

Sept. 9, 1969

D. A. MEEKER ET AL

3,465,761

APPARATUS FOR WASHING GLASSES, DISHES AND THE LIKE

Filed Jan. 5, 1968

4 Sheets-Sheet 1

FIG-1

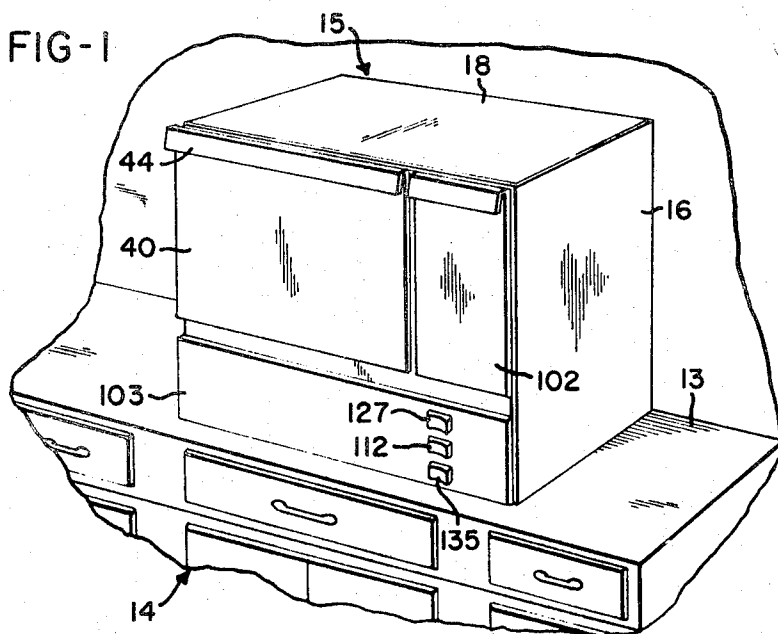


FIG-2

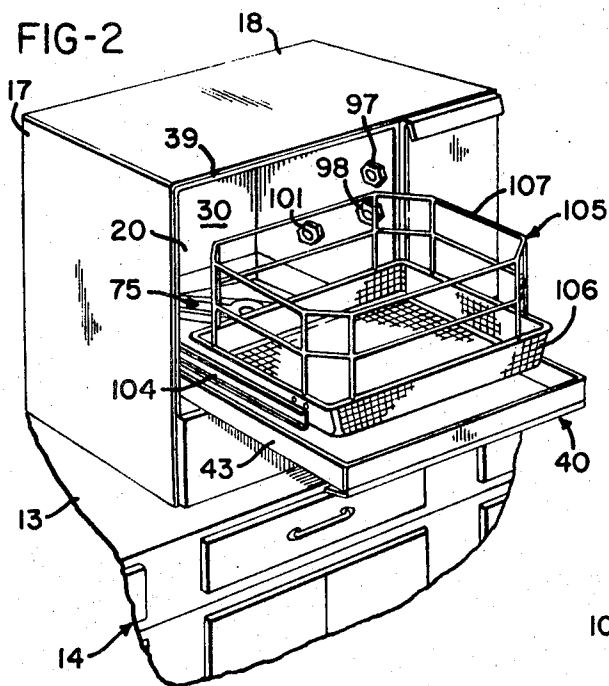
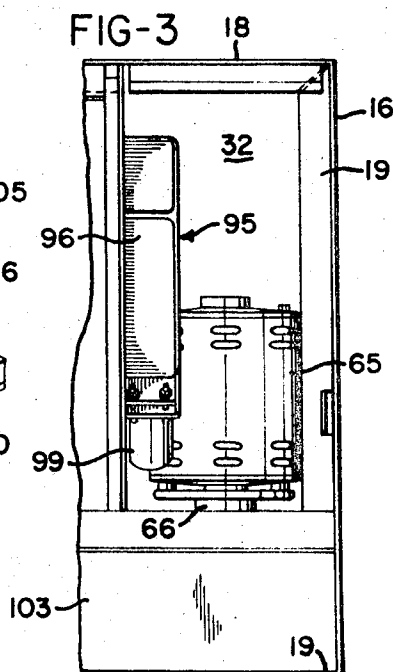


