April 22, 1969 T. G. McLAUGHLIN 3,439,370

HAND WASHING MACHINE

Filed April 17, 1967 Sheet 1 of 3

Fig. 1

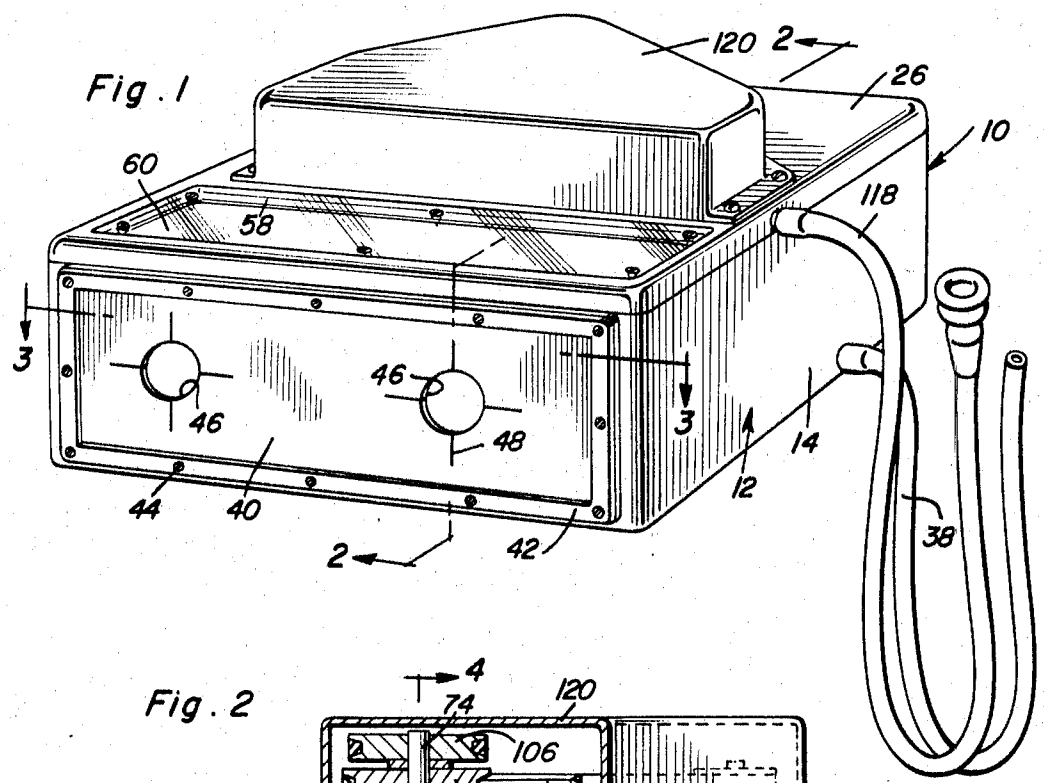
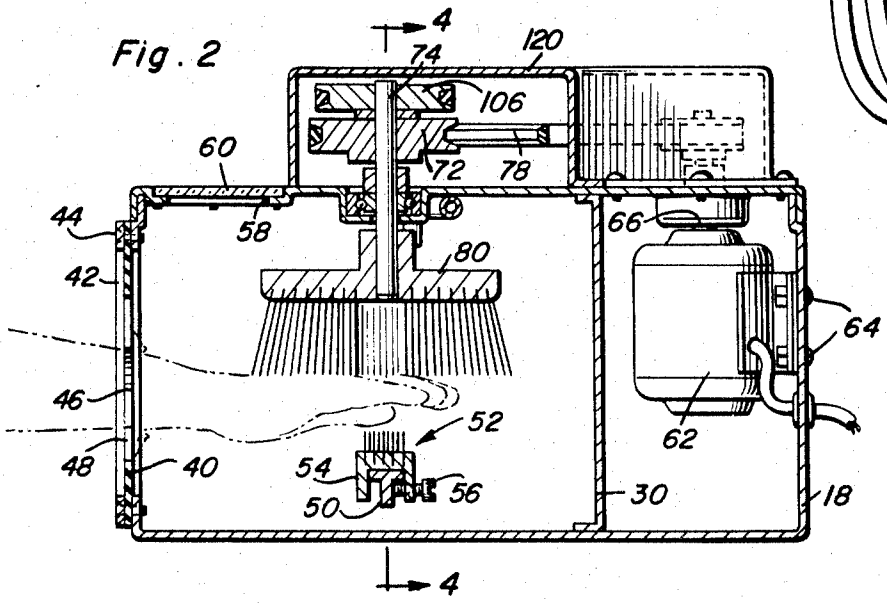


