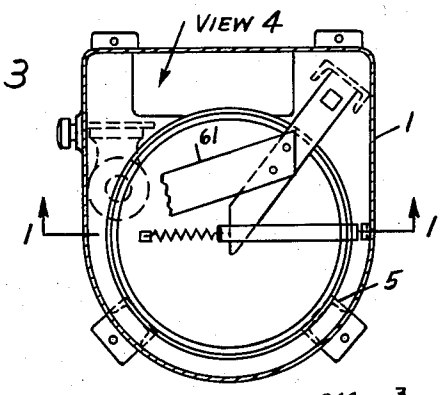
June 3, 1958 R. B. WAY ET AL 2,837,100

MASK WASHING MACHINE

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FIG. 3



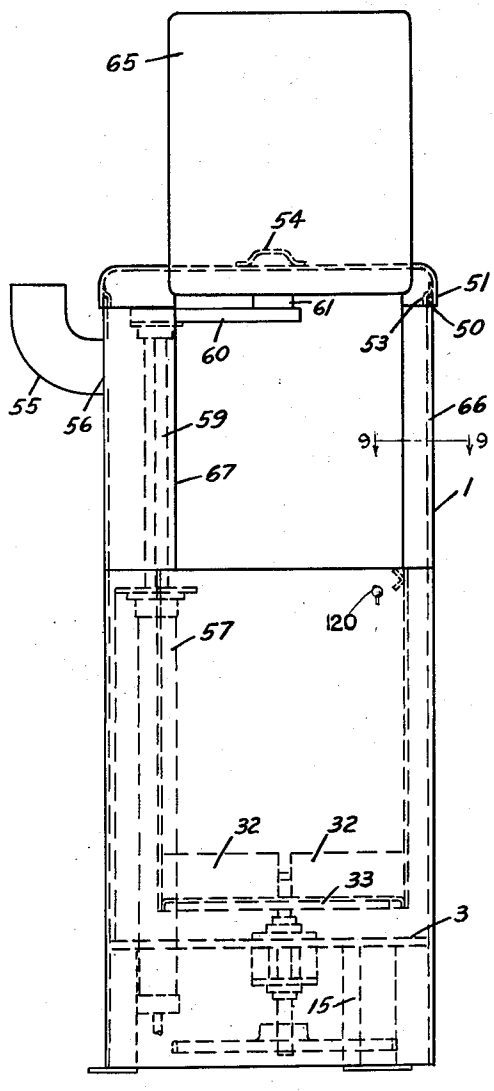


FIG. 2

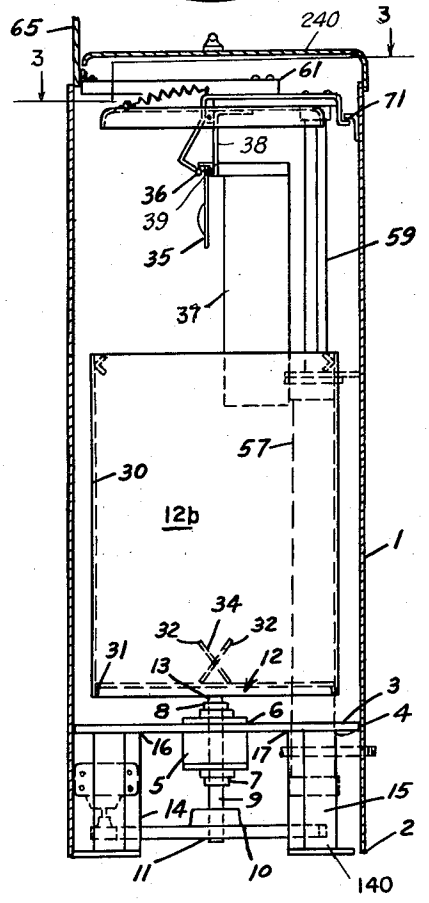


FIG. 1

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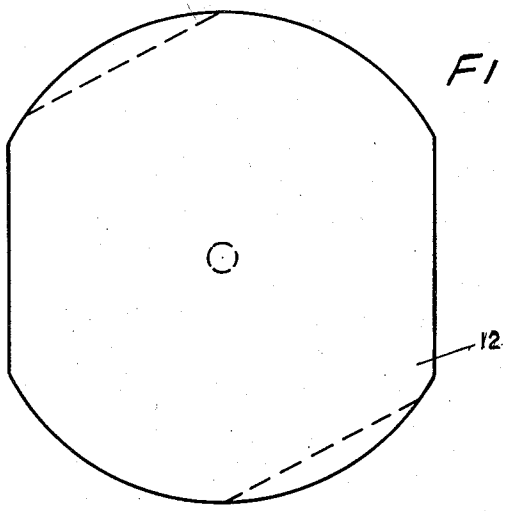
