May 21, 1935. R. H. BARNARD 2,002,335

STENCILING OR DECORATING APPARATUS

Filed Dec. 29, 1933 3 Sheets-Sheet 1

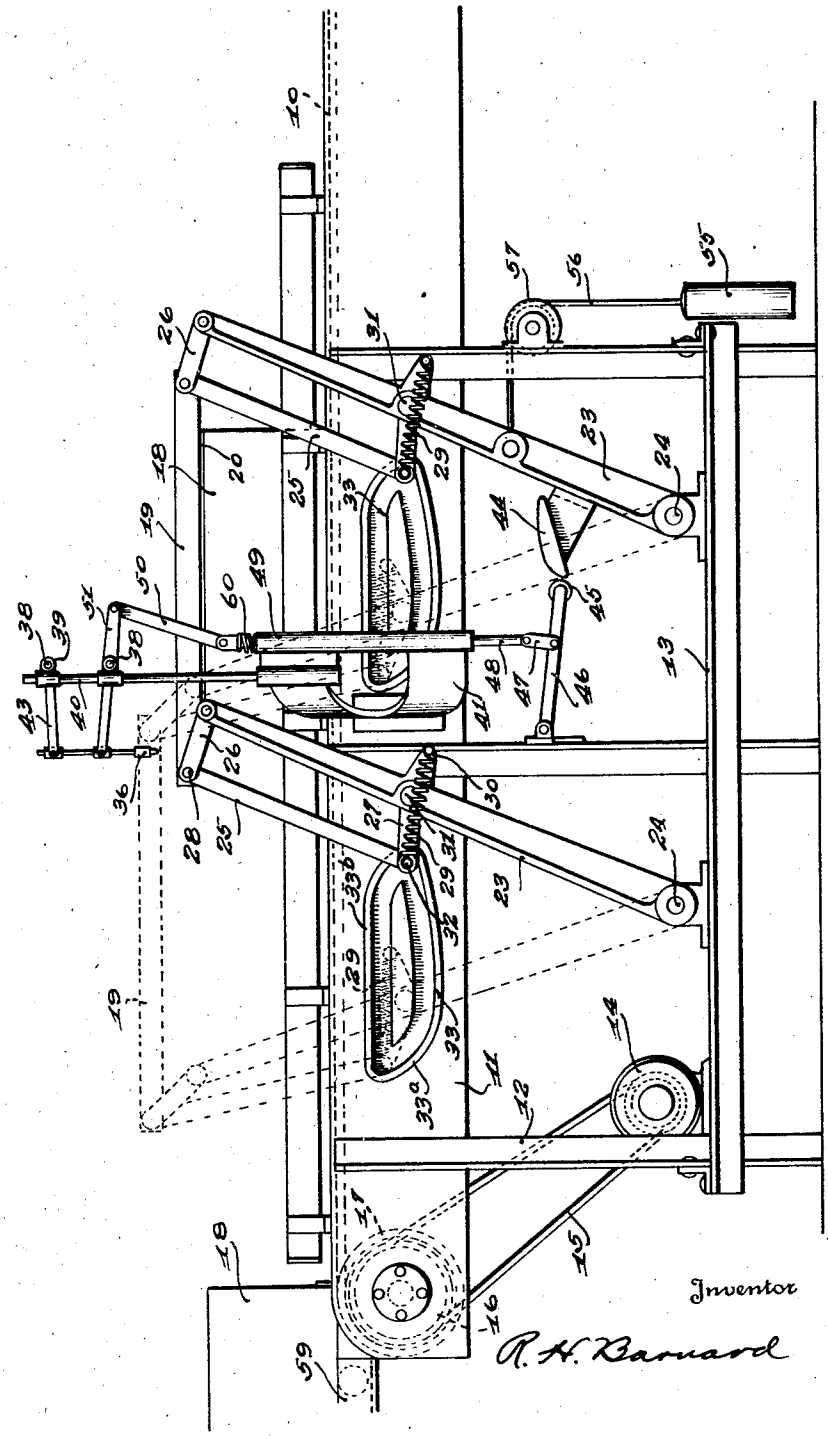


Fig. 1.

