Sept. 4, 1945. P. WENSEL ET AL 2,383,947

DECORATING MACHINES

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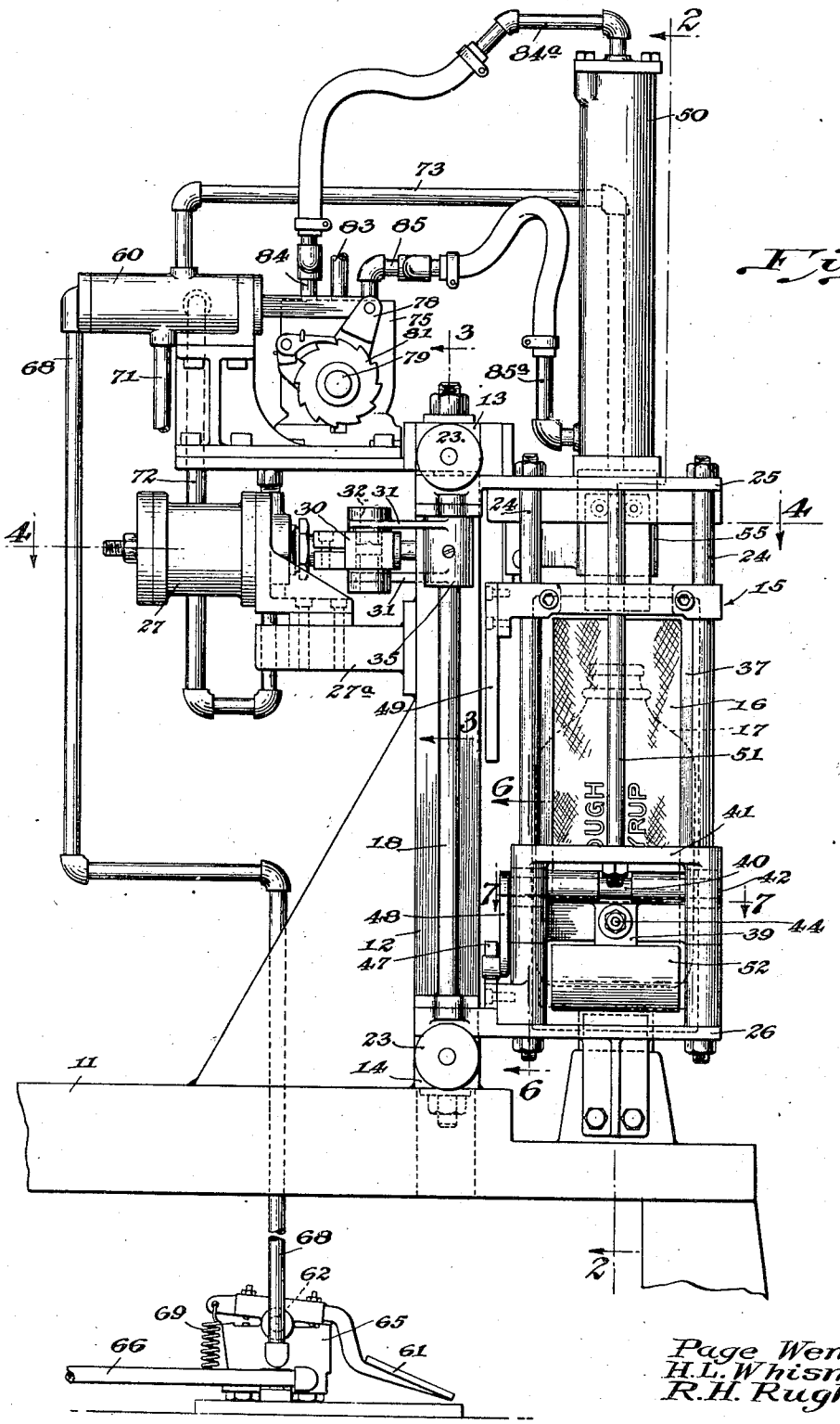


Fig. 1.

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Fig. 2.