Fig. 2



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Fig. 3

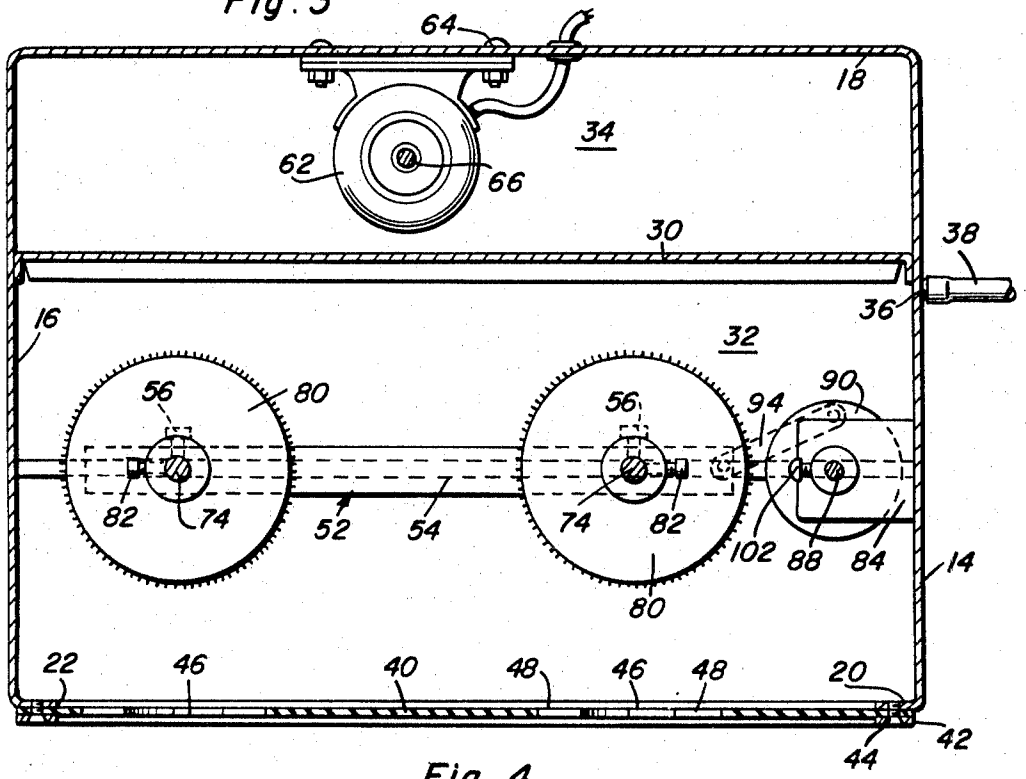
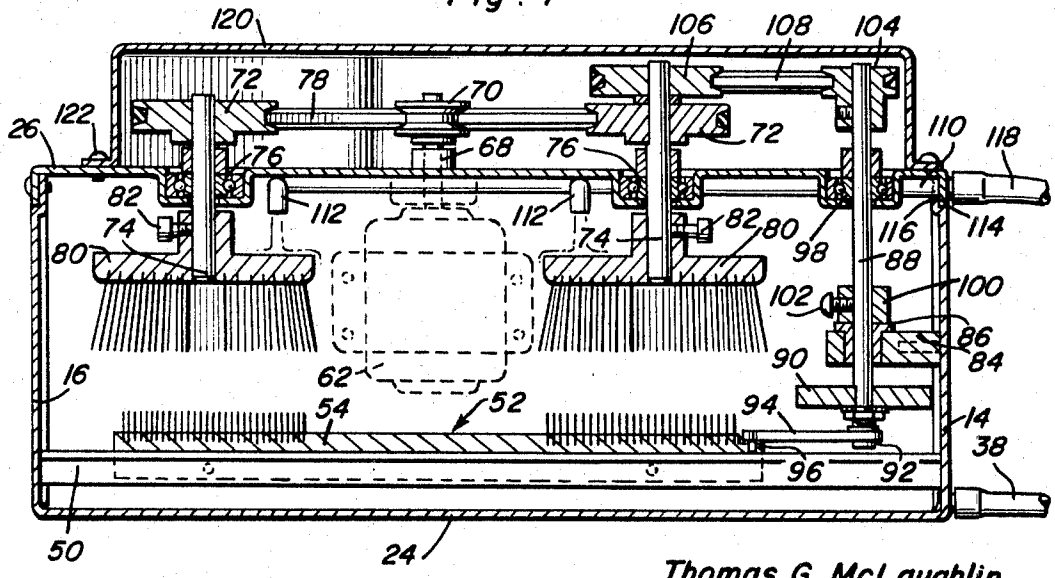