FIG-3



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FIG-6

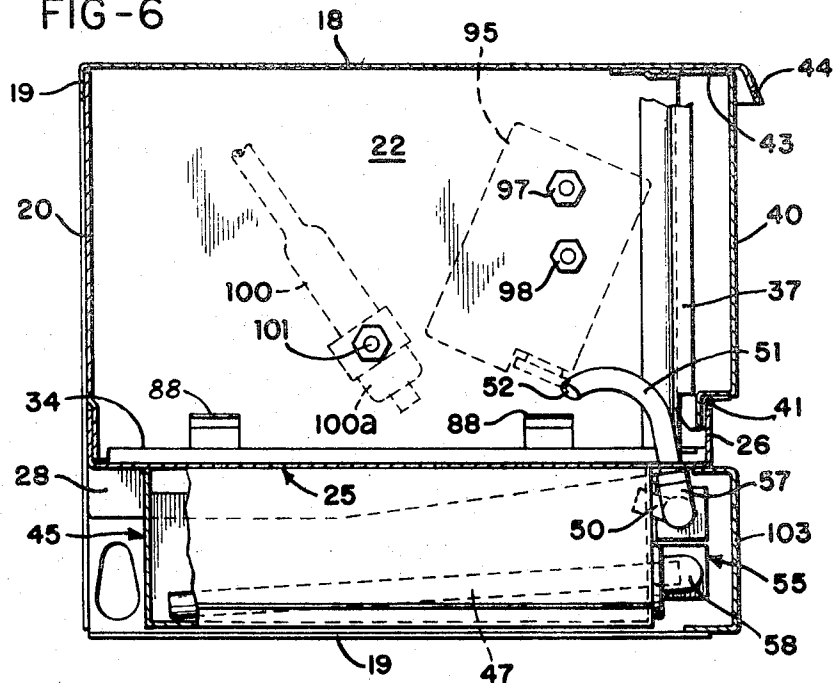
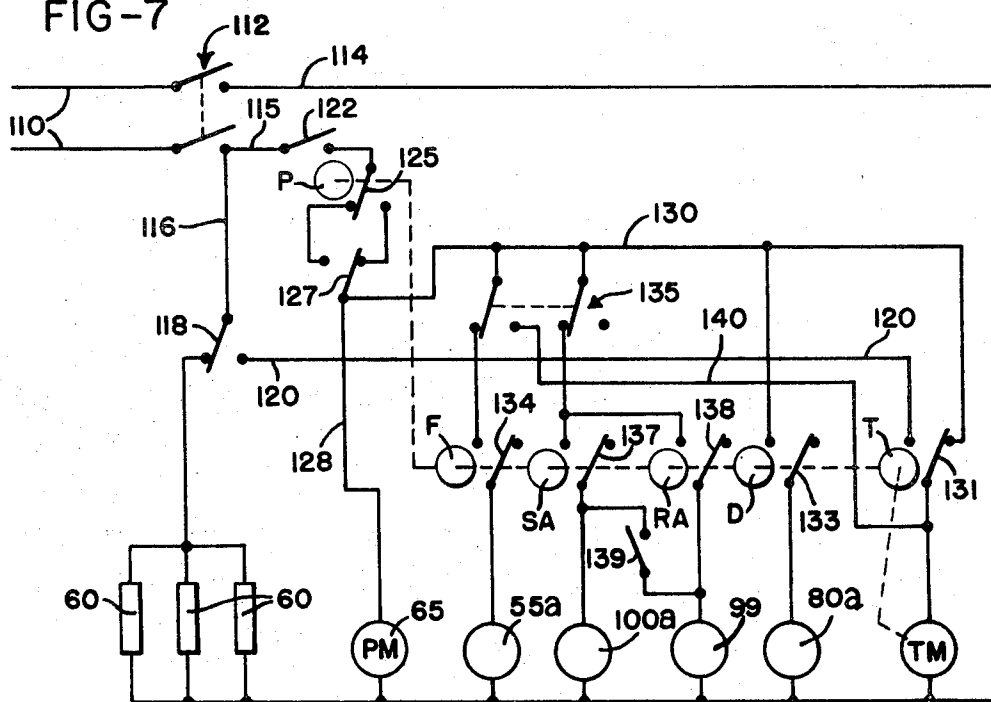


