains in such position during the first decorating operation while the holder 19 passes through the decorating zone Z^1.

Each bottle B carried by a holder 19 is adapted to be reversed in passing from the first decorating zone Z^1 to the second decorating zone Z^2, and accordingly, the orienting mechanism O^2 comes into cooperation with the pin 39 which is eccentrically mounted on the disk 47. The orienting mechanism O^2 comprises a vertically disposed plate 65 secured to the rail 21 and having a rearwardly and downwardly inclined cam strip 66 projecting laterally therefrom. The cam strip 66 is disposed in the path of movement of the pin 39 and is adapted to be contacted successively thereby in passing, thus causing the disk 47 to be rotated in a counter-clockwise direction as viewed in Fig. 1 until such time as the pin 39 assumes its lowermost position. The holding detent 49 is thus forcibly removed from one depression *d* and rides outwardly on the inclined side 48 thereof (Fig. 4) and remains in contact with the periphery of the head 42 and finally enters the diametrically opposed depression *d*. The base chuck 41 is therefore reversed throughout an angle of one hundred and eighty degrees and the bottle is reversed so that the decorated face thereof is turned downwardly while the undecorated face thereof is presented upwardly for proper presentation to the stencil screen S^2 in the second decorating zone Z^2.

Still referring to Figs. 1 and 2, the two stencil screens S^1 and S^2 are of the cylindrical drum type and each is supported upon a cylindrical frame-like structure including a front retaining ring 55 which is connected by means of ribs 56 to a circular plate 57 mounted upon a hub 58. The hub 58 is carried by a shaft 59 which is selectively and rotatably receivable in any one of a number of bearings 60 provided at different elevations on a standard 61 secured to the rail 21. By proper selection of the bearings 60, compensation may be made for stencil screens of different diameters.

Referring now to Fig. 3, the ribs 56 are equally spaced about the inside of the drum-like screen S^1 and S^2 as the case may be and each rib is provided with oppositely inclined surfaces 63 which converge inwardly toward a common apex 64. The portions of the screen representing the design or designs to be applied to the flat surfaces of the bottles are indicated in Fig. 3 by dimension lines and occur between adjacent ribs 56.

Each stencil screen has associated therewith a

squeegee S which is carried in a squeegee holder 70, the latter being adjustably and pivotally suspended from the outer end of a squeegee arm 71. In the case of the squeegee which cooperates with the screen S^1, the squeegee arm 71 has a pin and slot connection 72 with the upper end of an actuating rod 73 which is slidably mounted for vertical movement in a bearing 74 integrally formed on the bracket 23. The bracket 23 is provided with a vertical extension 75 and the end of the squeegee arm 71 remote from the squeegee S is pivotally connected to the upper end thereof.

A coil spring 76 extending between the arm 71 and bracket 75 serves to normally maintain the squeegee in its lowermost position. The rod 73 is adapted to be actuated by a cam member 77 which is supported for rotation on a horizontal shaft 78, the latter being rotatably supported between the brackets 23 and 24.

In the case of the squeegee S which cooperates with the stencil screens S^2, the mounting for the squeegee S is similar to the mounting just described. A separate pair of standards 80 (Fig. 1) however are provided and serve to support therebetween a shaft 81 similar to the shaft 78. A cam member 82 is secured to the shaft 81 for cooperation with the actuating rod 73 for the squeegee arm 71. In lieu of the bracket 23, an extension 83 mounted on one of the standards 80 serves to operatively support the various squeegee instrumentalities associated with the stencil screen S^2.

The conveyor shaft 13 and the shaft 78 are operatively connected together by means of a chain 90 which passes over sprockets 91 and 92 on the respective shafts. Similarly the shafts 78 and 81 are connected together by a chain 93 and sprockets 94 and 95. The diameters of and the number of teeth provided on the sprockets 94 and 95 are identical and thus the shafts 78 and 81 rotate in unison.

The performance of the decorating operation on one face of a bottle B at the decorating zone Z^1 is substantially the same as the performance of the decorating operation on the other face of the bottle at the zone Z^2 and a description of the former will suffice for both. As previously stated, each bottle issuing from the orienting mechanism O^1 and rounding the forward end of the conveyor 10 approaches the stencil screen S^1 with one face thereof presented upwardly for decorative contact with the screen. The cam member 77 is so designed and angularly positioned on the shaft 78 that, operating through the actuating rod 73, it serves to lower the squeegee S precisely as the upper face of a bottle B comes into contact with the stencil screen. Referring now to Fig. 3, in order that the squeegee immediately upon being lowered shall not engage the screen and commence its decorative contact therewith, the ribs 56 are so spaced about the periphery of the drum-like screen that the squeegee will come to rest thereupon successively each time the squeegee is lowered. In order to insure registry of the squeegee with successive ribs 56, a spring holding detent 100 (Fig. 2) mounted on the bracket 51 is designed to cooperate with a plurality of shallow recesses 101 formed on the plate 57.