Fig. 4



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HAND WASHING MACHINE

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Fig. 5

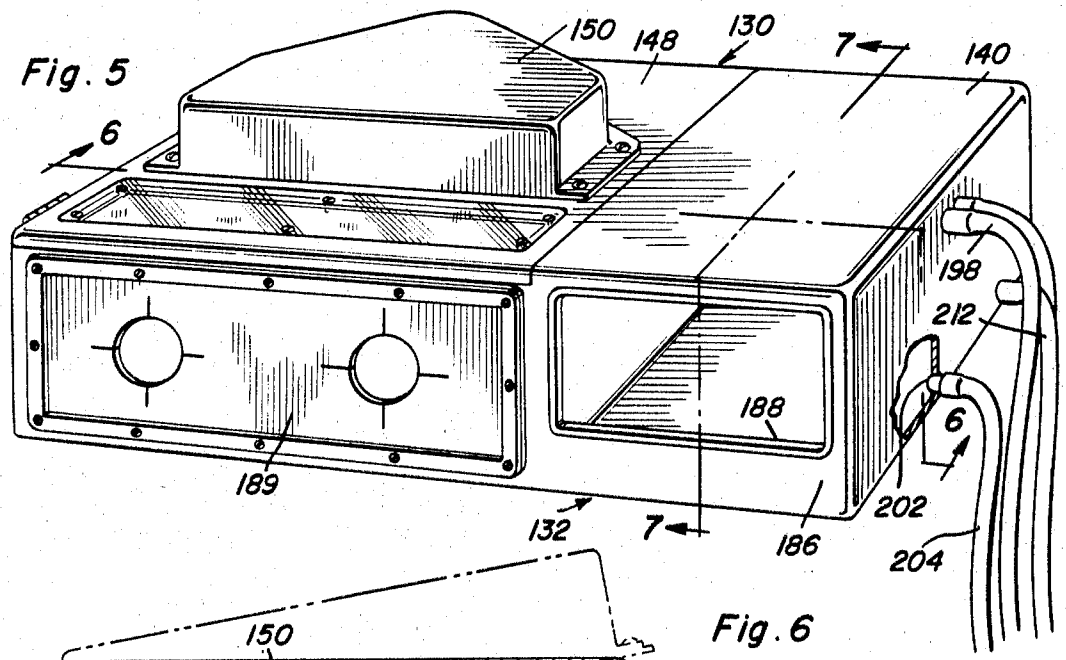


Fig. 6

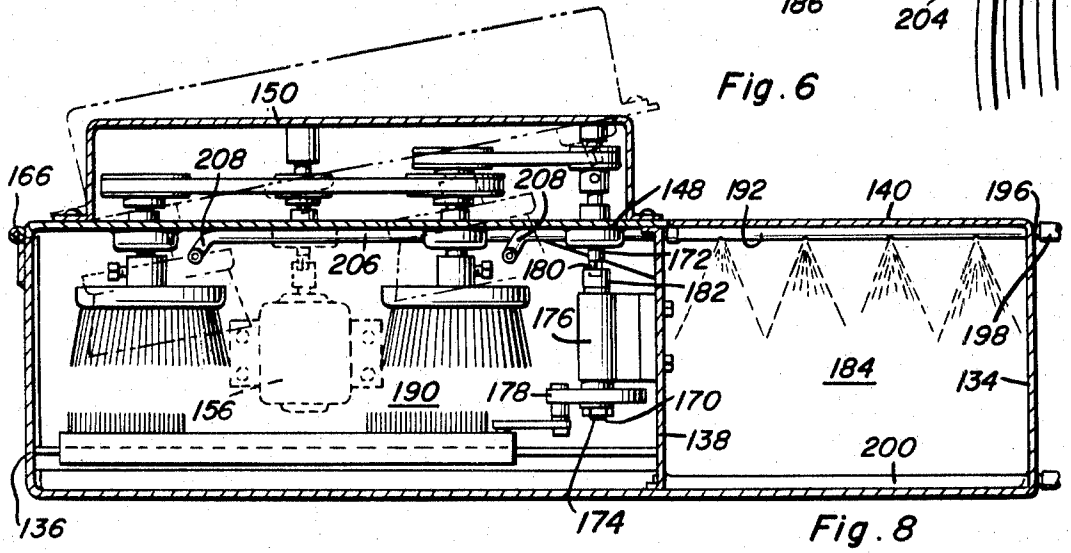


Fig. 7

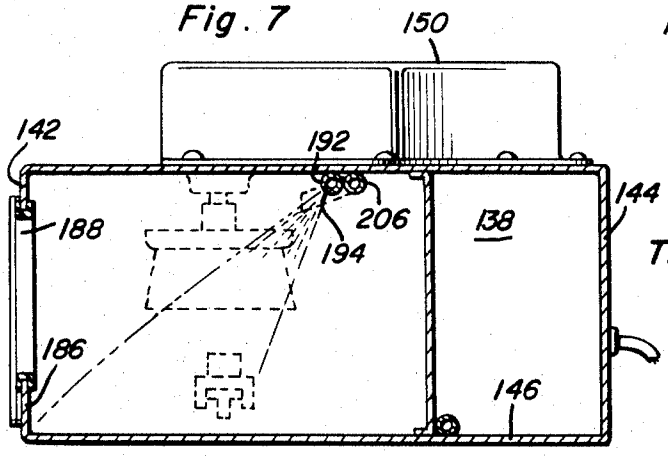
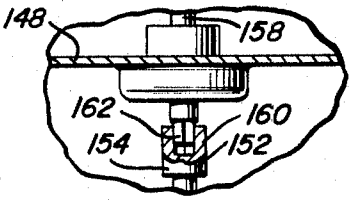


Fig. 8



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3,439,370

HAND WASHING MACHINE

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U.S. Cl. 15—4 10 Claims

ABSTRACT OF THE DISCLOSURE

A hand washing machine defined by a housing having an access opening formed in one wall thereof and in which powered movable brush means is disposed, the access opening in the housing being positioned relative to the powered brush means in a manner such that a person's hand may be readily inserted into the housing through the access opening and engaged with the powered brushes and the machine including means for discharging soap and water within the housing in a manner operative to apply soap and water to the hand of a user of the machine.

The hand washing machine of the instant invention has been designed for use in various environments wherein persons find it necessary or are required to frequently wash their hands. The machine of the instant invention may be utilized in garages whereby mechanics may readily wash their hands to remove grease and grime therefrom whenever desired and may also be utilized in hospitals by nurses and doctors who are required to frequently wash their hands.

One form of the invention is particularly well adapted for use in hospitals is that it includes a first compartment in which the user's hands may be washed and a second compartment in which the user's hands may be rinsed with clear water (sterilized if desired), or disinfected.