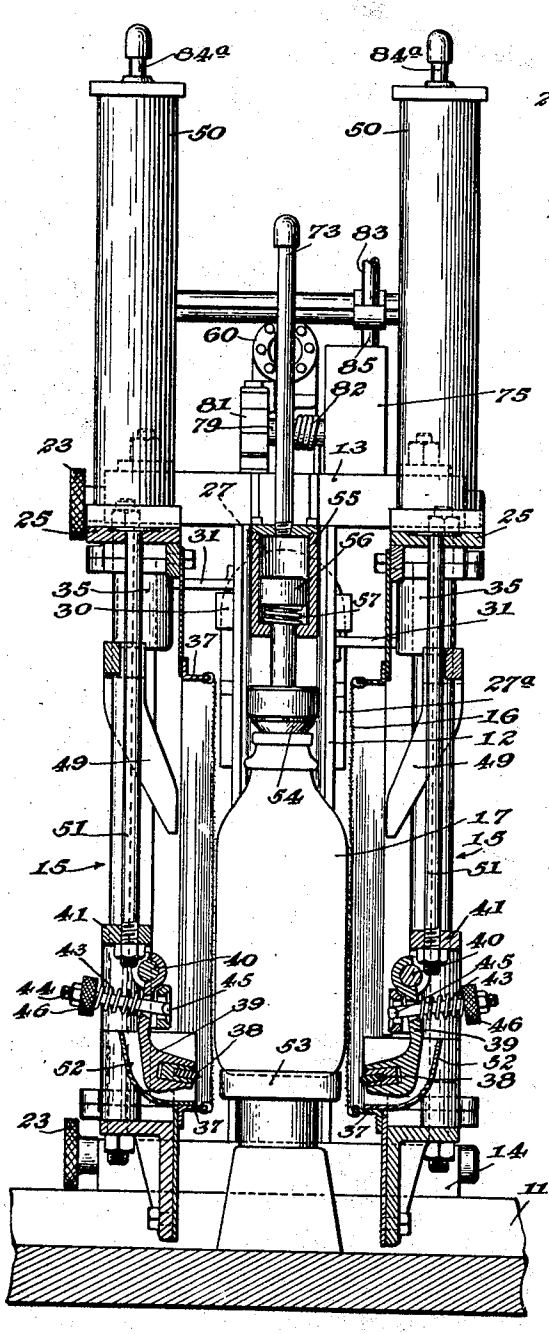
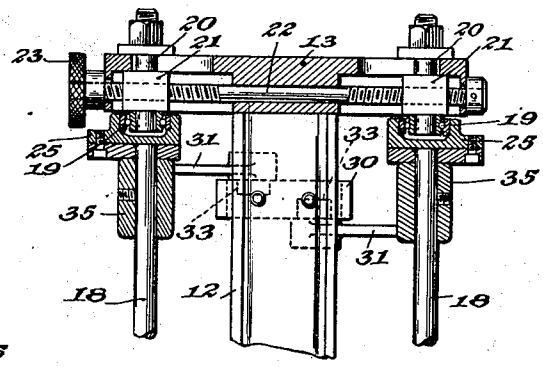


Fig. 3.



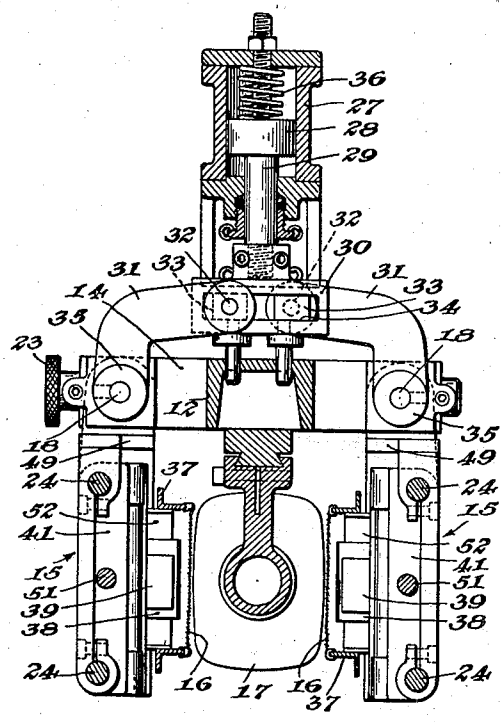


Fig. 4.

