

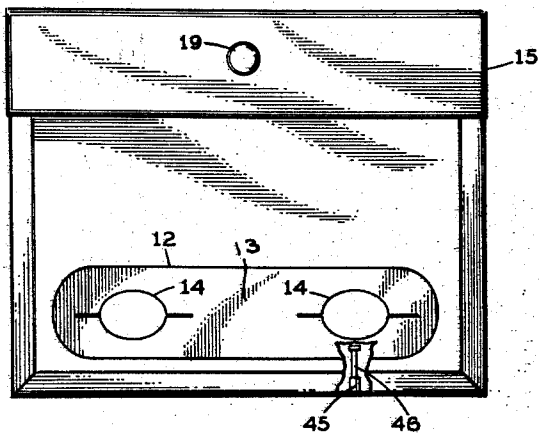
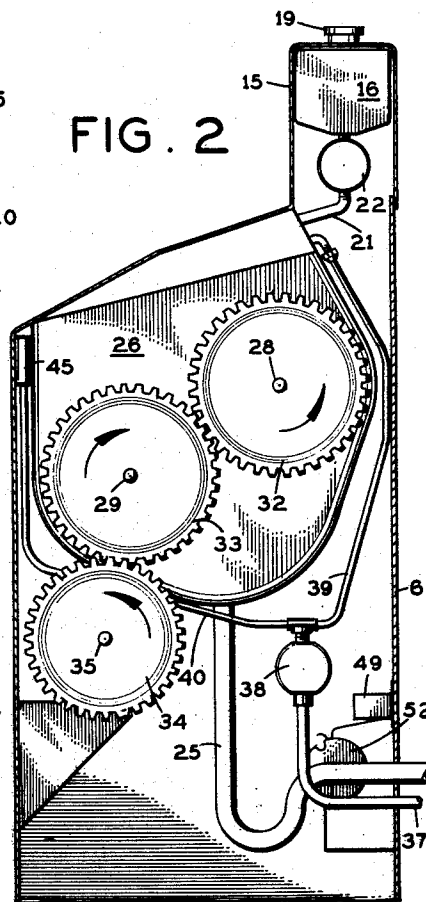
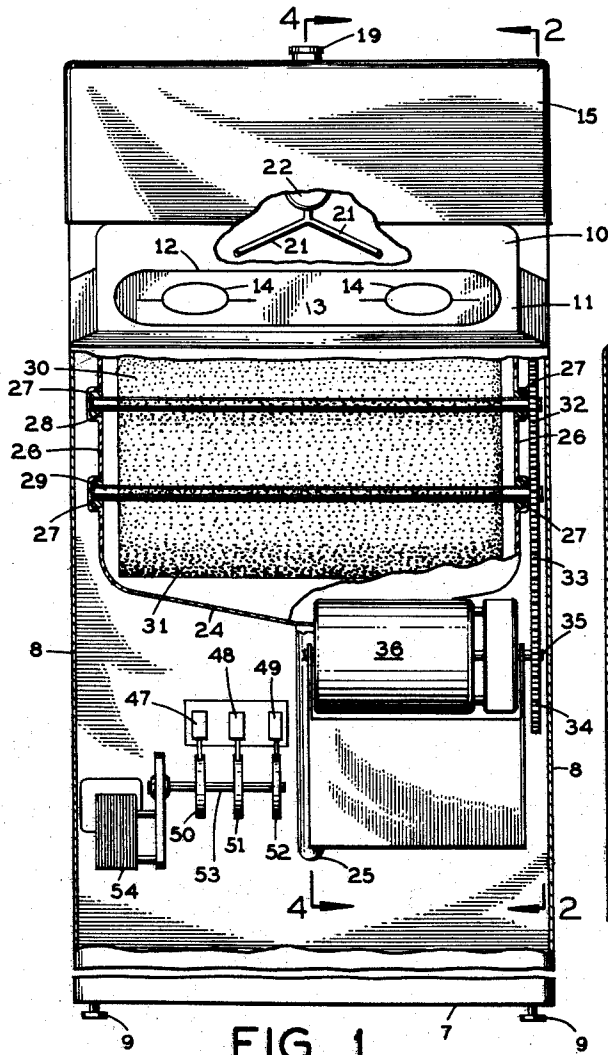
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R. E. NEWELL
HAND WASHING MACHINE