The main object of this invention is to provide a hand washing machine that will provide a means whereby persons may readily wash their hands.

Another object of this invention, in accordance with the immediately preceding object, is to provide a machine including a first hand washing compartment and a second hand rinsing compartment.

Yet another object of this invention is to provide a hand washing machine in accordance with the preceding objects and including working components that may be readily serviced.

A final object of this invention to be specifically enumerated herein is to provide a hand washing machine which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of a first form of the hand washing machine of the instant invention;

FIGURE 2 is an enlarged vertical sectional view taken substantially upon the plane indicated by section line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged horizontal sectional view taken substantially upon the plane indicated by section line 3—3 of FIGURE 1;

FIGURE 4 is a vertical sectional view taken substantially upon the plane indicated by section line 4—4 of FIGURE 2;

FIGURE 5 is a perspective view of a second form of the hand washing machine of the instant invention;

FIGURE 6 is an enlarged vertical sectional view taken substantially upon a plane indicated by section line 6—6 of FIGURE 5;

FIGURE 7 is an enlarged vertical sectional view taken substantially upon a plane indicated by section line 7—7 of FIGURE 5; and

FIGURE 8 is a fragmentary elevational view illustrating the manner in which the main driving shaft of the second form of the invention is removably coupled to the output shaft of the electric motor of the second form of the invention.