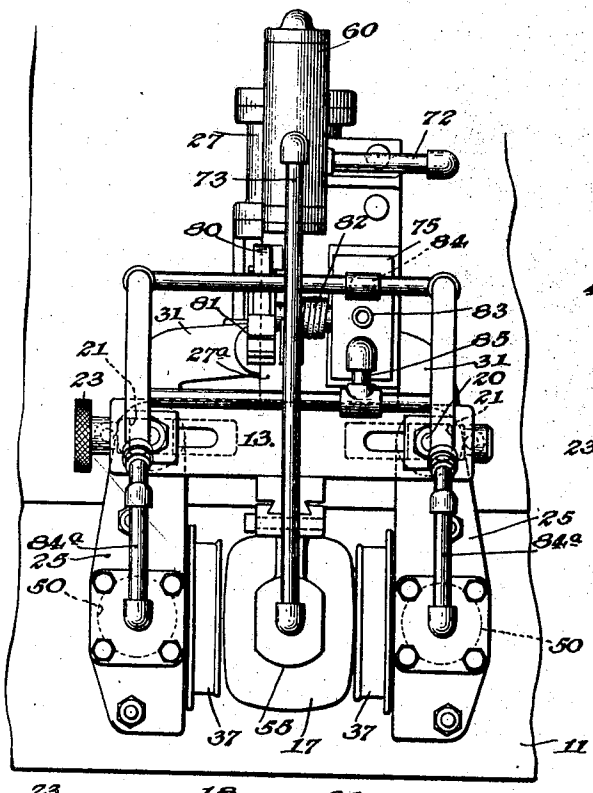
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DECORATING MACHINES

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Fig. 5.



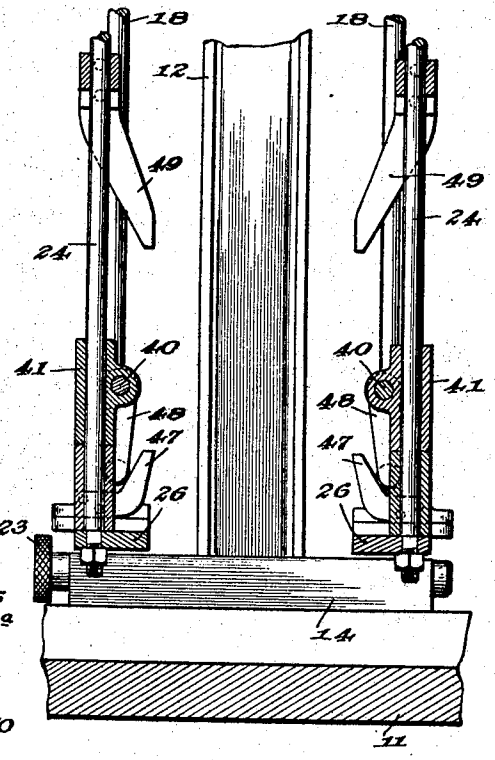


Fig. 6.

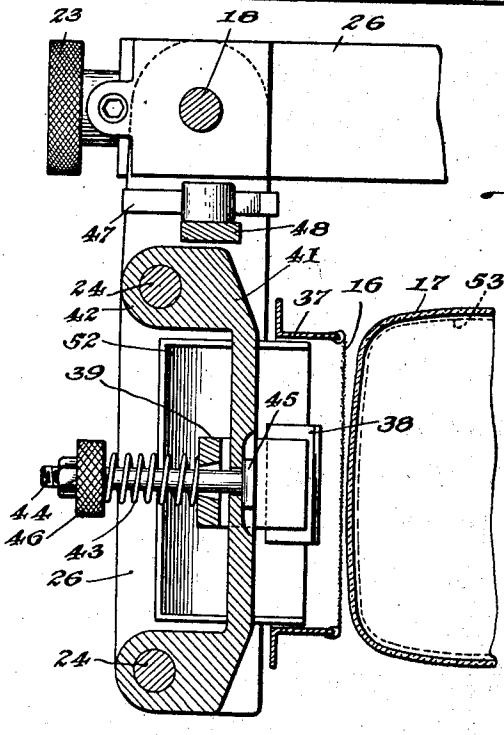


Fig. 7.