3,081,471

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2 Sheets-Sheet 1



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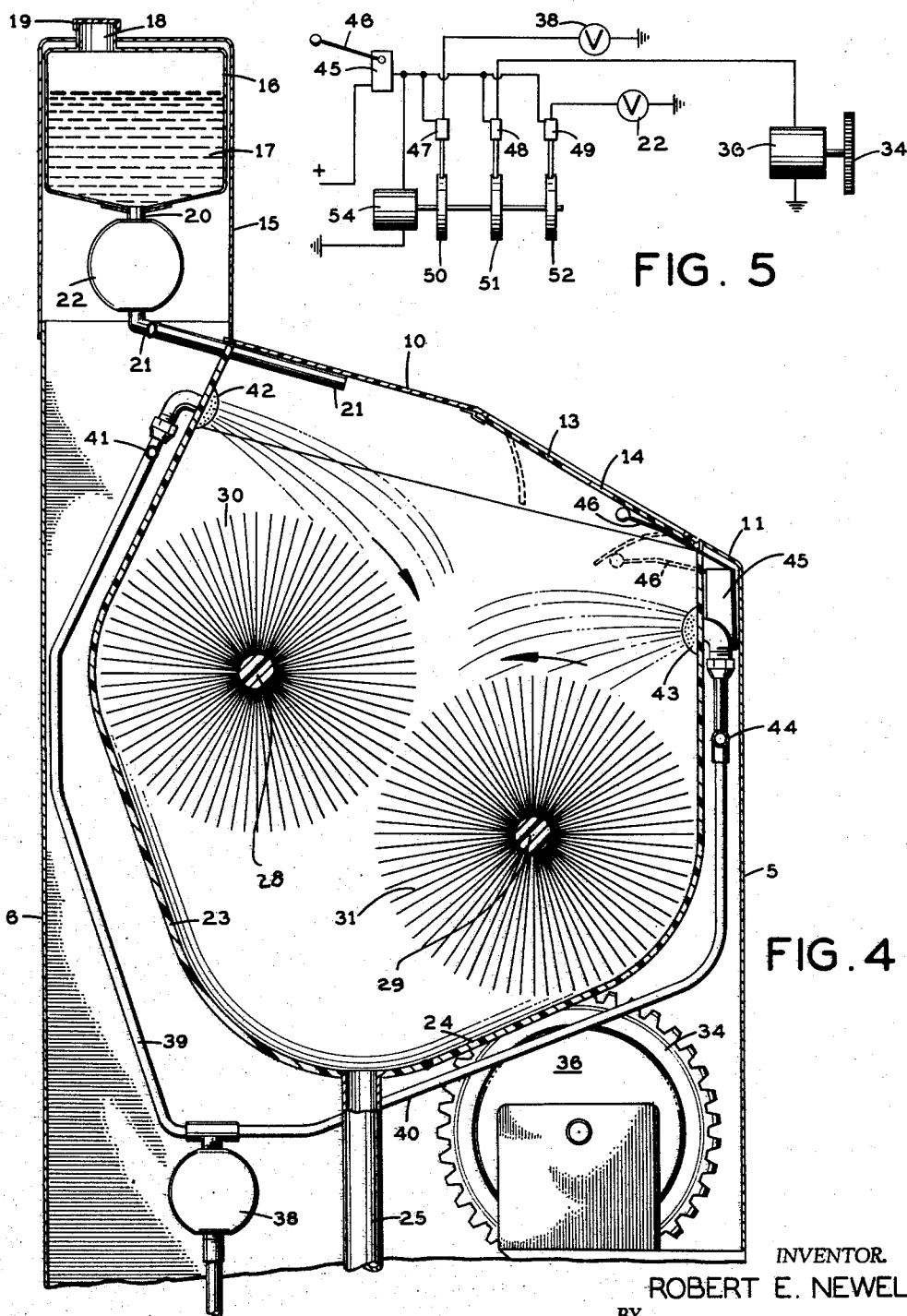


FIG. 5

FIG. 4

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HAND WASHING MACHINE
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This invention relates to a washing machine and particularly to a machine for washing or scrubbing the hands of the operator of the device.