Referring now more specifically to the drawings, and in particular to FIGURES 1–4, the hand washing machine of the instant invention is generally referred to by the reference numeral **10**. The machine **10** includes a housing referred to in general by the reference numeral **12** including opposite side walls **14** and **16**, a rear wall **18**, and a partial front wall **20** having an access opening **22** formed therein. The walls **14**, **16**, **18** and **20** are interconnected along their lower marginal portions by means of a bottom wall **24** and a top wall **26** interconnects the upper marginal edge portions thereof, the top wall **26** being telescoped over inwardly offset upper marginal edge portions of the walls **14**, **16**, **18** and **20**.

The housing **12** includes a vertical partition wall **30** secured to the bottom wall **24** along its lower marginal edge portions and to the side walls **14** and **16** along its opposite end portions. The partition wall **30** divides the interior of the housing **12** into a washing compartment **32** and a motor compartment **34**. The side wall **14** has the inlet end of a drain tube **36** secured therethrough and the inlet end of a drain hose **38** is telescoped over the outlet end of the drain tube **36** disposed exteriorly of the housing **12**.

A flexible diaphragm **40** is secured over the partial front wall **20** to close the access opening **22** and the diaphragm **40** is secured to the partial front wall **20** by means of a frame **42** secured to the partial front wall **20** by means of a plurality of suitable fasteners **44**, the diaphragm **40** having peripheral edge portions clampingly disposed between the frame **42** and the partial front wall **20**. The diaphragm **40** has a pair of hand receiving openings **46** formed therein and the diaphragm **40** includes a plurality or radially outwardly extending slits **48** disposed about and projecting outwardly of each opening **46**. In this manner, a person's hands may be readily inserted into the interior of the housing **12** through the openings **46** with the diaphragm **40** forming a relatively good closure about the wrists of a person whose hands are disposed in the housing **12**.

An elongated and generally horizontally disposed guide bar **50** is secured between the walls **14** and **16** in elevated position relative to the bottom wall **24** and is generally T-shaped in cross-section. A finger-tip and nail scrubbing brush assembly generally referred to by reference numeral **52** and including an inverted channel-shaped body **54** is slidably disposed on the guide bar **50** for reciprocal movement theeralong and provided with longitudinally spaced setscrews **56** for removably securing the body **50** against disengagement from the guide bar **50**.

The front portion of the top wall **26** has an access opening **58** formed therein and a transparent panel **60** is secured in the opening **58** so as to define a window through which the interior of the housing may be viewed from the exterior thereof.

An electric motor **62** is mounted on the rear wall **18** in any convenient manner such as by fasteners **64** and may be connected to a suitable source of electrical potential (not shown) through appropriate switch means if desired. The motor **62** includes an output shaft **66** which

projects upwardly through a bearing structure **68** carried by and projecting above the top wall **26**. The upper end of the output shaft **66** has a drive pulley **70** mounted thereon aligned with a pair of similar driven pulleys **72** carried by a pair of driven shafts **74** journaled through the top wall **26** by means of bearing assemblies **76** supported from the top wall **26**. An endless flexible belt **78** is entrained about the pulleys **70** and **72** and the lower end portions of the shafts **74** projecting downwardly into the interior of the housing **12** have a pair of circular brushes **80** removably secured thereto for rotation therewith by means of setscrews **82**. Accordingly, it may be seen that operation of the motor **62** will cause the brushes **80** to be rotated.