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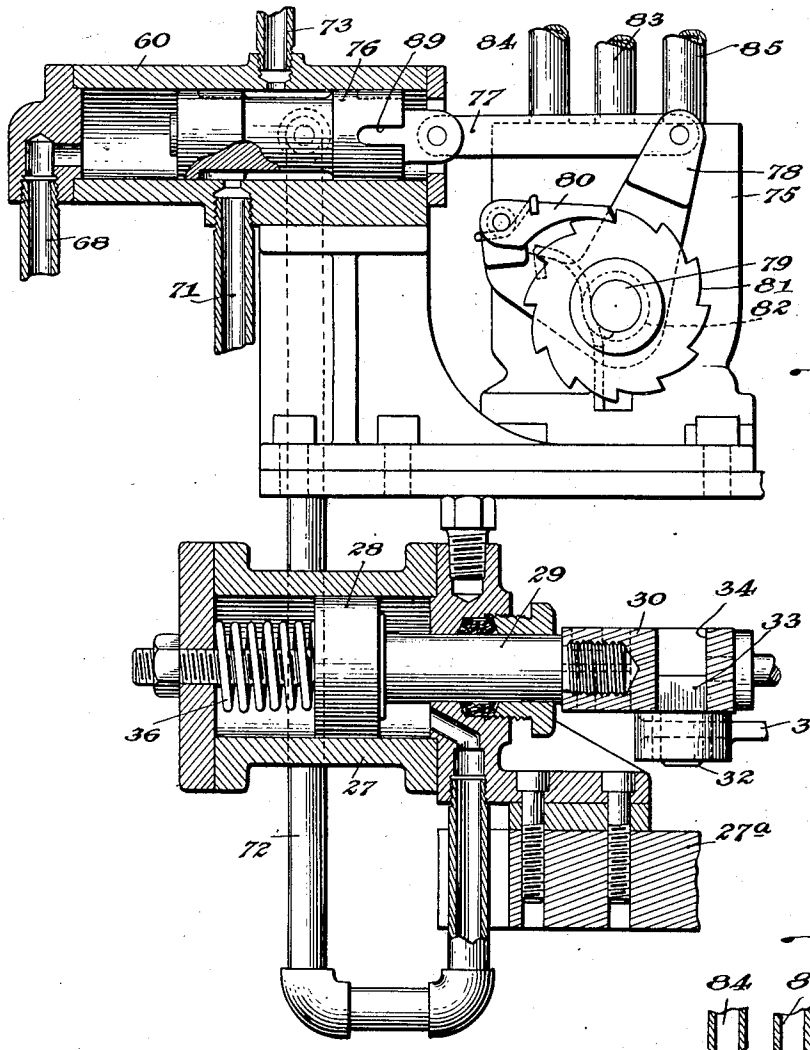


Fig. 8.

Fig. 9.

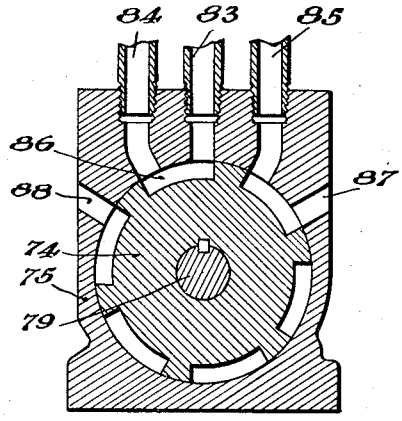
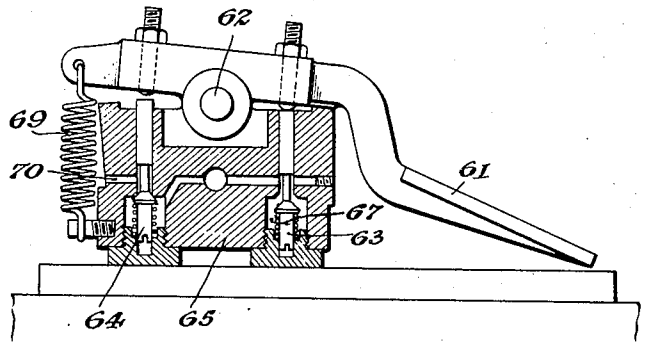


Fig. 10.



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Patented Sept. 4, 1945 2,383,947

UNITED STATES PATENT OFFICE

2,383,947

DECORATING MACHINE

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Application April 28, 1943, Serial No. 484,802

13 Claims. (Cl. 101—123)

Our invention relates to decorating machines of the screen type in which the decorating material is applied to the articles through a screen. The invention is adapted for applying lettering or ornamental designs, to bottles, jars, and various other articles.

An object of the invention is to provide a practical machine for applying decorations simultaneously to the opposite sides of flat bottles, jars, and other articles.