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MASK WASHING MACHINE

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FIG. 6



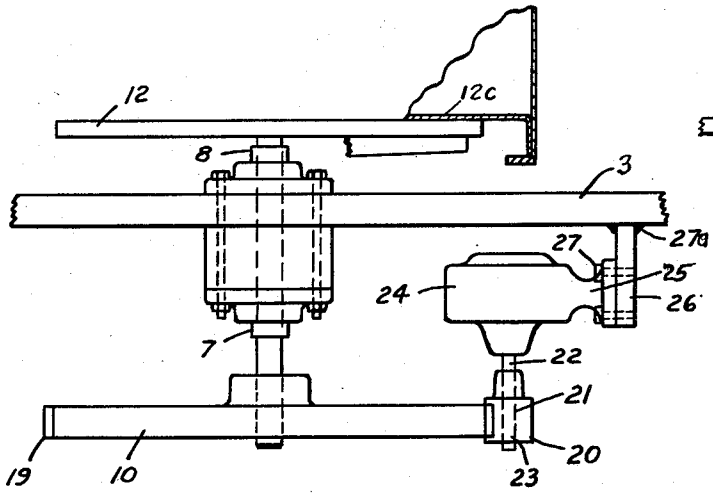


FIG. 4

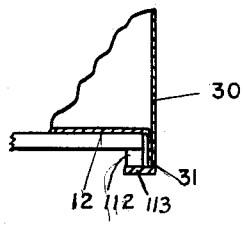


FIG. 5

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MASK WASHING MACHINE

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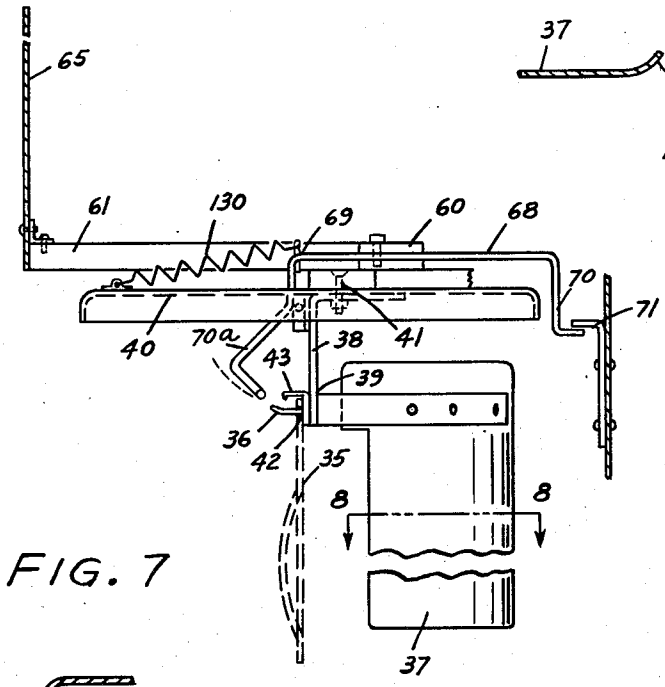