FIG-7



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FIG-8

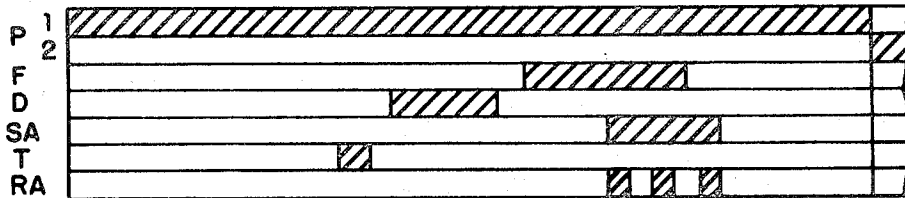


FIG-9

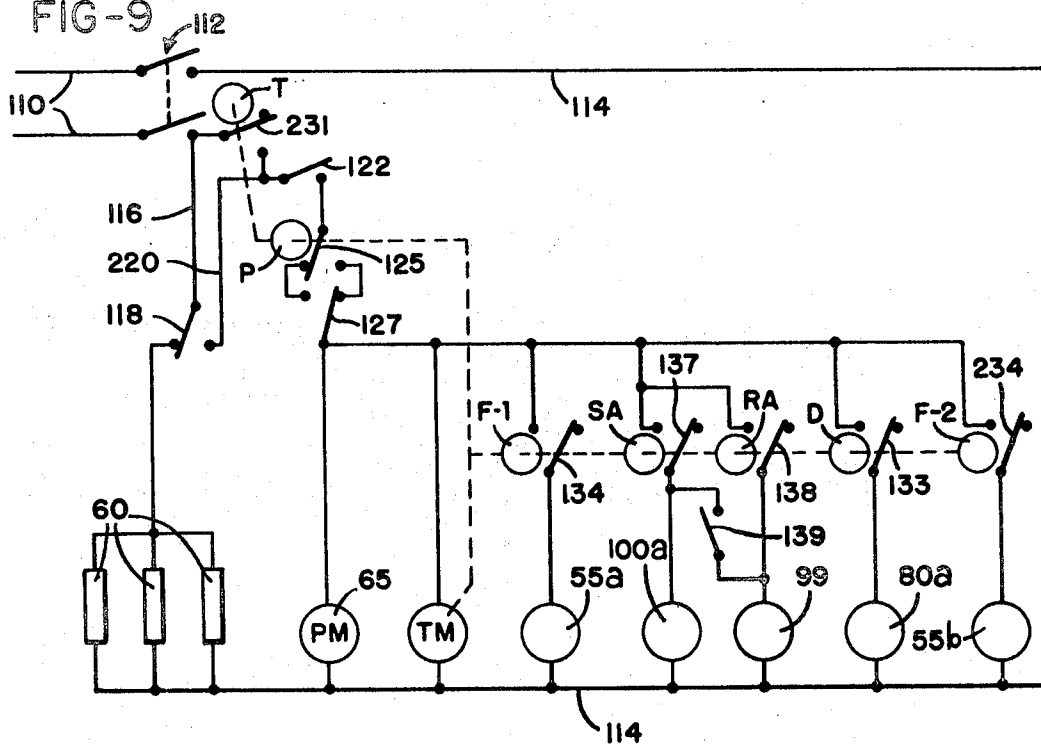
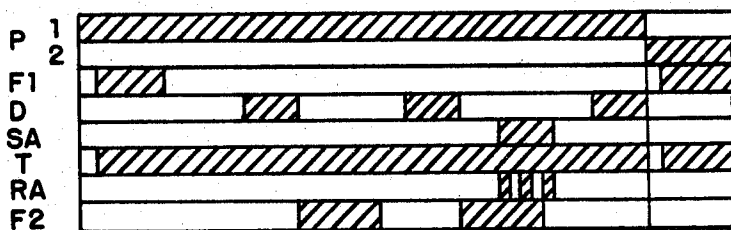


FIG-10



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APPARATUS FOR WASHING GLASSES, DISHES AND THE LIKE

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Int. Cl. A47I 15/46, 15/22

U.S. Cl. 134—58

11 Claims

ABSTRACT OF THE DISCLOSURE

A generally rectangular cabinet has a cleansing chamber and a motor chamber separated by an intermediate vertical wall having a lower edge portion spaced above a sloping bottom wall to provide for drainage of water distributed by a reaction spray arm within the cleansing chamber to a pump positioned below the bottom wall and driven by a motor located within the motor chamber. A strainer is removably mounted on the lower edge portion of the intermediate wall which also supports a dispenser for a treating agent, and a water heating tank is mounted on the underneath surface of the bottom wall for heating both water within the cleansing chamber and water which is subsequently displaced into the cleansing chamber.

Background of the invention

The present invention relates to a relatively small compact dishwasher which is ideally suited for placing on a countertop and either temporary or permanent connection to water supply and drainage lines and to a suitable electrical power supply. To provide such a dishwasher with effective washing and cleaning action, it is desirable to employ a rotary reaction spray arm within the cleansing chamber wherein the articles to be cleaned are placed on a suitable rack. A motor driven pump is commonly used to recirculate water through the spray arm, and preferably a strainer or filter is employed to prevent the recirculation of large food particles. In some installations where only cold water supply is available, it is also desirable to provide means for heating the water recirculated within the cleansing chamber. In providing the above features, numerous problems are encountered in the construction of the dishwasher cabinet and the arrangement of the major components in order to provide maximum capacity for glasses and/or dishes within the cleansing chamber while also providing the dishwasher with overall compactness and an economical construction.

Summary of the invention

The present invention is directed to an improved compact dishwasher which preferably incorporates a generally rectangular cabinet having a bottom wall sloping downwardly under the lower edge of an intermediate vertical wall to the inlet of a recirculating pump. The dishwasher has a rotary reaction spray arm and incorporates a strainer or filter positioned between the lower edge of the intermediate wall and the bottom wall. The filter has substantial area for minimizing the likelihood of blocking the recirculation of water.