A further object of the invention is to provide an apparatus adapted for decorating bottles or other articles while being held in an upright position.

Our invention provides a decorating apparatus of the screen type for decorating flat bottles or the like, while in an upright position and for applying the decorations or designs during both the upward and downward movements of the squeegees, an object of the invention being to thereby overcome practical difficulties which have been encountered in the use of apparatus in which the squeegees are operative while moving in one direction only.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is a side elevation of a decorating machine embodying the present invention.

Fig. 2 is a sectional elevation at the line 2—2 on Fig. 1.

Fig. 3 is a sectional elevation at the line 3—3 on Fig. 1.

Fig. 4 is a sectional plan view at the line 4—4 on Fig. 1.

Fig. 5 is a plan view of the machine.

Fig. 6 is a section at the line 6—6 on Fig. 1, showing the cams for retracting the squeegees.

Fig. 7 is a section at the line 7—7 on Fig. 1.

Fig. 8 is a fragmentary part-sectional elevation showing the piston motor for swinging the screen frames and the valve mechanism for controlling said motor and other parts.

Fig. 9 is a sectional view of the rotary valve controlling the piston motors for lifting and lowering the squeegees.

Fig. 10 is a view of the foot pedal and valves operated thereby.

The machine as shown, is mounted on a frame 11 and includes a vertical standard 12 of channel-shape in cross section (Fig. 4), to the upper and lower ends of which are respectively attached, cross bars 13 and 14. A pair of upright frames 15 (Fig. 4) serve as swinging carriers for the decorating screens 16, the frames being spaced apart to receive therebetween the bottles 17 or other articles which are to be decorated.

The frames 15 are carried on vertical pivot rods 18, rotatively mounted for swinging the frames about the axes of said rods. Each of the swinging frames 15 comprises a pair of vertical rods 24 and horizontal frame members or bars 25 and 26 connected respectively to the upper and lower ends of the rods 24. The upper frame bars 25 are welded or otherwise rigidly secured at their inner ends to the upper ends of the hinge rods 18 (Figs. 1 and 3). The bars 25 have ball bearing connections 19 with stud shafts 20 in vertical alignment with the rods 18. Said stud shafts are mounted in slide blocks 21 which are slidable in guideways in the stationary frame member 13 for horizontal adjustment. Means for adjusting the slide blocks and stud shafts comprises an adjusting rod 22 having right and left-hand screw thread connections with the blocks 21 and provided with an adjusting knob 23. Mechanisms substantially similar to that just described and illustrated in Fig. 3 are also provided at the lower ends of the swinging frames 15.

Means for swinging the frames 15 toward and from each other comprises an air-operated piston motor 27 (Figs. 1, 4 and 8), mounted on an arm 27a on the standard 12. The motor includes a piston 28 and a piston rod 29. A crosshead 30 attached to the other end of the piston rod, is operatively connected to a pair of rock arms 31 by means of pins 32 carrying squared heads 33 slidable in a slot 34 formed in the crosshead 30. The outer ends of the arms 31 are fixed to the hinge rods 18 by means of collars 35 formed on said arms and keyed to the rods 18.

The motor piston 28 is moved in a forward or outward direction by a coil spring 36 and operates through the arms 31 to swing the screen carriers 15 apart to permit the placing of a bottle 17 or other article between the decorating screens. The piston is moved inwardly for swinging the frames 15 and decorating screens to operative position, by air pressure admitted to the forward end of the cylinder as hereinafter described.

The screens 16 are attached to screen frames 37 secured to the swinging frames 15.

Squeegees 38 are adapted to be swung inwardly against the screens and to be moved up and down while bearing against the screens for transferring the lettering or other perforate designs in the screens to the bottles 17 in a well-known manner. Each squeegee 38 is removably mounted in a rock-arm 39 secured to a horizontal rock shaft 40 mounted for rocking movement on a carriage

41. The carriages 41 are mounted for up-and-down sliding movement on the frames 15 and for this purpose are formed with bearing sleeves 42 slidably mounted on the rods 24.

The squeegees are held with a yielding pressure against the screens during the decorating operations by coil springs 43, each carried on a rod 44 having at its inner end a rocking connection 45 (Fig. 7) with the carriage 41. The spring is held under compression between the rock arm 39 and a knob 46 on the rod 44. While the squeegees are in their lowered position, they are held out of contact with the screen by stationary cams 47 positioned and arranged to engage rolls on the lower ends of rock arms 48 fixed to and depending from the rock shafts 40. The squeegees are also swung to a retracted position as they approach the limit of their upward movement, by stationary cams 49.