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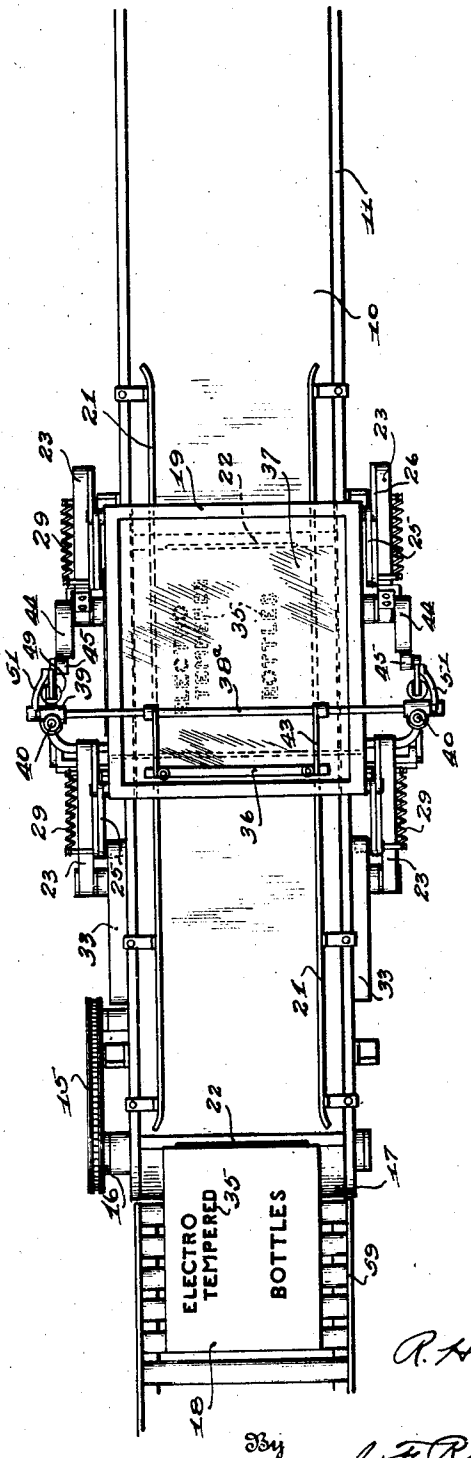


Fig. 2.

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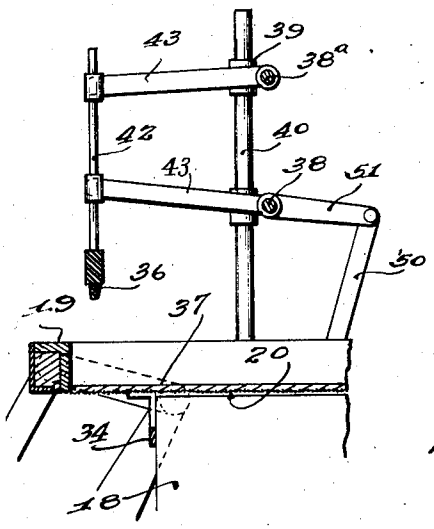


Fig. 3.