FIG. 7

FIG. 8



FIG. 9

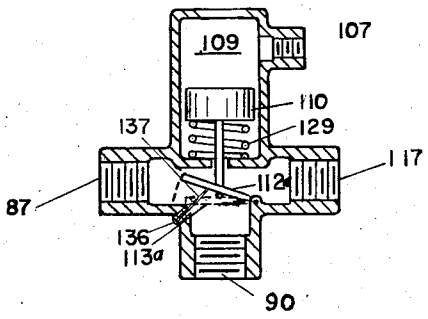


FIG. 12

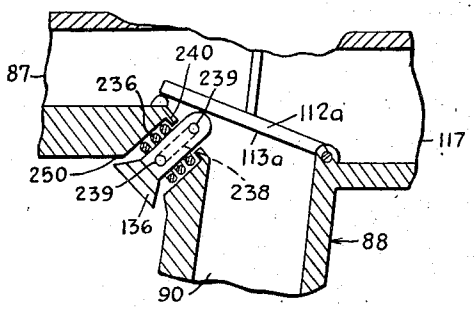


FIG. 13

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MASK WASHING MACHINE

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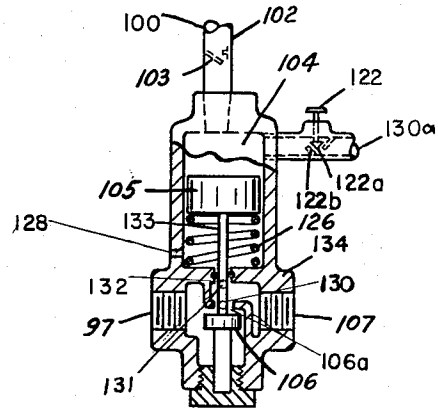


FIG. 11

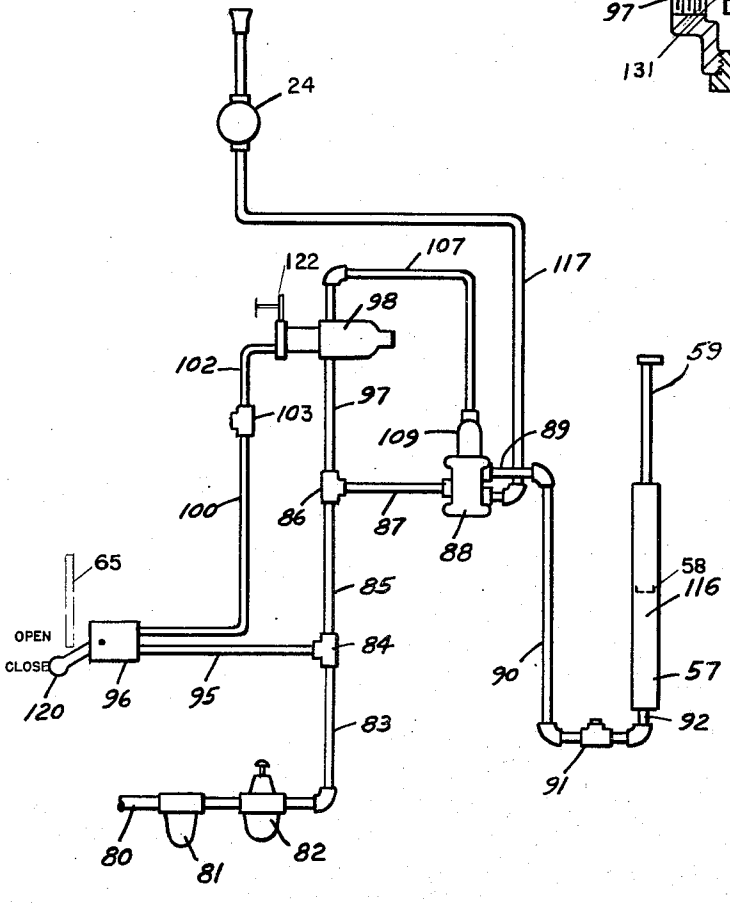


FIG. 10

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Patented June 3, 1958

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MASK WASHING MACHINE

Robert B. Way and Carl D. Hersey, Erie, Pa.

Application November 26, 1954, Serial No. 471,196

13 Claims. (Cl. 134—121)

This invention relates to cleaning machines and more particularly to machines for cleaning the deposits of paint from the surface of masks and stencils used in spray painting and decorating.