The end wall **14** includes a journal support **84** projecting inwardly thereof which receives a sleeve bearing **86** through which a third driven shaft **88** is journaled. The lower end of the driven shaft **88** includes a crank disk **90** mounted thereon for rotation therewith and including a crank pin **92** from which one end of a connecting rod **94** is pivotally supported, the other end of the connecting rod **94** being pivotally secured to the body **54** as at **96**. The upper end of the third driven shaft **88** is journalled through the top wall **26** by means of a bearing assembly **98** and a stop collar **100** is mounted on the shaft **88** above the sleeve bearing **86** by means of a setscrew **102**. The upper end of the shaft **88** which projects above the top wall **26** has a driven pulley **104** mounted thereon aligned with a drive pulley **106** carried by the upper terminal end portion of the adjacent shaft **74**. An endless flexible belt **108** is entrained about the pulleys **104** and **106** and therefore it may be seen that operation of the electric motor **62** will cause rectilinear reciprocation of the brush **52**.

Further, the removable top wall **26** includes a manifold pipe **110** secured to the undersurface thereof and which includes a pair of branch sections opening downwardly over the brushes **80**. The inlet end of the manifold pipe **110** opens through the downturned flange portion **114** of the top wall **26** telescoped over the inwardly laterally offset upper marginal portion of the side wall **14** and the latter is provided with a suitable notch **116** to receive the manifold pipe **110** therethrough. Further, the outlet end of a soap and water hose **118** is telescoped over the outwardly projecting inlet end of the manifold pipe **110** and may have its inlet end suitably communicated with a source of soapy water or other liquid cleaning agent.

The housing **12** includes a readily removable downwardly opening cover **120** and the cover **120** is removably secured to the top wall **26** by means of movable fasteners **122**. The cover **120** encloses the upper ends of the shaft **66**, **74** and **88** and the various pulleys mounted thereon as well as the endless flexible belts **78** and **108**.

In operation, a person desiring to wash his hands may place the latter within the housing **12** through the openings **46** and the motor **62** may be actuated whereupon the backs and palms of the user's hands may be selectively brought into engagement with the rotary brushes **80** and the finger-tips and fingernails may be brought into engagement with the brush **52** if desired. Of course, as the hands are being washed, a suitable liquid agent is introduced into the manifold pipe **110** through the hose **118** and thus is discharged from the sections **112** onto the brushes **80** which in turn transfer the liquid cleaning agent or solution to the hands of the person being washed. In addition, inasmuch as the brushes **80** are disposed directly above the brushes **54**, the liquid cleaning agent discharged onto the brushes **80** from the sections **112** will fall from the brushes **80** or a person's hand disposed therebeneath onto the brushes **54**.

Referring now more specifically to FIGURES 5–8 of the drawings there may be seen a modified form of hand washing machine referred to in general by the reference numeral **130**. The machine **130** is quite similar to the machine **10** except that the housing **132** thereof is elongated so as to displace the end wall **134** considerably further away from the end wall **136** corresponding to the end wall **16**. However, a second partition wall **138** is secured between the top wall **140** the front and rear walls **142** and **144** and the bottom wall **146**. In addition, the top wall **144** includes a hinged section **148** from which the cover **150** corresponding to the cover **120** is supported and the motor output shaft **152** corresponding to the shaft **66** includes a lower section **154** carried by the motor **156** and an upper section **158** carried by the hinged section **148**, the sections **154** and **158** including axially separable adjacent end portions **160** and **162**, respectively, removably coupling the lower section **154** to the upper section **158** whereby the hinged section **148** may be pivoted from the solid line position thereof illustrated in FIGURE 6 of the drawings to the phantom line position thereof illustrated in FIGURE 6 of the line position thereof illustrated in FIGURE 6 to provide access to the interior of the housing **12**.

The hinged section **148** is hinged to the end wall **136** by means of suitable hinge assemblies **166** and the shaft **170** corresponding to the shaft **88** includes upper and lower end portions **172** and **174**, the lower section **174** being journalled from a journal support **176** similar to the journal support **84** and connected at its lower end to a crank disk **178** corresponding to the crank disk **90** while the upper section **172** is journalled from the hinged section **148**, the sections **172** and **174** including axially separable end portions **180** and **182** similar to the end portions **154** and **162**.

The left end portion of the housing **132** disposed to the left of the partition **138** as viewed in FIGURES 5 and 6 of the drawings defines a rinse chamber **184** and the portion of the front wall **186** corresponding to the front wall **20** but in registry with the chamber **184** has a second access opening **188** formed therein devoid of a diaphragm such as **189** corresponding to the diaphragm **40**. In this manner, a person after having washed his hands in the wash chamber **190** of the housing **132**, may insert his hands into the rinse chamber **184**, the latter being provided with a liquid rinse manifold **192** including forwardly and downwardly directed outlets **194** and an inlet end portion **196** which projects through an upper portion of the end wall **34** and has the outlet end of a liquid rinse supply line or hose **198** telescoped thereover.