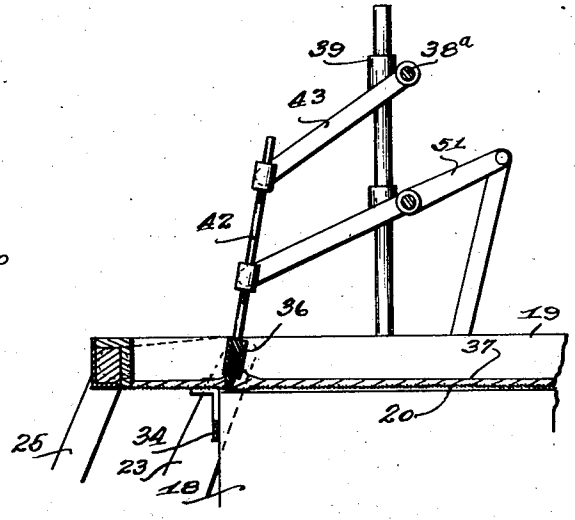
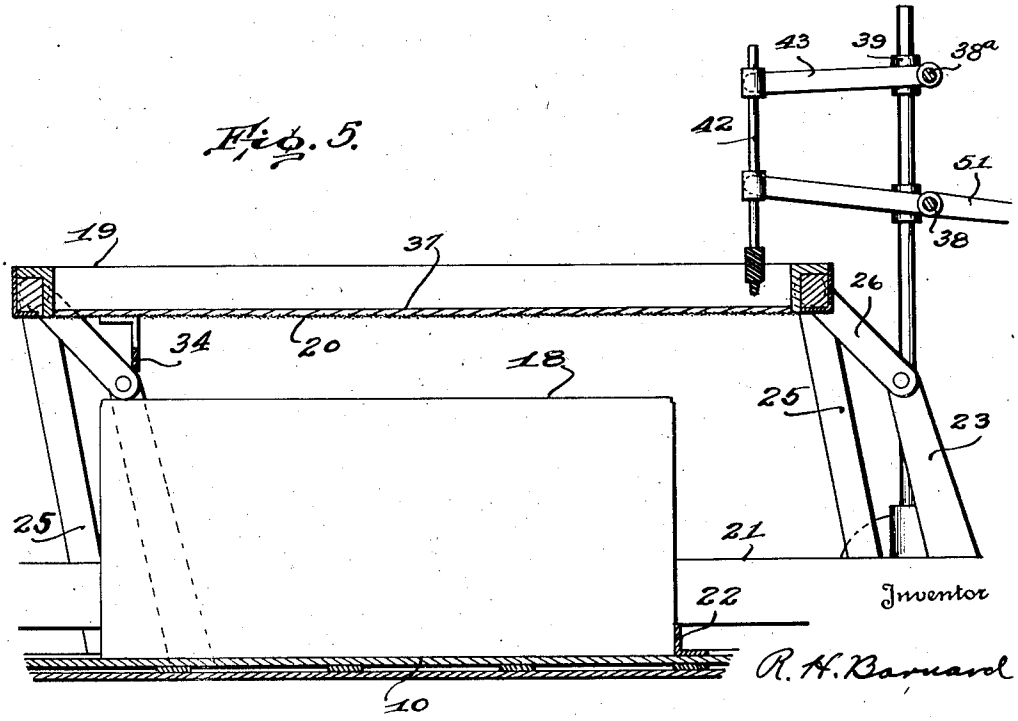


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE

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STENCILING OR DECORATING APPARATUS

Randolph H. Barnard, Toledo, Ohio, assignor to Owens-Illinois Glass Company, a corporation of Ohio

Application December 29, 1933, Serial No. 704,435

12 Claims. (Cl. 101—124)

My invention relates to apparatus for decorating or marking cartons or other articles with lettering, ornamental designs and the like by a stenciling method. An object of the invention is to provide a simple and practical apparatus and method by which the markings or decorations may be applied to the cartons or other articles as they pass in succession past such apparatus while being transferred from one point to another as by means of an endless conveyor.

Other objects of the invention will appear hereinafter.

In the accompanying drawings:

Fig. 1 is a side elevation of a machine constructed in accordance with my invention.

Fig. 2 is a top plan view of the same.

Fig. 3 is a fragmentary sectional view showing particularly the squeegee or wiper just before it has been lowered to operative position.

Fig. 4 is a similar view showing the squeegee lowered.

Fig. 5 is a fragmentary sectional view showing the screen lifted from the carton at the completion of the marking operation.

Referring to the drawings, an endless belt conveyor 10 is mounted to travel horizontally on a supporting frame comprising side members 11 carried on the framework including vertical angle bars 12 and horizontal bars 13. The conveyor 10 is driven continuously by an electric motor 14 having a driving connection with the conveyor through a sprocket chain 15 running over a sprocket wheel 16 on the conveyor roll 17.