In addition to a novel cabinet construction, the dishwasher provides a novel arrangement of the various components including a treating agent dispenser mounted on the intermediate wall and a water heating tank mounted on the underneath side of the bottom wall for effectively heating both water within the tank and within the cleansing chamber. The dishwasher of the invention also provides the feature of selectively introducing fresh water either directly into the cleansing chamber, wherein a sanitizing agent is added, or directly into the heating tank

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for displacing hot water therein into the cleansing chamber.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

Brief description of the drawings

FIG. 1 is a perspective view of dishwashing apparatus constructed in accordance with the invention, with the access door in the closed position;

FIG. 2 is a view similar to FIG. 1 with the access door in the open position;

FIG. 3 is a fragmentary front elevational view with the door and a front panel removed;

FIG. 4 is a front view with the door and front panels removed and with a portion of the apparatus shown in section;

FIG. 5 is a section taken generally on the line 5—5 of FIG. 4 with a portion of the bottom wall broken away;

FIG. 6 is a section taken generally on the line 6—6 of FIG. 5 with a portion of the heating tank broken away;

FIG. 7 is an electrical wiring diagram for the apparatus and FIG. 8 is the corresponding timing chart; and

FIG. 9 is a diagram of a modified electrical control and FIG. 10 is the corresponding timing chart.

Description of a preferred embodiment

The washing apparatus shown in FIG. 1 is supported by the top 13 of a counter 14 and generally includes a rectangular shaped cabinet 15 having flat parallel spaced end walls 16 (FIG. 1) and 17 (FIG. 2) integrally connected by a flat horizontal top wall 18 forming an inverted U-shaped configuration. For rigidity, the end walls 16 and 17 and top wall 18 include inwardly formed flanges 19 along the back and bottom edges. A rear wall 20 is attached to the rear flanges 19 of the top wall 18 and end wall 17 as by suitable welds, and is integrally connected to an intermediate wall 22 (FIGS. 4 and 5) extending vertically parallel to the end walls 16 and 17. A bottom wall 25 includes an upwardly extending peripheral flange 26 which is attached to the end walls 16 and 17 and rear wall 20 and has two flat wall sections 27 and 28 (FIG. 5) which slope downwardly from the left side wall 17 and front flange 26 towards the right rear corner where a circular opening 29 is formed within the bottom wall 25.

The intermediate wall 22 divides the cabinet 15 into a cleansing chamber 30 (FIG. 4) and a motor compartment or chamber 32, and has a lower edge portion with a horizontal flange 34 (FIG. 4) which is spaced above the bottom wall 25 to define an elongated passageway interconnecting the chambers 30 and 32. A stepped flange 37 (FIGS. 4 and 5) is secured to the forward edge portion of the end wall 17 (FIGS. 4 and 5), top wall 18 and an intermediate wall 22 to form a channel 38 and cooperates with the top edge of the front flange 26 of the bottom wall 25 to define a front access opening 39 for the cleansing chamber 30.

A door 40 is pivotally connected by hinges 41 to the forward flanges 26 of the bottom wall 25 and pivots between a vertical closed position (FIG. 1) and a horizontal open position (FIG. 2), with the assistance of a suitable spring counterbalance (not shown). The door 40 includes a peripheral flange 43 which seats within the channel 38 when the door is closed to provide a baffle-like seal for preventing the escapement of sprayed water from the chamber 30. An elongated handle 44 (FIG. 1) is attached to the upper portion of the door 40.

A box-like water heating tank 45 (FIGS. 4-6) is attached to the underneath surface of the bottom wall 25 adjacent the end wall 17 so that the bottom wall 25 also forms the top wall of the tank 45. A tube 47 (FIGS. 5

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and 6) extends within the tank 45 and slopes downwardly from the front wall, thus its lower open end portion is positioned close to the bottom and rear walls of the tank. The forward end portion 48 (FIG. 5) of the tube 47 projects from the front wall of the tank 45 and a relatively short tube 50 (FIG. 6) extends through the upper portion of the front wall of the tank 45 on a slightly inclined angle.

from the front wall of the tank 45 and a relatively short tube 50 (FIG. 6) extends through the upper portion of the front wall of the tank 45 on a slightly inclined angle.

An inverted generally U-shaped fill tube 51 is mounted on the bottom wall 25 of the cabinet 15 adjacent the front left corner and projects upwardly into the chamber 30, with its outlet end 52 positioned slightly above the top edge of the front flange 26 of the bottom wall 25. A dual solenoid fill valve 55 is mounted on the heating tank 45 by a bracket 56 and has an upper outlet connected by a flexible tube 57 to the tube 50 and fill tube 51. The lower outlet of the fill valve 55 is connected by a flexible tube 58 to the projecting end portion 48 of the tube 47 which extends longitudinally within the tank 45. Fresh water is supplied through a suitable water supply line connected to the inlet 59 (FIG. 5) of the fill valve 55. A series of three electrical resistance heating elements 60 extend longitudinally within the tank 45. These heaters are high capacity, for example approximately 3.5 kw., for quickly heating the water within the tank 45.