The screen S^1 is adapted to be rotated by direct tractional engagement thereof with the face of a bottle undergoing decoration. Consequently, as the bottle is moved beneath the screen, the squeegee moves downwardly on the inclined surface 63 of the rib 56 (Fig. 3) and comes into decorative contact with the screen to force the coloring material placed therein through the pervious portions thereof and onto the upwardly presented face of the bottle. The area in Fig. 6 existing between the parallel broken lines represents the area which the screen traverses in performing each decoration. Upon completion of each decoration, the squeegee rides upwardly on the next adjacent rib 56 and immediately thereafter the cam member 77 comes into operation to elevate the squeegee to a position completely out of contact with any portion of the screen assembly.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. In an apparatus for applying decorations to the opposite sides of bottles, a plurality of bottle holding units each including a rotary chuck for supporting a bottle, means for continuously moving said units successively past a receiving zone and first and second decorating zones, means for imparting a predetermined degree of angularity to the chucks prior to arrival thereof at the first decorating zone, and means for rotating the chucks through an angle of one hundred and eighty degrees as the same proceed from the first decorating zone to the second decorating zone.

2. In an apparatus for applying decorations to the opposite sides of bottles, a plurality of bottle holding units each including a rotary chuck for supporting a bottle, means for continuously moving said units successively past a receiving zone and first and second decorating zones, a spring detent carried by each unit, a pair of diametrically disposed recesses in each chuck designed for cooperation with said detent for maintaining the chuck in one of two positions, means positioned between the receiving zone and the first decorating zone and in the path of movement of the chucks for engaging the latter and rotating the same to cause said detent to enter one of said recesses, and means positioned between the first and second decorating zones in the path of movement of the chucks for engaging the latter and rotating the same to cause said detent to enter the other recess.

3. In an apparatus for applying decorations to the opposite sides of bottles, a plurality of bottle holding units each including a rotary chuck for supporting a bottle, means for continuously moving said units successively past a receiving zone and first and second decorating zones, a spring detent carried by each unit, a pair of diametrically disposed recesses on each chuck designed for cooperation with said detent for maintaining the chuck in one of two positions, means positioned between the receiving zone and the first decorating zone and in the path of movement of the chucks for engaging the latter and rotating the same in one direction to cause said detent to engage one of said recesses, and means positioned between the first and second decorating zones in the path of movement of the chucks for engaging the latter and rotating the same in the opposite direction to cause said detent to engage the other recess.

4. In an apparatus for applying decorations to the opposite sides of bottles, a plurality of bottle holding units each including a rotary chuck for supporting a bottle, means for continuously moving said units successively past a receiving zone and first and second decorating zones, means for maintaining each of said chucks in either of two angular positions one hundred and eighty degrees apart, means positioned between the receiving zone and the first decorating zone and

positioned in the path of movement of the chucks for engaging the latter and rotating the same in one direction to move the chucks to one position thereof, and means positioned between the first and second decorating zones in the path of movement of the chucks for engaging the latter and rotating the same in the opposite direction to move the chucks to the other position thereof.

5. In an apparatus for applying decorations to the opposite sides of bottles, a plurality of bottle holding units each including a rotary chuck for supporting a bottle, means for continuously moving said units successively past a receiving zone and first and second decorating zones, means for maintaining each of said chucks in either of two angular positions one hundred and eighty degress apart, means positioned between the receiving zone and the first decorating zone and positioned in the path of movement of the chucks for engaging the latter and rotating the same to move the chucks to one position thereof, and means positioned between the first and second decorating zones in the path of movement of the chucks for engaging the latter and rotating the same to move the chucks to the other position thereof.

6. In an apparatus for applying decorations to the sides of articles, a plurality of bottle holding units each including a rotary chuck for supporting a bottle, means for continuously moving said units successively past a receiving and first and second decorating zones, means for imparting a predetermined degree of angularity to the chucks prior to arrival thereof at the first decorating zone, a pin eccentrically disposed on each chuck, and a cam positioned in the path of movement of said pins between the first and decorating zones for successive engagement therewith to rotate the chucks and apply a predetermined degree of angularity to the chucks prior to arrival of the same at the second decorating station.

7. In a stenciling apparatus, a cylindrical stencil screen mounted for rotation about a horizontal axis, a plurality of ribs equally spaced about the periphery of said screen on the inside thereof, said screen including pervious portions between the ribs, means for moving a series of articles to be decorated successively beneath said screen in decorative relationship thereto in tangential rolling line contact with the screen, the peripheral distance between adjacent ribs on said screen being substantially equal to the extent of rolling contact between the screen and each article undergoing decoration, a squeegee disposed within the screen, means normally urging said squeegee into contact with the inside of the screen along the line of contact between the screen and surfaces of the articles undergoing decoration, and an inclined surface on each rib adapted to pass beneath the squeegee and elevate the same after the squeegee has traversed the distance between one rib and the next adjacent one on the screen.

8. In a stenciling apparatus, a cylindrical stencil screen mounted for rotation about a horizontal axis, said screen having spaced pervious portions thereon representing designs to be applied to a series of articles, means for moving a series of articles to be decorated successively beneath said screen in decorative relationship thereto in tangential rolling line contact with the screen whereby the screen is periodically rotated by such contact with the articles, and means for yieldingly holding the screen stationary between decorating operations.

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