The squeegee carriages 41 are moved up and down by a pair of piston motors 50 mounted on the upper ends of the swinging frames 15. Each motor 50 includes a vertically reciprocating piston and a piston rod 51, the latter being attached to the carriage 41.

The squeegees operate during each upward movement of the carriages to decorate the two sides of a bottle 17 and to decorate the sides of a succeeding bottle during their downward movement. The inking or coloring material is placed in containers or pans 52 carried at the lower ends of the swinging frames 15. As a squeegee swings into contact with its screen, it carries with it a supply of the coloring material which, as the squeegee moves upward, is carried upwardly therewith ahead of the squeegee. When a squeegee is withdrawn from the screen as it completes its upward movement, the coloring material commences to run down the screen so that when the squeegee commences its downward movement, there is a supply of the ink or coloring material therebelow in position to be carried downward by the squeegee. In this manner an adequate supply of the coloring material is always maintained in advance of the squeegee.

While the frames 15 are swung apart, a bottle 17 is placed on a bottom support 53 (Fig. 2). A centering chuck 54 is then lowered to engage the mouth of the bottle and hold it in a fixed position during the decorating operation. The chuck is operated by an air motor 55 comprising a vertically reciprocating piston 56 and piston rod connected to the chuck. The piston is lowered by air pressure and lifted by a coil spring 57.

The operations of the several air motors, including the motor 27 for swinging the carrier frames 15, the motors 50 for moving the squeegees up and down, and the chuck-operating motor 55, are under the control of an air-operated master control valve 60, the operation of which is under the control of a foot pedal 61. The foot pedal is mounted to swing on a pivot 62 for operating valves 63 and 64 (Fig. 10) mounted in a valve casing 65. Air under pressure is supplied through a pipe 66 (Fig. 1) which opens into the valve chamber 67 (Fig. 10) of valve 63. When the foot pedal is depressed, the valve 63 is opened to supply air under pressure to a pipe 68 extending to the valve 60. The pedal when depressed also permits the valve 64 to close. When the pedal is released it is lifted by a coil spring 69 and permits the valve 63 to close, thereby cutting off the air pressure supply through the pipe 68, and at the same time opens the valve 64 and thus opens the pipe 68 to an exhaust port 70.

Air under pressure for operating the piston motors 27 and 55, is supplied through an air pressure pipe 71 leading to the valve 60. The air for operating the motor 27 is supplied through the valve 60 to a pipe 72 extending to the inner end of the motor 27. An air pressure line 73 leads from the valve 60 to the chuck-operating motor 55. The motors 50, for lifting and lowering the squeegees, are under the control of a rotary valve 74 (Fig. 9) in valve box 75, the valve being actuated by the piston 76 of the valve 60 which functions as a piston motor for this purpose. The valve piston 76 is connected through a link 77 to a rock arm 78 mounted to rock on a shaft 79 to which the rotary valve is keyed. The rock arm 78 carries a dog 80 for operating a ratchet wheel 81 on the valve shaft 79.

When air pressure is supplied through a pipe 68 to the motor valve 60, the piston 76 operates through the dog and ratchet to rotate the valve 74 forward one step. When the air pressure is released, the rock arm 78 and piston 76 are returned by means of a coil spring 82 (Figs. 2 and 8) on the shaft 79. An air pressure pipe 83 leads to the valve 74 from a continuous source of air pressure. Pipes 84 and 85 lead from the valve 74 to the upper and lower ends respectively of the motor 50, the pipe 84 including branch pipes 84^a, and the pipe 85 including branch pipes 85^a extending to the motor cylinders.

When the rotary valve is in the position shown in Fig. 9, the pipe 84 is in communication with the air pressure line 83 through a port 86, so that air is supplied to the upper end of the motors 50 and lowers the squeegees. The pipe 85 is at this time in communication with an exhaust port 87. When the valve is rotated one step, the pressure line 83 is connected to the pipe 85 and the exhaust port 87 cut off so that air pressure is supplied to the lower ends of the cylinder motors 50 for lifting the squeegees. At the same time the pipe 84 is opened to an exhaust port 88. The next succeeding step rotation of the valve again reverses the connections, thereby causing the squeegees to be lowered.