Painting masks and stencils often have various concave surfaces from which it is difficult to remove the excess paint which has deposited thereon. Various methods have been provided for removing this excess paint. None of these methods have been completely satisfactory for all applications. The present invention proposes to provide a machine to remove the excess paint from masks, stencils, and other decorating equipment by suspending the mask or stencil in a container having liquid paint solvent therein, the solvent being agitated and striking the mask or stencil with considerable velocity to remove the paint deposited thereon.

It is, accordingly, an object of this invention to provide a machine for removing paint deposited on paint masks, stencils, and other decorating equipment which is simple in construction, economical to manufacture, and simple and efficient to use.

Another object of the invention is to provide a machine for cleaning stencils and paint masks which is automatic in operation to the end that paint masks and stencils may be exposed to a cleaning process for a predetermined length of time.

A further object of the invention is to provide a machine for cleaning paint masks and stencils wherein a timing means is provided, controlling the opening and closing of a cover on the machine.

Another object of the invention is to provide a machine for cleaning paint masks and stencils wherein a novel method of agitation in the machine is provided.

Another object of the invention is to provide a cleaning machine with a removable drum.

Another object of this invention is to provide a mask or stencil washing machine wherein no pump is necessary for the solvent.

A further object of this invention is to provide a vent system in a mask or stencil washing machine wherein the vent draws air over the masks or stencils to dry them after washing.

Another object of this invention is to provide a mask washing machine with a mask support therein which will keep the mask being washed from falling off the support.

With the above and other objects in view, the present invention consists of the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions, and minor details of construction without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Fig. 1 is a cross sectional view taken on line 1—1 of Fig. 3;

Fig. 2 is a front view of the mask or stencil washing machine;

Fig. 3 is a cross sectional view of the mask washing machine taken on line 3—3 of Fig. 1;

Fig. 4 is a detailed view of the driving mechanism;

Fig. 5 is another detailed view of the machine;

Fig. 6 is a top view of the part shown in Fig. 4 showing the bottom of the drum with the drum locking device thereon;

Fig. 7 is an enlarged view of the cover lifting mechanism and mask support;

Fig. 8 is a view taken on line 8—8 of Fig. 7;

Fig. 9 is a partial cross sectional view taken on line 9—9 of Fig. 2;

Fig. 10 is a view of the hydraulic or compressed air circuit used in the machine;

Fig. 11 is a detailed cross sectional view of the timer valve used in this application;

Fig. 12 is a detailed view of the four-way valve; and

Fig. 13 is an enlarged view of a part of one of the valves.

Now with more specific reference to the drawings, the cleaning machine or mask washer is made up of the casing 1 which is adapted to rest on the floor of a building or other support at 2. The frame 140 supports a transverse support member 3 which is attached thereto at 4 and has a bearing 5 supported therein at 6 and provides a thrust bearing at 7 and 8 for a shaft 9. The shaft 9 is attached to a gear 10 at 11 and extends upwardly through the bearing 5 and is attached to the bottom of a drum 12*b* at 13. Legs 14 and 15 are attached to the support 3 at 16 and 17, respectively.

The gear 10 has teeth 19 thereon which are engaged by teeth 20 on pinion 21 which is attached to motor shaft 22 at 23. The motor shaft 22 extends from the motor 24 which is supported on a base 25 attached to the bracket 26 by bolts 27. Bracket 26 is attached to support 3 by welding at 27*a* or other suitable means.

The base 12 supports the drum 12*b*. The drum 12*b* has upwardly extending, preferably cylindrical shaped sides 30 which are sealingly attached to the bottom 12*c* at 31 to form a liquid container. The base 12 has wedge shaped lugs 112 which fit under spaced peripheral flange segments 113 to hold the drum 12*b* in place on the base 12. By slightly rotating the drum 12*b*, it can be removed from the base 12. Inwardly extending inclined vanes 32 extend across the bottom 12*c* at 33. As shown in Fig. 3, the vanes 32 are inclined upwardly and rearwardly when the drum 12*b* is rotated in a counterclockwise direction. The vanes 32 hold solution and they will rotate with the drum 12*b*. This forces the liquid against baffle 37 and forces it through the mask attached to the support. This eliminates the need of a pump. The pump would wear rapidly if allowed to run in the solvent. The baffles 37 are attached to downwardly extending bracket 38 at 39. Bracket 38 is attached to the cover 40 by means of bolts 41. Hangers 36 are attached to the bracket 38 at 42 and have a stop 43 attached to the bracket 38 and overlying the hangers 36. The baffle 37 has a curved surface 48 which engages the liquid forced thereagainst by the vanes 32 and directs the liquid into engagement with the mask or stencil 35 supported on hanger 36.