The device is particularly adaptable for many and varied uses, such as hospitals, manufacturing plants and any other area where it becomes necessary or desirable that a person cleanse his hands in an automatic manner.

The invention contemplates a preferably floor-supported housing in which is rotatably supported a pair of cylindrical scrubbing brushes into which the hands of the user may be engaged by insertion of the hands through hand openings formed in a flexible panel and with the device having a predetermined cycle of operation that is electrically activated when the user inserts his hands through the hand openings to first energize a driving motor for the brushes for a predetermined number of seconds and, to activate the water supply system whereby the water is sprayed upon the brushes for a predetermined number of seconds and then to activate a soap or other detergent dispenser for spraying the detergent upon the brushes for a predetermined number of seconds and whereby the hands of the operator will be successfully scrubbed by the rotation of the soapy wet brushes and for the additional cycle of the operation of the water, the hands of the user will be rinsed, and that at the end of the cycle, the circuit to the several elements will be deactivated.

A further object of the invention resides in a plurality of cam actuated micro-switches whereby to successively energize the driving motor for the brushes, the introduction of the water to the spray nozzles and the introduction of the detergent and whereby the device is adapted to a predetermined time cycle capable of successfully cleansing and rinsing the hands and, will be interrupted in its action, even though the user maintains his hands in the machine.

Novel features of construction and operation of the device will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings wherein has been illustrated a preferred form of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

FIGURE 1 is a view partly in front elevation and partly in section showing the device in accordance with the invention,

FIGURE 2 is a fragmentary vertical section taken substantially on line 2-2 of FIGURE 1,

FIGURE 3 is a top plan view of the device,

FIGURE 4 is an enlarged central vertical section taken substantially on line 4-4 of FIGURE 1, and

FIGURE 5 is a diagrammatic illustration of the circuit for controlling the system.

Referring specifically to the drawings, there has been illustrated a sheet metal housing, embodying a forward wall 5, a rear wall 6, a bottom 7 and side walls 8. The bottom 7 may be provided with adjustable legs 9 and whereby the device may be adjustable upon a floor area so as to maintain the device in a perpendicular position. The housing has an upper incline transparent cover 10 which serves as a window for operator and that is angled intermediate its length to form a slightly angled continuation of the cover 10, as shown at 11. The cover 11 is provided for its major length with a slot 12, that is normally covered by a flexible strip 13, formed of rubber

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or other material and the strip 13 is cut away to form substantially oval openings 14 whereby the hands of the operator may be inserted through the strip 13 to engage the washing mechanism of the device and still maintain a water tight seal. The strip 13 is obviously yieldable to accommodate the hands of the wrist portion of the user so that the hands for their complete area may be fully inserted into scrubbing brushes, to be presently described.

Mounted upon the upper end of the housing for connection to the back wall 6 and the incline cover 10 is a further sheet metal housing 15. The housing 15 communicates with the housing previously described and supports an elongated tank 16, carrying a supply of detergent or the like 17. A filler spout 18 extends above the housing 15 whereby to replenish the supply of detergent to the tank and a suitable cap 19 is screwed or otherwise connected to the spout 18. The tank 16 has its bottom wall inclined downwardly toward a discharge coupling 20 that communicates through a Y-shaped discharge tube 21, through the medium of an electrically controlled solenoid valve 22. The Y 21 is adapted to direct the detergent on to the tops of the brushes, to be described.

Also mounted within the housing is a shell 23, having an inclined bottom 24 that is connected to a drain pipe 25. The drain pipe 25 of course is connected to the usual plumbing system of the structure in which the device is to be installed. The end walls 26 of the shell 23 are provided with spaced apart journaled bearings 27, rotatably supporting shafts 28 and 29, carrying cylindrical brushes 30 and 31. The brushes 30 and 31 extend transversely for the major spacing between the walls 26 of the shell and with the shafts and brushes 28 and 29 and the brushes 30 and 31 being in exact parallel relation.

The shafts 28 and 29 at one end of the shell extend beyond the bearings 27 to receive gears 32 and 33 that are fixed upon the extended end of the shafts. The gear 33 is driven by a gear 34, fixed upon a shaft 35, that is driven by a conventional electric motor 36.