Cartons 18 or other articles which are to be marked or decorated are carried by the conveyor in succession through the decorating or stenciling zone. Each article passes beneath a screen frame 19 on which is supported a stencil screen 20 through which the ink or decorating material is applied to the carton in the manner hereinafter set forth. A pair of horizontal guide rails 21 mounted on the frame members 11, guide the cartons and hold them against lateral displacement while passing beneath the screen. Angle bars 22 attached to the conveyor 10 and positioned at intervals lengthwise thereof, provide positive means for determining the position of the cartons on the conveyor and feeding them forward with the conveyor.

The screen frame 19 which, as herein shown, is rectangular and of conventional construction, is mounted for a forward and backward oscillating or reciprocating movement so that it may advance with a carton 18 through the decorating or stenciling zone during the decorating operation and then return to position to cooperate with the next succeeding carton. For this purpose the screen frame is carried on an oscillating framework comprising pairs of parallel lever arms 23, one pair on each side of the conveyor. These arms are connected at their lower ends by pivots 24 to the frame bars 13. Carried by each arm 23 is a parallel bar 25 connected to the arm by links 26 and 27. Pivots 28 which connect the links 26 and bars 25, are mounted on the corners of the frame 19 so that the latter has a floating support on the swinging arms 23. Each arm 23 carries a coil spring 29 anchored at one end to a lug 30 on said arm and connected at its opposite end to a pivot pin 32 which connects the outer end of the link 27 to the bar 25. The arrangement is such that during the forward movement of the screen, the spring is below the pivot point 31 of the link 27 so that the screen is held downward with a yielding pressure on the carton 18.

The pivot pins 32 are extended to engage stationary cam tracks 33 mounted on the frame members 11. During the forward movement of the screen frame from the full line to the dotted line position (Fig. 1) the pins 32 are guided along the lower lead of the cam track which is so shaped that the screen is maintained in contact with the carton 18 therebeneath. A positive driving connection is effected between the screen frame and the carton 18 by means of an angle bar 34 (see Figs. 3 to 5) attached to the lower side of the screen frame and extending thereacross in position to be engaged by the carton as the latter advances with the conveyor, said carton thus serving as a driving means for imparting forward movement to the screen. As the screen nears the limit of its forward movement. the pins 32 are carried upward by the upwardly inclined sections 33a of the track 33. This carries the line of pull of the springs 29 above the center line of the pivots 31 so that said springs operate to lift the screen frame away from the carton and hold it in an elevated position during the return movement during which the pins 32 ride in the upper leads 33b of the cam tracks. During the completion of this return movement, the pins 32 are guided downward by the cams and carry the springs below the pivots 31 so that the screen is again moved downward onto the next succeeding carton which in the meantime has been brought into position.

The screen 20 may be a conventional silk screen having an imperforate layer or coating of material in which is stenciled a design 35 consisting

of letters, words or some other design or marking. A squeegee or wiper 36 which may be of conventional form, made of rubber or other suitable material, is mounted above the screen frame and is adapted to be held in contact with the screen as the latter advances therebeneath. The wiper operates to force the ink or coloring material 37 through the stenciled portion of the screen, thereby impressing the stenciled design on the carton. The mounting for the wiper bar 36 comprises horizontal rock shafts 38 and 38a located above the screen and mounted to rock in bearings 39 carried on vertical stationary rods 40. The latter are mounted in stationary bracket arms 41. Vertical rods 42 attached to the wiper bar 36 are carried at the forward ends of rock arms 43 attached to the rock shafts 38 and 38a.

Up and down movement is imparted to the wiper bar under the control of cams 44 on the arms 23. Cam rolls 45 adapted to run on said cams are carried at the free ends of levers 46 pivoted to the framework. Each lever 46 is connected through a link 47 to a vertical rod 48 which is movable up and down through a bearing sleeve 49 on the bracket 41. The upper end of the rod 48 is connected through a link 50 to a rock arm 51 on the rock shaft 38. The return movement of the screen frame is effected by a weight 55 attached to a cable 56 running over a pulley 57 and connected to an arm 23.