The casing 1 extends upwardly and terminates in edges 50 which are adapted to engage the inner sides of the edges 51 of the cover 40 and have the inner circumferential concentric flange 53 attached thereto to form a seal to prevent leakage of liquid between the cover 40 and drum 12*b* when the cover 40 is closed. The cover 40 has a handle 54 attached thereto providing a convenient means for lifting the cover 40 manually. A vent pipe 55 is attached to an opening 56 in the side of

the casing 1 to carry off fumes from solvent to prevent their escape into the ambient air. The vent pipe 55 draws air over the masks 35 supported on hangers 36 when the cover 40 is closed and assists in drying them. In prior washers, the vent did not draw air over the masks to help dry them.

A cylinder 57 is fixedly attached to the frame 140 and has a piston 58 slidably operated therein having a square piston rod 59 extending upwardly and attached to a bracket 60 which is attached to the piston rod 59. The bracket 60 is attached to the cover 40 and by means of members 61 is adapted to move the sliding door 65. The casing 1 has a cover 240 and the sliding door 65 is shown in open position in Fig. 2 is adapted to slide downward over the opening between the walls 66 and 67 when the stencil or mask 35 is loaded to the position shown in Fig. 1. Air under pressure is provided under the piston 58 to hold the door 65 upward in the position shown. When air is released from the piston 58, the weight of the door 65, cover 40, and mask support or hanger 36 causes the piston 58 to slide downwardly, bringing the door 65 with it. The bracket 60 has a crank 68 pivoted in bearings 69 and a laterally extending end 70 is provided on the other end thereof. Door 65 is connected by bracket 61 to cover 40. When the door 65 is raised by the piston 58 to the open position shown in Figs. 1, 2, and 7, the end 70 of the crank 68 engages the stop member 71 which is fixed to the casing 1 and rotates the crank 68 in the bearings 69 to move the crank 68 out of engagement with the hanger 36 in the position shown in Fig. 7 to release the stencil 35 so that it can be removed.

The compressed air circuit for the machine is shown in Fig. 10. A source of compressed air is connected at 80 and flows through the pressure regulator 81 through the oiler 82, through the pipe 83 to the T 84, through the pipe 85 to the T 86, and to the pipe 87 where it is applied to the four-way valve 88 through the pipe 89, pipe 90, restricting check valve 91, and pipe 92 to the cylinder 57 where it forces the piston 58 upward to hold the piston rod 94 and the door attached thereto to the open position. The valve 91 preferably has a disk therein with a small hole in the center. When air is applied to pipe 90, the disk seats so that air flows through the center hole only and forces the piston 58 up slowly. When valve 88 cuts the air off from pipe 90, the valve 91 allows air to flow back therethrough slowly and maintains substantially full force on piston 58 and bleeds off through valve 136. The square piston rod 59 forms a guide for the cover attached thereto and, therefore, prevents the cover and mechanism being lifted from being rotated. Pressure is at all times also applied to the pipe 95, to the manually operated valve 96, and to the pipe 97, to one side of the timer valve 98. The oiler 82 supplies lubricant to the motor, valves, and cylinder.