The housing **132** includes a drain tube **200** corresponding to the drain tube **36** and which services the wash chamber **90** and also a similar drain tube **202** which individually services the rinse chamber **184** and has the inlet end of a drain hose **204** telescoped over its discharge end portion which projects outwardly of the housing **132** through the end wall **134**. Of course, the housing **132** also includes a soap and water or other suitable cleaning liquid manifold pipe **206** corresponding to the manifold pipe **110** and which includes branch sections **208** corresponding to branch sections **112**.

The separate rinse chamber **184** provided in the housing **132** will enable doctors and nurses to first wash their hands in the wash chamber **190** and then insert their washed hands, into the rinse chamber **184** without touching any portion of housing **132**.

The supply of fluid to the manifold pipes **110** and **206** as well as the pipe **192** may be readily controlled by means of foot actuated valves if desired and the drain hose **38** as well as the drain hose **204** and the drain hose **212** connected to the drain tube **200** may have their outlet ends suitably communicated with any desired receptacle or drain.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A hand washing machine comprising a housing having an upstanding wall, powered brush means movably supported in said housing, an access opening in said wall adapted to receive a person's hand therethrough and positioned relative to said brush means for ready positioning of a person's hand through said access opening into contact with said powered brush means, and means in said housing operative to discharge cleaning liquid to the area of the interior of said housing in which said brush means is disposed, said powered brush means including upwardly facing lower brush means mounted in said housing for horizontal reciprocation along a path generally paralleling said wall and downwardly facing upper brush means spaced vertically above said lower brush means, said upper brush means being mounted for rotation about a vertical axis.

2. The combination of claim 1 wherein said upper brush means includes a pair of downwardly facing rotary brushes journalled for rotation spaced along the path of reciprocation of said lower brush means.

3. The combination of claim 1 wherein said housing includes a flexible diaphragm of water impervious material closing said opening, said diaphragm including an opening therein of a size adapted to snugly receive a person's wrist therethrough and a plurality of slits therein extending outwardly from said opening.

4. The combination of claim 3 wherein said diaphragm includes a pair of said openings spaced horizontally apart from each other.

5. The combination of claim 1 wherein said housing includes a flexible diaphragm of water impervious material closing said opening, said diaphragm including an opening therein of a size adapted to snugly receive a person's wrist therethrough and a plurality of slits therein extending outwardly from said opening, said upper brush means including a pair of rotary brush means journalled for rotation about upstanding axes spaced along said path.

6. The combination of claim 1 wherein said housing includes a pair of separate compartments, said access opening into and said brush means being disposed in one of said compartments, the other of said compartments having rinsing liquid dispensing means therein and said housing including a second access opening opening into said second compartment, said second access opening being unobstructed and of a size adapted to freely receive the hand of a person therethrough with sufficient clearance between the edges of said second access opening and said hand to enable said hand to be inserted into and withdrawn from said second compartment without said hand tounching any part of said housing.

7. The combination of claim 1 including cleaning liquid drain means operatively associated with said housing to drain the cleaning liquid therefrom.

8. The combination of claim 6 including first and second liquid drain means operatively associated with the first and second compartments, respectively, for draining, cleaning and rinsing liquids therefrom.

9. The combination of claim 1 wherein said housing includes a hinged top wall section supporting said upper brush means.

10. The combination of claim 1 wherein said housing includes a pair of separate compartments, said access opening opening into and said brush means being disposed in one of said compartments, the other of said compartments having rinsing liquid dispensing means therein and said housing including a second access opening opening into said second compartment, said second access opening being unobstructed and of a size adapted to freely receive the hand of a person therethrough with sufficient clearance between the edges of said second access opening and said hand to enable said hand to be inserted into and withdrawn from said second compartment without said hand touching any part of said housing, said housing including a flexible diaphragm of water impervious material closing said opening, said diaphragm including an opening therein of a size adapted to snugly receive a person's wrist therethrough and a plurality of slits therein extending outwardly from said opening.

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U.S. Cl. X.R.

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