Entering through the back wall 6 of the casing, is a pressurized water supply line or pipe 37. The pipe 37 has connection through a solenoid valve 38 to a distribution system embodying pipes 39 and 40. The pipe 39 has connection through a Y-coupling 41 to a pair of spaced apart spray nozzles 42 that are so arranged as to spray the pressurized water upon the brush 30 for its maximum length. The nozzles 42 are mounted through the upper wall of the shell 23 and similar nozzles 43 are connected to the forward wall of the shell at spaced apart points, through a Y-coupling 44 that is connected to the pipe 40. It should be stated at this point that the solenoid valves 22 and 38 are of conventional construction and it is not believed necessary to indicate them in detail.

Means are provided to actuate the electrical system manually when the device is to be placed in operation and such means embodies a conventional time controlled switch 45. The switch 45 is manually actuated by a depressible arm 46 that is disposed in the path of movement of one hand of the operator when it is inserted through the particular hand opening 14, such forcing the flexible strip 13 downwardly, compressing or forcing the arm 46 downwardly, as indicated in FIGURE 4, such action tripping the switch and energizing the system for a predetermined number of seconds. Since the solenoid valves 22, 38 and the motor 36 are to be energized at predetermined intervals, there has been provided a plurality of micro switches 47, 48 and 49, see particularly FIGURES 1 and 5, these switches 47, 48 and 49 are successively activated by cam elements 50, 51 and 52 and

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with the several cams being carried upon a shaft 53. The shaft 53 is rotatable under the influence of a fractional horse power motor 54 through suitable reduction gearing. Each of the cams 50, 51 and 52 are provided with predetermined dwell areas, not shown and whereby the micro switches 47, 48 and 49 will be maintained in energized condition for a predetermined number of seconds.

The timing of the several micro switches 47, 48 and 49 and the control of the valves 22 and 38 may of course be varied by the substitution of any desirable cam upon the shaft 53, such being readily apparent. The gears 32 and 33 will obviously rotate the brushes 30 and 31 in a direction toward each other, forming a space into which the hands can be inserted for contact with the bristles of the brush.

In the use of the device, the operator forces his hands through the opening 14 and by such action, trips the time control switch 45 by the arm 46, energizing the circuit, such action energizing the motor 54, causing the cams to rotate and the cam 51 will actuate the micro switch 48 first, placing in operation the motor 36, setting in motion the brushes 30 and 31 through the gearing 34, 33 and 32. Cam 50 will then rotate actuating the micro switch 47 to energize the solenoid valve 38, permitting pressurized water to flow through the pipes 39 and 40 to be sprayed upon the brushes 30 and 31 through the spray nozzles 42 and 43. The cam 52 at a predetermined time will then actuate the micro switch 49, energizing the solenoid valve 22, causing a predetermined amount of detergent to be ejected upon the brushes during their rotation. The operator then holds his hands for contacting engagement between the brushes 30 and 31 so that the detergent and water will thoroughly wash or scrub the hands both top and bottom and at a predetermined time, the solenoid valve is deenergized, shutting off the detergent while the water continues to flow for the rinsing action. This continues for a predetermined number of seconds until the hands are thoroughly rinsed and at the end of the cycle, the time control valve 45 will be automatically opened and deenergizes the circuit after which, the hands are withdrawn from the machine and dried in any conventional manner.

It will be apparent from the foregoing that a very novel and simple form of mechanism has been employed to effectively scrub the hands of the user. The structural features presented are effective for the purposes described and it will be apparent that variations in the various structural features may be employed wherever found necessary. The cycles of operation as an example, for one complete scrubbing of the hands will be approximately 30 seconds. The brushes will run for the complete cycle. For the first three seconds, the water will be sprayed upon the brushes for completely wetting the hands then, the detergent will be sprayed upon the brushes for approximately three seconds while the balance of the time is devoted to washing of the hands and the rinsing and washing detergent from the brushes for drainage through the drain pipe 25. Obviously, this time cycle may be readily varied but the cycles as indicated has been found highly effective as a means to effectively wash the hands, while the switch 45 is so adjusted as to determine the exact complete cycle of operation. While this device has been illustrated as completely manually operated, it will be apparent that any desirable coin control mechanism may be employed to energize the system. The solenoid valves 22 and 38 and the micro switches 47, 48 and 49 are of conventional construction and no specific claims are presented to cover the structures of these valves and switches, since they are commonly known on the market and applicant has merely adopted such devices for a complete machine of the character described. The cams 50, 51 and 52 will obviously be formed with their required dwell portions in accordance with the timed cycle of operation.