When it is desired to operate the washing machine, the operator will hang the mask 35 on the hanger 36 as shown in Fig. 7. The operator then opens the valve 96. Air will flow from the valve 96 to the pipe 100 through the check valve 103 and through the pipe 102. The air will open the check valve 103 and allow air to flow into the chamber 104 to force the piston 105 downward. This will open the port 106*a* and, therefore, allow air to flow from the pipe 97 to the pipe 107 and then into the control chamber 109 to force the piston 110 downward and close the port 90 of the three-way valve 88 to the dotted line position 113*a* and, thereby, stop the flow of air from the pipe 87 to the pipe 90 and cause air to flow from the pipe 87 to the pipe 117. Valve member 112*a* in closing will engage shaft 137 of bleeder valve 136 and open it against the pressure of a spring 236. The shaft 137 has an axial hole 238 connected with radial holes 239 which allow air to flow by a partition 240 when valve 112*a* is forced to a closed position, forcing it off its seat 250 by piston 110. Since the flow of air is stopped through the pipe 90, the air in the cylinder 57 in the space 116 below the piston 58 will bleed out through the now open valve 136 and the piston 58 will descend in the cylinder 57, carrying the door 65 to the closed position over the opening between the walls 66 and 67, and the stop 71 will disengage the crank 68, causing the end 70*a* of the crank 68 to lock the mask 35 in position between the members 36 and 43. In its closed position, the door 65 engages valve handle 120 as indicated schematically in Fig. 10 and closes it, thereby stopping the flow of air from pipe 95 to timer valve 98.

The valve 88 will allow air to flow from the pipe 87 to the pipe 117 to the air motor 24, thereby starting motor 24 which will rotate the drum 12*b*, thereby causing the sloping surfaces 34 of the vanes 32 to force the solvent to rotate therewith and force the solvent to flow into engagement with the curved baffle 37 and thus be forced to flow into engagement with the stencil 35 to apply solvent under pressure to the surface of the stencil 35 and, thereby, wash all adhering paint therefrom.

As soon as the operator has moved the handle 120 of the valve 96 to the open position, he stands by while the machine operates. The sliding door 65 engages handle 120 when the door 65 is lowered to its closed position. When it is completely closed, it moves the handle 120 to a closed position and air in pipe 100 begins to bleed out through the bleeder valve 122 into the ambient atmosphere. The valve 122 has a plunger 122*a* which controls the size of the orifice 122*b*. The air pressure on piston 105 is thereby decreased and the piston 105 begins to drift to an upward position forced thereto by the spring 126. Shaft 133 is hollow between openings 130 and 131; as soon as the piston 105 carries the valve 106 to a closed position, the flow of air through the pipe 107 is stopped and shaft 133 moves with piston 105 and opening 131 moves above opening 134. This allows the pressure to bleed off through the opening 130, hollow 131 and opening 132 in shaft 133, then through opening 128 to the ambient atmosphere, and allows the spring 126 to force the piston 105 upward to pull the valve member 106 to a closed position. This stops the flow of air through pipe 107 and, thereby, allows the piston 110 to move the valve plate 112*a* to the full line position shown, thereby closing the port 117 of the valve 88 and stopping the flow of air through pipe 117 and stopping the motor 24. This will allow valve 136 to close, reapplying air from pipe 87 to pipe 90, re-establishing a pressure in the space 116 under the piston 58 and forcing the piston 58 upward. As piston 58 moves upward, it carries the door 65 with it to open the door 65, lifting the stop 71 from the end 70 of the crank 68 and, thereby, allowing the spring 126 to rotate the crank in its bearings and cause the crank to pull the end 70*a* of the crank 68 from between stop 43 and hanger 36 and out of engagement with the stencil 35. In this position, the door 65 will open and since the crank 68 no longer holds the stencil 35 on the hanger, and the operator can remove the clean mask 35 from the hanger 36.

In the foregoing specification, the invention has been set forth in its preferred practical forms but the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A mask washing machine comprising a frame, a container rotatably mounted on said frame, means to rotate said container, a cover for said container, said cover supported on said frame, and means on said cover to support articles to be washed, said cover being movable upward off of said container to an unloading position and movable

into engagement with said container lowering articles supported thereon into said container.

2. The mask washing machine recited in claim 1 wherein said article supporting means comprises a bracket attached to and extending from said cover, hanger members attached to said bracket, and a locking member adapted to engage articles supported on said hanger members when said cover is lowered onto said container and to release said articles when said cover is moved upward off said container, said locking member being actuated by engagement with a member of said mask washing machine when said cover is lifted from said container, said locking member locking said articles on said hanger members when said cover is disposed on said container.

3. The mask washing machine recited in claim 2 wherein said locking member is in the form of a crank rotatable by engagement of one end thereof with said member of said machine when said cover is moved into position on said container, the other end of said crank adapted to lockingly engage said articles whereby said articles are held against removal from said support.