Referring now to Fig. 8 and assuming that the valve piston 76 has been moved to the left, pressure supplied through the pipe 68 will move the valve piston forward. This operates first to open the pipe 73 to the air pressure line 71 so that the motor 55 operates to lower the chuck 54. Continued forward movement of the valve piston 76 then connects the pipe 72 with the air pressure line 71 so that the motor 27 is operated to swing the frames 15 and screens inwardly to operative position. During the final movement of the valve piston 76, the rotary valve is brought to position to operate the motors 50 for lifting the squeegee carriages.

These operations of the several piston motors take place while the foot pedal 61 is held depressed. When the operator releases the pedal, thereby cutting off the air pressure through pipe 68 and opening it to atmosphere, the valve piston 76 is returned by the spring 82 and operates; first to cut off the air pressure through pipe 72 to the motor 27, and opening it to an exhaust port 89 so that motor 27 is operated by its spring 36 to swing the screen carrying frames 15 apart. The pressure is next cut off from the pipe 73 and the latter is opened to the exhaust, so that the motor 55 is operated by its spring 57 to lift the

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chuck and release the decorated article. These operations are repeated for each article, except the squeegees are moved upward for one article and downward for the next.

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

We claim:

1. Decorating apparatus comprising a pair of upright screen carriers, screens mounted on said carriers in upright position and in horizontally-spaced relation, means for mounting said carriers for swinging movement about vertical axes, a holding device for holding a work-piece centered between the screens, squeegees individual to the screens, carriages on which the squeegees are mounted, said carriages being mounted for vertical sliding movement on the screen carriers, and piston motors mounted on said carriers and comprising vertical piston rods directly connected to the said carriages for moving the carriages up and down.

2. Decorating apparatus comprising a pair of upright screen carriers, screens mounted on said carriers in upright position and in horizontally-spaced relation, means for mounting said carriers for swinging movement about vertical axes, a holding device for holding a work-piece centered between the screens, squeegees individual to the screens, carriages on which the squeegees are mounted, said carriages being mounted for vertical sliding movement on the screen carriers, and piston motors mounted on said carriers and comprising vertical piston rods directly connected to the said carriages for moving the carriages up and down, means for causing the squeegees to bear against the screens during their up-and-down movements, and automatic means for retracting the squeegees as they approach the limits of their up-and-down movements.

3. Decorating apparatus comprising a pair of upright screen carriers, screens mounted on said carriers in upright position and in horizontally-spaced relation, means for mounting said carriers for swinging movement about vertical axes, a holding device for holding a work-piece centered between the screens, squeegees individual to the screens, carriages on which the squeegees are mounted, a motor operatively connected to said carriers for swinging them about their vertical axes, a motor connected to operate said holding device, a motor operatively connected to said carriages, and manually controlled means for causing the motors to operate automatically in a predetermined order.

4. Decorating apparatus comprising, in combination, decorating screens, vertically disposed screen carrier frames on which the screens are mounted in upright position and spaced horizontally in parallel relation, means for mounting said carrier frames for swinging movement about vertical pivots and thereby swinging the screen frames to and from an operative position, carriages mounted for sliding movements on said frames, squeegees supported on said carriages, means for holding the squeegees with a yielding pressure against the screens while moving up and down with the carriage, stationary cams operative to swing the squeegees to retracted positions at the limits of their up-and-down movements, and means for moving the said carriages up and down comprising piston motors mounted on the said carrier frames to swing therewith, said motors comprising vertical pistons having fixed connections with the squeegee carriages.

5. Decorating apparatus comprising a pair of vertically-disposed horizontally-spaced screen carrier frames, upright screens mounted on said frames, said frames being mounted for movement toward and from each other for moving the screens to and from operative position with respect to articles supported therebetween, vertical piston motors individual to and mounted on said carrier frames, squeegee carriages mounted for up-and-down sliding movement on said carrier frames, squeegees mounted on the carriages to travel up and down their width, and movable thereon toward and from the screens, said carriages being operatively connected to the motor pistons, the means for mounting said frames comprising vertical pivots, and means for adjusting the pivots horizontally toward and from each other and thereby adjusting the spacing between the screens.