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It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be determined by the scope of the subjoined claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. A hand scrubbing mechanism of the character described that comprises a sheet metal cabinet for support upon the floor, the cabinet having an incline top and with the incline top being provided with an elongated opening having a flexible strip mounted therein and with the strip being provided with spaced apart hand openings, a shell mounted within the cabinet and with the shell having an open top that underlies the top of the cabinet and also underlies the hand openings, a pair of horizontally arranged rotatable brushes mounted within the shell and extending between the side walls of said shell, the said brushes being rotatable in opposed relation, each of the brushes being arranged closely adjacent to each other and having shafts that extend through the wall of the shell at one side to receive gears and with the gears of the brushes being in meshing relation, a drive motor below the shell that is connected to a driven gear that is also connected to the gear of one brush, a water supply system that includes a pressurized water supply line that has connection with spaced apart spray nozzles upon both the front and back walls of the shell for spraying water at a predetermined time upon the brushes, a solenoid valve connected to the water supply line for controlling the flow of water to the spray nozzles, an elevated detergent supporting tank carried upon the top of the cabinet and means connected to the tank whereby to spray a detergent upon the brushes, a solenoid valve for controlling the discharge of the detergent, the bottom of the shell being provided with an enlarged drain pipe, control means for the solenoid valves and the motor, the said control means embodying a plurality of micro-switches that are cam actuated and that are rotatable by a motor, the said motor for actuating the micro-switches being energized by a time controlled switch that is connected to a source of energy and that is actuated by a switch arm that is disposed in the path of movement of one hand of the operator being inserted through the hand opening, the said solenoid valves and the drive motor being successively operated for the control of the detergent and the control of the brushes, all in a predetermined timed cycle.

2. The structure according to claim 1 wherein the inclined top of the cabinet is formed of transparent plastic and whereby the operator may observe the action of his hands when inserted into contact with the brushes, the shafts for the brushes being relatively slender and with their extremities being journaled in the end walls of the shell, the bristles of the brushes being relatively long and flexible and with the brushes being closely adjacent to each other so that the hands of the operator may be engaged downwardly between the brushes during their rotation and so that the hands may be scrubbed on both top and bottom, the shell being sufficiently deep so that the hands of the operator may be forced downwardly to permit the brushes to engage the wrist portion of the arms.

3. The structure according to claim 1 wherein the shell is formed of plastic and with the shell having a sump portion that has communication with the drain pipe, the said spray nozzles each being fixed in spaced apart pairs upon the front and back walls of the shell and with the spray nozzles being substantially equidistantly spaced from the vertical center line of the machine and so that the nozzles will spray the pressurized water upon both brushes during the rotation thereof, the said detergent tank being mounted at an elevation above the inclined top of the cabinet whereby the detergent will flow by gravity for discharge to the brushes, the dis-

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charge being controlled by the solenoid valve and with the discharge comprising a Y-pipe formation whereby the detergent will be equidistantly sprayed upon the brushes.

4. The structure according to claim 1 wherein a drive motor for the brushes is first energized when the operator inserts his hands through the hand openings, the insertion of the hands through the openings energizing a timed controlled switch and with the switch also energizing a fractional horse power motor, the fractional horse power motor actuating a cam shaft for controlling the several micro-switches that function to actuate the drive motor for the brushes, to actuate the solenoid valve for the water supply and to actuate the solenoid valve for the detergent supply, each being controlled by a cam for a predetermined number of seconds.

5. The structure according to claim 1 wherein the cabinet is provided with adjustable legs, the flexible strip

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being formed of yieldable material and with the hand openings being substantially oval in shape and with the strip at the ends of each opening being cut to permit the forceful entry of the hands through the openings to be engaged with the brushes, the yieldable strip successfully permitting the insertion of the hands of individuals of varying sizes and to cause the strip to snugly engage the arm of the operator when inserted to a depth for engagement with the brushes.

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