The operation of the apparatus may be described as follows: Assuming the parts to be in the position shown in full lines in Fig. 1, the screen frame 19 has just been lowered so that the screen rests on a carton 18 which is advancing with the conveyor 10. The carton has just been advanced to the point at which it engages the bar 34 on the screen frame, so that as the carton continues its forward travel it will drive the screen frame forward to the dotted line position (Fig. 1). As this forward movement of the frame commences, the cam 44 engages the roll 45 and pushes the rods 48 upward, said rods acting through the links 50 and rock arms 51 to rock the shaft 38 and through the rock arms 43 move the wiper bar 36 downward into engagement with the screen as shown in Fig. 4. The cam 44 now holds the wiper against the screen while the latter advances so that the semi-liquid ink or paint 37 is forced through the stenciled portions of the screen to stencil or print the design 35 on the flat upper surface of the carton 18. As the stencil frame nears the forward end of its stroke, the switch or forward ends 33a of the cam tracks 33 lift the pins 32 so that the springs 29 are carried above the center line of the pivots 31. The frame 19 is thus lifted to the dotted line position (Fig. 1) and held in an elevated position during the return movement of the screen frame.

At the completion of the forward movement of the screen frame, the cam roll 45 runs off the inner end of the cam 44 and drops below the tip of the cam so that during the return movement of the screen the roll 45 runs on the lower surface of the cam, thereby holding the wiper in an elevated position out of contact with the screen. During this return movement, a coil spring 60 on the rod 48 is placed under compression so that as the screen completes its return movement and the roll 45 runs off the forward end of its cam, said roll is lifted into position to engage the upper surface of the cam when the latter is again moved forward.

The lifting of the screen frame in the manner above described carries the bar 34 upward, disengaging it from the carton 18, (see Fig. 5) thereby releasing the screen frame and permitting it to be automatically returned by the weight 55. During this return movement the pins 32 ride along the upper leads of the stationary cams and at the completion of said return movement are guided downward, carrying the springs 29 below the pivots 31 so that the screen is brought down on the next succeeding carton 18. The stop bars 22 on the conveyor 10 which determine the positions of the cartons on the conveyor are so located that the movements of the cartons are in synchronism with those of the stenciling mechanism and so that the screen frame will be accurately positioned on each succeeding carton. The stenciled cartons pass from the belt conveyor onto a support here shown as comprising a set of rolls 59 from which they may be removed for shipping or storing.

Modifications may be resorted to within the spirit and scope of my invention.

I claim:

1. A marking device, means for carrying articles in succession through a marking zone, means carried on said marking device in the path of said articles and providing with each article, a driving connection from said carrying means through the article to the marking device and causing the marking device to travel with each article through said zone, means for causing the marking device to mark each article, and means for returning the marking device.

2. The combination of a stencil frame, means for conveying articles seriatim through a stenciling zone, means carried on said stencil frame in the path of said articles and providing with the articles, driving connections from said carrying means through the articles to the stencil frame and causing the stencil frame to advance with each article through said zone, means for stenciling the articles as they pass through said zone, and automatic means for returning the stencil frame after a stenciling operation.

3. The combination of a stencil frame, means for conveying articles seriatim through a stenciling zone, means depending from said frame and extending in the path of the advancing articles for causing the stencil frame to be driven by and to advance with each article through the stencil zone, a stencil screen carried by said frame, a wiper having a stationary mounting, means for holding the wiper in contact with the screen while the latter travels through the stenciling zone, and automatic means for returning the stencil frame and screen.

4. The combination of a conveyor by which articles are advanced serially through a stenciling zone, stenciling apparatus comprising a screen frame, a screen thereon, means depending from said frame for positioning the screen on each article as the latter reaches the stenciling zone and causing said screen to advance with the article through said zone, a wiper, and means for causing it to engage and wipe the screen, means for returning the screen, and means for holding the wiper out of contact with the screen during the return movement of the screen.

5. The combination of a traveling conveyor, means cooperating therewith for causing articles on the conveyor to travel therewith through a stenciling zone, a screen frame, a screen thereon, means for lowering said screen and frame, onto an article and causing them to advance with said article through the stenciling zone, a wiper, means for moving it downward into engagement

with the screen and holding it in wiping contact with the screen as the latter advances, automatic means for lifting the screen frame from the article as the latter completes its movement through the stenciling zone, and automatic means for returning the screen frame through an elevated path and then lowering it to engage a succeeding article.