6. Decorating apparatus comprising a pair of vertically-disposed horizontally-spaced screen carrier frames, upright screens mounted on said frames, said frames being mounted for movement toward and from each other for moving the screens to and from operative position with respect to articles supported therebetween, vertcial piston motors individual to and mounted on said carrier frames, squeegee carriages mounted for up-and-down sliding movement on said carrier frames, squeegees mounted on the carriages to travel up and down their width, and movable thereon toward and from the screens, said carriages being operatively connected to the motor pistons, the means for mounting said frames comprising vertical pivots, a piston motor for moving the squeegee carriages up and down, a piston motor operatively connected to said carrier frames for swinging them about their pivots, a chuck for holding a work-piece in position between the screens, a piston motor for operating the chuck, a master control valve operable to effect the operations of said piston motors in a predetermined order, and manual means for effecting the operation of said control valve.

7. Decorating apparatus comprising upright screen carrier frames, upright screens carried by said frames, squeegee carriages mounted for up-and-down movement on said frames, squeegees on said carriages, vertical piston motors mounted on said frames and comprising pistons connected to said carriages, a rotary valve, fluid pressure lines extending from said valve to the opposite ends respectively of the piston motors, means for rotating said valve step by step, and means controlled by the valve to supply fluid under pressure to said lines in alternation.

8. Decorating apparatus comprising, in combination, screens, screen carrier frames on which the screens are mounted in upright position and in horizontally-spaced relation, a support positioned to hold a work-piece between said screens, means for moving the screen carrier frames and screens toward and from the work-piece, squeegee carriages mounted on said frames for up-and-down movement, squeegees on said carriages, piston motors mounted on said frames and having vertical pistons connected to the squeegee carriages for moving the squeegees up and down, and means for holding the squeegees against the screens and causing the screens to bear against the work-piece during both the up movements and the down movements of the squeegees.

9. Decorating apparatus comprising, in combination, screens, screen carrier frames on which the screens are mounted in upright position and in horizontally-spaced relation, a support posi-

tioned to hold a work-piece between said screens, means for moving said frames toward and from each other and thereby moving the screens toward and from the work-piece, squeegee carriages on said frames, squeegees on the carriages, means for holding the squeegees in contact with the screens, piston motors mounted on said frames and having vertical pistons connected to the carriages for moving the squeegees up and down while in contact with the screens, and automatic means for swinging the squeegees away from the screens as they approach the limits of their up-and-down movements.

10. Decorating apparatus comprising, in combination, decorating screens, vertically disposed screen carrier frames on which the screens are mounted in upright position and spaced horizontally in parallel relation, means for mounting said carrier frames for swinging movement about vertical pivots and thereby swinging the screen frames to and from an operative position, said means comprising vertical pivot rods fixed to said frames, a piston motor comprising a horizontal piston rod reciprocable horizontally in a vertical plane between said frames, rock arms fixed to said pivot rods, and means connecting the motor piston with said rock arms for swinging the carrier frames.

11. Decorating apparatus comprising a pair of vertically-disposed horizontally-spaced screen carrier frames, upright screens mounted on said frames, said frames being mounted for movement toward and from each other for moving the screens to and from operative position with respect to articles supported therebetween, vertical piston motors individual to said carrier frames and having fixed mounting thereon, squeegee carriages mounted for up-and-down movement on said frames, squeegees on said carriages, said motors comprising vertically reciprocating piston rods, and means providing fixed connections between the motor pistons and said squeegee carriages.

12. Decorating apparatus comprising upright screen carrier frames mounted for movement toward and from each other, upright screens carried by said frames, squeegee carriages mounted for up-and-down movement on said frames, squeegees on said carriages, vertical piston motors mounted on said frames for movement therewith and comprising pistons connected to said carriages, a valve, fluid pressure lines extending from said valve to the opposite ends of the motor cylinders, means comprising a piston motor for moving the screen carrier frames toward and from each other, a control valve for said last mentioned motor, and manually controlled means for actuating said valves in succession and thereby causing the first mentioned motors to operate in alternation with the last mentioned motor.

13. Decorating apparatus comprising a support for a work-piece, a screen carrier frame, a decorating screen carried by said frame, a fluid-operated motor connected to said frame for moving the screen toward and from the work-piece, a squeegee carriage mounted for movement on said frame, a squeegee on said carriage, a second fluid-operated motor connected to the said carriage, a motor valve, means actuated thereby for controlling the operation of said motors, and a manual device for effecting the operation of said motor valve.

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