4. The mask washing machine recited in claim 3 wherein a curved baffle is supported on said cover adjacent said hanger and disposed to direct solvent onto an article supported on said hanger, said baffle being curved to generally conform to the direction of travel of fluid rotated by said container, the curvature of said baffle diverging slightly from the path of travel of said fluid carried by said container whereby said fluid is directed onto said articles.

5. The mask washing machine recited in claim 4 wherein said cover is movable by means of a piston of a fluid actuated cylinder and means is provided to actuate said cylinder to lift said cover, fluid pressure to said cylinder being deactivated, lowering said cover on said container when said container rotating means is actuated to rotate said container.

6. The mask washing machine recited in claim 5 wherein a ventilating means is provided adapted to draw air over said articles to dry said articles.

7. A mask washing machine comprising a frame and a generally cylindrical shaped container having a closed and an open end rotatably mounted on said frame, air actuated means to rotate said container, a cover on said frame movable into engagement with the open end of said container, an air actuated piston attached to said cover and disposed to move said cover away from said container, means to interrupt the flow of air to said cylinder when air is supplied to said air actuated means to rotate said means, and means to control the time air is supplied to said air actuated means and interrupted from said piston.

8. A mask washing machine comprising a frame, an air actuated motor on said frame, a drum supported on said frame, said actuated motor being operatively attached to said drum to rotate said drum, said drum having a bottom, upwardly extending sides, and an open top, inclined vanes disposed on the bottom of said drum disposed to cause fluid contained in said drum to rotate therewith, a baffle in said drum disposed to direct fluid on articles supported over said fluid, a cylinder attached to said frame having a piston rod, a cover for said drum, said cover being operatively attached to said piston rod, and control means to control the flow of fluid to said motor and to said cylinder, said fluid being directed by said control to said cylinder to lift said piston rod and said cover when said fluid is interrupted from said motor, said fluid being interrupted from said cylinder allowing said piston rod to lower said cover onto said drum when said fluid is admitted to said motor by said control means whereby said motor is actuated to rotate said drum.

9. The mask washing machine recited in claim 8 wherein a hanger is provided for supporting said articles in said drum, and means actuable by movement of said cover locking said articles on said hangers.

10. A mask washing machine comprising a drum, a motor operatively attached to said drum to rotate said drum, a cover for said drum, a fluid actuated cylinder operatively connected to said cover adapted to lift said cover from said drum when said cylinder has fluid pressure applied thereto, a source of fluid, said source of fluid being connected to a four-way valve, a timer valve, and an actuating member for said timer valve, said actuating member operatively connected to said timer valve and adapted to actuate said timer valve, said timer valve actuating said four-way valve directing the flow of fluid away from said cylinder and said motor whereby said cylinder lowers said cover onto said drum and said motor rotates said drum, said timer valve being de-actuated after a predetermined time, de-actuating said four-way valve and stopping the flow of fluid to said motor and allowing flow to said cylinder actuating said cylinder, thereby lifting said cover from said drum and interrupting the flow of fluid to said motor, thereby stopping said motor.

11. The mask washing machine recited in claim 10 wherein a throttle valve controls the flow of air to said timer valve, thereby controlling the time said timer valve is actuated.

12. The mask washing machine recited in claim 11 wherein means is provided in said fluid supply to supply lubricant to said motor.

13. A washing machine comprising a drum adapted to contain solvent, means to direct said solvent onto an article supported in said drum, a cover for said drum, a fluid actuated motor to rotate said drum, a fluid actuated cylinder, means on said cylinder attached to said cover to raise and lower said cover for said drum, and means to direct fluid to said motor when it is cut off from said cylinder, allowing said cover to be lowered onto said drum and removed from said drum, said means to direct fluid comprising a four-way valve having a source of fluid connected thereto and a valve member to selectively direct fluid to said motor and to said cylinder, a piston controlled valve, said valve member being actuable by fluid pressure supplied thereto from said valve controlled by said piston, said piston having means to supply fluid pressure thereto for a predetermined time, said means to supply air to said piston being manually actuated and deactuated by engagement with means on said cover.

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