A motor 65 is supported within the motor chamber 32 by a tubular housing 66 which is mounted on the inlet portion 67 of a pump housing 68 projecting upwardly through the bottom wall opening 29, and having an outer flange secured to the bottom wall 25. The motor 65 includes a shaft 69 which extends downwardly through the inlet portion 67 to support a centrifugal impeller 70 within the pump housing 68. The discharge outlet 71 (FIG. 5) of the pump housing 68 is connected by a flexible conduit 72 to the lower end portion of a manifold 74 projecting downwardly through a hole formed in the bottom wall 25 at the center of the substantially square chamber 30. An elongated hollow reaction spray arm 75 has a hub portion rotatably mounted on the manifold 74, and includes a series of longitudinally spaced nozzle openings 76.

The conduit 72 also has a portion 78 (FIG. 5) which is connected to the inlet of a solenoid actuated drain valve 80 having an outlet connected by a flexible U-shaped conduit 82 to a tube 83 adapted to be connected to a suitable drain line. The conduit 82 also has a portion which is connected to the lower end portion of a rigid overflow tube 85 projecting upwardly through the bottom wall 25 and into the motor chamber 32. The top edge of the overflow tube is substantially level with the lower flange 34 of the intermediate wall 22.

A pair of tabs 88 (FIGS. 4 and 6) are secured to the lower edge portion of the intermediate wall 22, and supports a long perforated strainer 90 (FIGS. 4 and 5) through its vertical flange portion 91 which has openings for receiving the tabs 88. The lower portion 92 of the strainer slopes downwardly to rest upon the bottom wall 25 of the tank 15, and covers the entire opening beneath the wall 22 and the bottom wall.

A solenoid actuated rinse agent dispenser 95 (FIG. 4) is mounted on the intermediate wall 22 and projects into the motor compartment or chamber 32. The dispenser 95 includes a container 96 having an upper inlet 97 (FIG. 6) which projects into the chamber 30 so that it can be conveniently filled with liquid rinse agent. The container 96 has a lower outlet 98 (FIG. 6) through which the rinse agent is dispensed in predetermined quantities into the cleansing chamber 30 by energizing the solenoid 99 (FIG. 4). The intermediate wall 22 also supports a solenoid actuated sanitizer dispensing unit 100 having an outlet 101 (FIG. 6) projecting through the intermediate wall 22 and an inlet which is connected by a tube (not

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shown) to a remote storage container for a liquid sanitizing solution such as a sodium hypochlorite. The solution is introduced into the cleansing chamber 30 by energizing the solenoid valve. Details of such a sanitizing agent dispenser are explained in copending U.S. application Ser. No. 346,261, filed Feb. 20, 1964, and now Patent No. 3,370,597.

A removable cover plate 102 (FIG. 1) forms the front wall of the motor chamber 32 and a removable cover plate 103 forms the lower front wall of the cabinet 15. A pair of parallel spaced tracks 104 are supported by rollers (not shown) mounted on the lower edge portions of the end wall 17 and intermediate wall 22 and extend within the cleansing chamber 30 to support a generally square rack 105 (FIG. 1) preferably formed of wire with a suitable resilient coating thereon and having a coarse mesh bottom portion 106 surrounded by a rail 107. The rack is adapted to be moved between a position within the chamber 30 over the spray arm 75 to a position (FIG. 2) extending over the open door 40 to provide for convenient loading and unloading the rack with articles such as glasses and dishes.

Washing apparatus constructed in accordance with the foregoing description has a number of desirable features and advantages. For example, by employing the intermediate wall 22 to divide the cabinet 15 into the cleaning chamber 30 and motor compartment chamber 32 and by spacing the lower edge of the intermediate wall 22 above the sloping bottom wall 25, the construction of the cabinet 15 and the operation and arrangement of the recirculating system is substantially simplified. That is, the water distributed by the spray arm 75 returns quickly to the inlet of the pump 68 as a result of the sloping configuration of the bottom wall 25 and the large area of the filter 90 and thereby minimizes the volume of water required for each cycle of operation. Furthermore, the intermediate wall 22 provides a convenient support for the dispensers 95 and 100 and for the removable filter 90. The simplified construction of the cabinet 15 is also provided by forming the end walls 16 and 17 integral with the top wall 18 and forming the intermediate wall 22 integrally with the rear wall 20.

Another important feature of the dishwashing apparatus of the invention is provided by attaching the water heating tank 45 to the underneath surface of the bottom wall 25 so that the bottom wall 25 forms the top wall of the tank 45. As a result, the water being recirculated in the cleansing chamber 30 by the spray arm 75 is continuously heated by the direct transfer of heat through the bottom wall 25 from the hot water within the tank 45.

A typical control circuit for the apparatus is shown in FIG. 7, and the timing chart of FIG. 8 should be considered at the same time since it represents the positions of the various timer cams during a typical operating cycle. For convenience it will be assumed that the tank 45 is filled with water, and likewise that a heated charge of water is in the bottom of the washing chamber. This can readily be accomplished by running the machine quickly through an operating cycle without any articles to be cleansed in the rack, as will be understood from the following description.