6. The combination of a traveling conveyor, means cooperating therewith for causing articles on the conveyor to travel therewith through a stenciling zone, a screen frame, a screen thereon, means for lowering said screen and frame onto an article and causing them to advance with said article through the stenciling zone, a wiper, means for moving it downward into engagement with the screen and holding it in wiping contact with the screen as the latter advances, automatic means for lifting the screen frame from the article as the latter completes its movement through the stenciling zone, automatic means for returning the screen frame through an elevated path and then lowering it to engage a succeeding article, and automatic means for lifting the wiper from the screen and holding it out of contact therewith during the said return movement of the screen.

7. The combination of a horizontally traveling conveyor by which articles are conveyed in succession through a stenciling zone, a screen frame, means carried thereby in the path of said articles to be engaged by the latter and cause the screen frame to advance with the articles through a stenciling zone, means for stenciling the articles during their passage through said zone, automatic means for lifting the said frame and releasing it from the article when the latter has passed through said zone, means for returning the screen frame through an elevated path, and means for lowering it into position for cooperation with a succeeding article.

8. The combination of a horizontally traveling conveyor, parallel lever arms mounted on opposite sides of the conveyor, a screen frame positioned above the conveyor and mounted for floating movement up and down on said arms, a screen carried by the frame, automatic means for lowering said frame and screen into engagement with an article on the conveyor, automatic means for rocking said arms and causing the screen to advance with the article through a stenciling zone, means to hold the screen on the article as the latter advances through said zone, a wiper above the screen, means for lowering the wiper into engagement with the screen and holding it in wiping contact therewith while the screen moves through the stenciling zone, automatic means for lifting the screen at the forward end of its travel and holding it in an elevated path during its return movement, and automatic means to return the screen.

9. The combination of a horizontally traveling conveyor, parallel lever arms mounted on opposite sides of the conveyor, a screen frame positioned above the conveyor and mounted for floating movement up and down on said arms, a screen carried by the frame, automatic means for lowering said frame and screen into engagement with an article on the conveyor, automatic means for rocking said arms and causing the screen to advance with the article through a stenciling zone, means to hold the screen on the article as the latter advances through said zone, a wiper above the screen, means for lowering the wiper into engagement with the screen and holding it in wiping contact therewith while the screen moves through the stenciling zone, automatic means for lifting the screen at the forward end of its travel and holding it in an elevated path during its return movement, automatic means to return the screen, and automatic means for lifting the wiper and holding it out of contact with the screen during the return movement of the latter and for then lowering the wiper to again engage the screen.

10. The combination of a horizontally traveling conveyor, a screen frame above the conveyor, a screen thereon, parallel rock arms mounted to rock about stationary pivots, links connecting said arms to the screen frame, permitting up and down movement of the frame relative to said arms, means for rocking said arms and thereby causing the screen frame to advance through a stenciling zone with an article carried on the conveyor, stationary cams, and operating connections between said cams and frame by which the screen is held on the said article while passing through the stenciling zone.

11. The combination of a horizontally traveling conveyor, a screen frame above the conveyor, a screen thereon, parallel rock arms, links connecting said arms to the screen frame, permitting up and down movement of the frame relative to said arms, means for rocking said arms about stationary pivots and thereby causing the screen frame to advance through a stenciling zone with an article carried on the conveyor, and stationary cams formed to hold the screen in contact with the article as it advances and to then lift the screen off the article after passing through the stenciling zone and holding said frame in an elevated path during its return movement.

12. The combination of a horizontally traveling conveyor, a screen frame above the conveyor, a screen thereon, parallel rock arms, links connecting said arms to the screen frame, permitting up and down movement of the frame relative to said arms, means for rocking said arms and thereby causing the screen frame to advance through a stenciling zone with an article carried on the conveyor, stationary cams formed to hold the screen in contact with the article as it advances and to then lift the screen off the article after passing through the stenciling zone and holding said frame in an elevated path during its return movement, a wiper positioned above the screen, a cam carried by one of said rock arms, and operating connections between the wiper and said last mentioned cam by which the wiper, during the forward movement of the screen, is held in contact with the screen.

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