Electrical power is supplied from the lines 110 which are controlled by a master switch 112. This switch is manually operated, and is located on the cover plate 102, as shown in FIG. 1. Once the machine is placed in operation this switch is moved to the closed position and remains closed until the machine is shut down. Closing of this switch applies power to the timing and control circuit through lines 114 and 115 respectively. The line 114 may be considered as the common or bus lines, and it is also included in the heater control circuit for the heater elements 60 which are connected to the master switch through a line 116 that is parallel to the timing control circuit, and includes a thermostat switch 118. This switch is shown in its "cold" position during which electrical

power is supplied to the heater element. A typical location of the thermostatic switch is shown in FIG. 4.

Once the water in tank 45 has been heated to the desired temperature, switch 118 transfers to complete a circuit through line 120, as is described hereafter. In line 115 there is a normally open door interlock switch 122 which is closed when the door 40 is moved to its closed position. Closing of the switch completes a circuit to the cam controlled switch 125 which operates under the control of the timer cam P. This is a double throw switch and the cams in the timer are constructed and arranged such that 180° of rotation can actuate the apparatus through a complete cycle. Thus each of the cams except for the cam P is duplicated once around its periphery so that a full rotation of the timer actually corresponds to two operating cycles of the apparatus.

The cam P moves the switch 125 to one of its contacts in one cycle and to the other of its contacts during the next cycle, hence in FIG. 8 a segment of the second cycle is shown to indicate that the other half of the cam P has transferred switch 125 during the next succeeding cycle. The remainder of the diagram for the next cycle is omitted since it is merely a duplicate of what is shown.

The cycle starting switch 127 is a manually operated double throw switch also located on the cover plate 103 (FIG. 1) and it is shown in FIG. 7 in a position such as it would occupy just prior to beginning a cycle. Its contacts are connected respectively to the alternate contacts of the cam switch 125, hence moving the switch 127 to whichever circuit is energized by the cam switch 125 will begin operation of a cycle.

Upon actuation of switch 127, assuming that the door is closed and the machine is ready for operation, a circuit is immediately completed through line 128 in the pump motor 65, hence the pump continues to operate from the beginning of the cycle to the end, at which time cam switch 125 is transferred to the open side of its alternate circuits. Recalling that there is a liquid in the sump and cleansing chamber, the pump immediately begins to recirculate this liquid through the washing arm 75. This operation continues while the timer motor TM is advanced by a circuit completed through the line 130 and the cam control timer switch 131 which is under the control of the timer cam T. It will be noted that during this operation the thermostatic switch 118 may still be in the "cold" position as the charge of water in tank 45 is being heated. When the cam T transfers switch 131, this completes a circuit from the timer motor TM through line 120, but this circuit will remain open and the timer will stop if the thermostatic switch 118 has not yet transferred. Once water in tank 45 is properly heated, switch 118 will transfer and power will be supplied to the timer motor TM through line 120 and cam switch 131 until the cam T is advanced sufficiently to return switch 131 to its normal position completing the circuit from line 130. In other words, if additional time is required beyond the normal time allowed in the cycle to heat the water in tank 45, this will be provided by a pause in timer operation until the thermostatic switch transfers. In normal operation it has been found that the water is already preheated by the time the cam T first transfers switch 141, hence there is in fact no delay in the cycle at this time in most cases.

Shortly after this operation the timer cam D closes its normally open switch 133, completing a circuit from line 130 through the drain valve solenoid 80a. This actuates the drain valve 80 and the pump in continuing to operate acts to assist the drain operation until the liquid head in the wash chamber drops to the point where further drainage is essentially by gravity. The time duration during which the drain valve is energized is shown in FIG. 8 opposite the bar corresponding to cam D.

Shortly after the drain valve is deenergized, and hence closed, the timer advances cam F to close a normally open timer switch 134 which will energize the solenoid 55a of the fill valve 55 (see FIG. 4). In this arrangement it should be noted that the other fill valve solenoid 50b is not con-

nected into the circuit, and the direct connection of the fill valve to tube 57 is not used. The circuit from line 130 to the fill control cam switch 134 includes a contact of a double pole, double throw manual switch 135, which likewise is mounted on the cover plate 103 (FIG. 1). In normal operation this switch is in the position shown. It is moved manually to its other position when it is desired to drain the machine at the end of operation, as is explained hereafter.

After solenoid 55a is energized water from the supply enters the tank 45 through tube 47, and this in turn forces the heated water from this tank through the tube 57 and the inlet 51 into the chamber of the machine. It should be noted that the pump continues to operate at this time. After the fill operation has continued for some time, the cams SA and RA close their respective normally open switches 137 and 138, and this in turn completes circuits through the rinse agent dispenser solenoid 99, via switch 138, and through the solenoid 100a of the sanitizing agent dispenser, via switch 137.

It should be noted that switch 137 remains closed in the normal operation somewhat longer (see FIG. 8) since the functioning of the sanitizing agent dispenser requires a certain amount of time for the measured amount of liquid sanitizer agent to drain through its outlet 101 into the washing chamber. In the meantime the switch 138 may be opened and closed several times, for example three times as shown in FIG. 8, by the cam RA. This causes several pulses of the rinse agent dispenser in order to meter a sufficient quantity of the rinse agent into the washing chamber. In some cases it has been found that rinse agents of higher concentration are available, and that only one pulsing of the dispenser will provide an adequate amount of rinse agent. In such cases a manually operated switch 131, normally open, is connected in a circuit from the one solenoid 99 to the other solenoid 100a, hence the cam SA will effectively take over control of the solenoid 99 when this switch is closed, and there will be only one effective injecting pulse of the rinse agent dispenser. The switch 139 can be mounted in any conventional point within the chamber 32.

With the sanitizing and rinsing agents added to the fresh water in the washing chamber, the treated liquid is recirculated over the articles in rack 25 from the remainder of the cycle, producing an effective rinsing of the articles and for the action of the sanitizer agent, and elimination of essentially all bacteria. At the end of the cycle (about 150 seconds total) the cam P transfers switch 125 to its opposite contact, effectively opening the main power circuit at the manual switch 127, and the timer motor TM is deenergized. The treated water is held in the wash chamber and system for use as wash liquid in the next cycle.

During the next cycle switch 127 is transferred to its opposite contact, and the sequence is the same except that the switch 125 is now at its opposite position as indicated by the bar diagram P2. When it is desired to shut down the machine, the drain control switch 135 is transferred to complete a circuit through line 140 to the timer motor TM, and operation of switch 127 will start the pump motor and also the inner motor, however, power can be supplied only through the cam switch 133 to the drain valve solenoid 80a, hence the machine will drain itself, but will not fill nor dispense any rinsing or sanitizing agent, but merely run to the end of the timer cycle and stop.

Referring now to FIGS. 9 and 10, these show a modified circuit diagram in which the second fill valve solenoid 55b is employed, and the articles are rinsed with essentially unheated water with which sanitizing and rinsing agents are mixed. Where applicable the same reference numerals are used for identical parts and circuits. Essentially there are three differences between the circuit shown in FIG. 7 and that shown in FIG. 9. The timer cam T and its associated switch 122 are connected somewhat differently, the manually operated drain control switch

135 is eliminated since it is not necessary, and an additional cam F-2 and associated switch is employed to control energizing of the fill valve solenoid 55b. The cam controlling fill valve solenoid 55a thus is marked with the reference F-1.

Closing the master switch 112 completes a circuit to a switch 231 which is controlled by the timer cam T, and at the same time the circuit through line 116 and thermostatic switch 118 is completed. Once the water in tank 45 reaches the desired heat, switch 118 transfers to supply power to the circuit line 220 which leads to the door switch 22. Hence, if the door is closed, actuating switch 127 will complete the starting cycle as before, and the pump motor 65 will immediately be energized, along with the timer motor TM. The cam P is so arranged that as the timer advances it continues to hold switch 125 in the same position, hence the cycle continues, and the cam T closes switch 231 to complete a circuit bypassing the thermostatic switch and connecting the door switch 122 directly to the master switch. This continues supply of power even though the thermostatic switch will subsequently go to its "cold" contact as additional water is supplied to the heater tank 45.

Referring to FIG. 10, it will be noted that cam F-1 closes switch 134 at the same time that cam T closes switch 231. Thus the fill valve solenoid 55a is energized and fresh water is supplied through line 58 and the tube 47 into the tank 45, displacing the heated water into the wash chamber. This heated water is circulated over the articles in the chamber, and may mix with detergent placed in the chamber before the door is closed, if desired. After a period of time cam D energized the drain valve solenoid 80a and the chamber is drained of the hot wash water. As the drain valve is deenergized after this operation, the cam F-2 closes switch 234 to complete a circuit energizing the fill valve solenoid 55b. This causes fresh unheated water from the supply to enter the tube 57 and pass into the wash chamber from the fill pipe 51. With the pump continuing to run, this fresh water is sprayed over the articles and subsequently the cam D again closes switch 133 to energize the drain valve and the chamber is again drained.

At the end of this second drain operation cam F-2 again causes drainage and additional fresh water is supplied directly to the wash chamber. Shortly thereafter the cam SA closes switch 137 to energize the sanitizer dispenser solenoid 100a, and the cam RA closes switch 138 several times to repeatedly energize the rinse agent dispenser solenoid 99. The manual selector switch 139 is provided as before, for selecting one long energization of the rinse agent dispenser if this is desired.

After the final rinse operation, during which the unheated water is treated with the sanitizing and rinsing agent, cam D again closes switch 133 to energize the drain valve and finally drain the chamber, at the end of which the cycle is completed. In a typical machine, this entire cycle takes approximately 210 seconds. In the next cycle the second half of cam P (P-2) controls switch 125, and otherwise the cycle is repeated as before.

This modified cycle makes use of the alternate fill valve control and permits rinsing of the cleansed articles with treated unheated water. This type of operation may be desirable, for example, where it is preferred that the articles when removed from the washing chamber be as cool as possible.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made in either without departing from the scope of the invention.

What is claimed is:

1. Apparatus for cleaning articles such as glasses, dishes and the like, comprising a cabinet formed of front, rear, side and top walls and a bottom wall spaced somewhat

above the lower ends of said front, rear, and side walls, a generally vertically extending intermediate wall cooperating with said side and bottom walls to define a cleansing chamber and a motor chamber in laterally adjacent relationship, means for supporting articles in said cleansing chamber, means defining an access opening for said cleansing chamber and a movable door for said access opening, said bottom wall sloping generally downwardly from said cleansing chamber towards said motor chamber and said intermediate wall having a lower edge portion spaced above said bottom wall to provide for flow of liquid along said bottom wall from said cleansing chamber into said motor chamber, means forming a drain opening in the lowest part of said bottom wall, a pump positioned below said drain opening, an electric motor disposed with said motor chamber above said bottom wall and having a shaft extending downwardly to said pump, means defining an outlet from said pump, spray means for distributing liquid over articles within said cleansing chamber, a conduit connecting said outlet of said pump to said spray means, an inlet connection for adding a quantity of liquid to said chambers, and a drain connection from said pump to the exterior of said chambers.

2. Apparatus as defined in claim 1 wherein said cabinet has a rectangular horizontal cross-sectional configuration and said cleansing chamber has a substantially square horizontal cross-sectional configuration, said spray means comprising a rotatable reaction spray arm within said chamber, means mounted on said bottom wall supporting said spray arm for rotation.

3. Apparatus as defined in claim 1 including a filter member extending between said bottom wall and said lower edge portion of said intermediate wall to prevent large food particles from entering said pump and being recirculated through said spray means.

4. Apparatus as defined in claim 3 including means for removably mounting said filter on said lower edge portion of said intermediate wall.

5. Apparatus as defined in claim 1 including means secured to said bottom wall and defining a water heating tank, said inlet connection including means for introducing water into said heating tank and means for directing water from said heating tank into said cleansing chamber, and at least one electrical heating element within said heating tank for heating directly the water therein and through conduction the water within said cleansing chamber.

6. Apparatus as defined in claim 5 including means for selectively introducing water directly into said water heating tank and directly into said cleansing chamber.

7. Apparatus as defined in claim 1 including a liquid treating agent dispenser mounted on said intermediate wall within said motor chamber, and an outlet from said dispenser into said cleansing chamber for introduction of treating agent into the water circulated within said cleansing chamber.

8. Apparatus as defined in claim 1 wherein said cabinet has parallel spaced end walls and parallel spaced front and rear walls, an access opening to said motor chamber through said front wall, and an access opening to said cleansing chamber through said front wall, and said door pivotally connected to said cabinet adjacent the bottom of said access opening, said drainage opening within said bottom wall adjacent said rear wall and one of said end walls.

9. Apparatus as defined in claim 1 wherein said drain connection is a tube connected to said conduit means between said pump and said spray means, and a solenoid operated drain valve within said drain line controlling draining of liquid from said cleansing chamber, said pump and said spray means.

10. Apparatus as defined in claim 9 wherein said means for introducing liquid into said chambers includes a solenoid fill valve, a sequence timer connected to control said

fill and drain valves in accordance with a predetermined sequence and operable to retain the final rinse water within said cleansing chamber at the end of each said cycle for use as the initial wash liquid of the following cycle.

11. Apparatus as defined in claim 10, including a rinse agent dispenser and a sanitizing agent dispenser each mounted on said intermediate wall in said motor chamber and having respective outlet openings through said intermediate wall into said cleansing chamber, and connections from said timer to each of said dispensers for causing addition of rinse agent and sanitizing agent into the last quantity of liquid recirculated over the articles in each cycle.

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ROBERT L. BLEUTGE, Primary Examiner

U.S. Cl. X.R.

134—101, 107, 108, 111, 176, 188, 200

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,465,761 Dated September 9, 1969

Inventor(s) David A. Meeker, Ernst Grunewald, Ben J. Vallor

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, lines 9, 10 and 11 are not needed. Column 4, lines 26 and 27, "cleaning" should be --cleansing--. Column 6, line 41, "conventional" should be --convenient--. Column 6, line 60, "inner motor" should be --timer motor--. Column 7, line 12, "switch 22" should be --switch 122--. Column 8, line 16, "disposed with" should be --disposed within--.

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(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents