In accordance with this invention and with reference in particular to FIGURE 3, a dishwasher 10 of the general type taught in Abresch et al. 2,808,063 is formed with an inner box-like dishwasher chamber 12 having a bottom 14 in which a depressed sump portion 16 is arranged to collect water being sprayed within the chamber 12 by a rotating spray tube 18. At one side of the chamber 12 an opening 20 is formed and adapted to be closed by a door 22 hingeably mounted in any conventional fashion at 24. The door 22 is arranged for pivotal movement between a horizontally open position as seen in FIGURE 3, and a vertically closed position as seen in FIGURE 1. This movement may be facilitated by a handle 26 attached along one portion of the door 22.

With reference to FIGURE 1, the dishwasher 10 is shown with a top panel portion 28 overlying the dishwashing chamber 12 and a base section or compartment 30 in which the various compartments and vapors from the dishwasher 10 are installed in hidden relationship to the room in which the dishwasher is installed. The base compartment 30 has an upstanding kickplate 32 recessed from a frontwardly located panel 34 of the base compartment 30. The offset between panels 32 and 34 provides a toe-space for anyone standing close to the dishwasher 10. A structural support channel 36 lies at the bottom of the dishwasher and carries support plates 38 in which adjustable foot members 40 may be screwed for leveling the machine. The dishwashing chamber 12, as aforesaid, is formed with a bottom wall 14 having a sump 16 and a top wall 42 which, with the sidewalls 15 and bottom wall 14, defines an opening 28 in the front thereof. The rear of the box-like receptacle 12 includes a back wall 44 to which the spray tube 18 is attached. Specifically, a support bracket 46 is supported in cantilever fashion from the rear wall 44 and extends outwardly where an upstanding portion 48 rotatably carries an outer stud or axle portion 50 of the spray tube 18. Secured to the rear wall 44 is an inlet header 52 for imparting a swirl to the water entering the spray tube 18. Since the spray tube is rotatably mounted in the outer flange 48 of the support bracket 46 and is rotatably mounted to the inlet header 52, the swirl thus imparted will cause the spray tube to rotate in a manner to distribute the water or washing fluid projecting from orifices 56 over any dishes or pans carried in the support racks, shown generally at 58.

Closing the opening 29 is a dishwasher door 22 having an outer panel 60 and an inner panel 62. A space 64 is provided between the inner and outer panels to receive a water-fill system which includes a water gap and sump tray member 66. The member 66 includes a reverse bend portion 68 having an opening 70 through the inner panel 62 of the door 22. Fill member 66 includes also a water-fill chamber 72 having an opening 74 thereto for receiving water during the fill period of the dishwashing cycle. In accordance with the sequence of a conventional dishwashing timer such as 168, a fill valve 76 operated by a solenoid 78 is supported in any conventional manner in the base compartment 30. Water is supplied to the fill valve 76 through a conduit 80 from the water supply, while water exhausts from the valve 76 through an outlet stub 82 of the valve. To carry the water from the valve 76 to the water receiving chamber 72 a flexible conduit 84 may be utilized which fits over the fill valve stub 82 at one end thereof and projects through the opening 74 of the water fill chamber 72. The outer panel 60 of the door 22 has a port 86 therein for admitting the flexible conduit 84 to the interior 64 of the door. In this manner the door 22 may be opened and closed without affecting the fill system, the flexibility of the water conduit 84 allowing for this movement. With sole-
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noid 78 calling for water, valve 76 is opened and water proceeds through the conduit 84 to the receiving receptacle or chamber 72. Since the terminus 85 of the conduit 84 overhangs the opening 74 in the receptacle 72, an air gap is provided which meets plumbing code requirements relating to back-siphoning. This fill arrangement is also convenient for servicing in that the components are located in the front of the dishwasher 10. In prior art systems this filling arrangement has been installed to the rear of the dishwashing chamber 12. Thus, when a prior art dishwasher is installed in an under-the-counter relationship, servicing of these parts is made extremely difficult.

With the door in the upright position as seen in FIGURE 1 it should be apparent that a water trap is contained in the reverse bend portion 68 of the fill device 66 which is effective in preventing suds which may occur within the dishwasher 12 from back out through the reverse bend portion 68 by way of fill opening 70. With the door 22 in a horizontal position, the water trap will still be maintained due to the raised portion or inverted U 88 in the fill device 66.

In accordance with the concepts of this invention, the water-tight connection between the orifice fitting 122 and the bottom wall 14 of the dishwashing chamber. Tabs 133 extend upwardly from the shoulder 124 of the orifice and effect a spring mounting arrangement for the strainer 118. Particularly the strainer 118 is fastened by a cylindrical boss 124 which may be snap-fastened over the tabs 133 to retain the strainer in correct relationship, to the orifice 122. The orifice fitting 122 is drilled at 136 in accordance with the amount of water it is desired to be bypassed through the strainer 118. An orifice which will bypass approximately 10 percent of the pump's output has been found satisfactory. During the period when water is being circulated from the pump 90 to the spray tube 18, a portion of the water will be returned to the dishwashing chamber 12 by means of the conduit 116, the orifice 136 in fitting 122 regulating the amount of water that is so bypassed. As soil is picked up from the surfaces of the dishes arranged in the baskets 58, this soil will be carried in the solid state in the washing solution as this solution is recirculated. That portion of the water which is passed through the strainer 118 will deposit the soil particles carried thereby on the inner surface of the strainer or screen 118. After the dishwashing cycle, the strainer 118 may be removed from the spring tabs 132 and carried to the kitchen sink where it may be cleaned by running faucet water over the screen. It should be understood that the strainer shown in FIGURE 5 represents an alternative arrangement to that shown in FIGURE 6. The strain-and-drain fitting 98 was shown in the pump supply conduit 96 in FIGURE 1 for purposes of clarity, but it should be recognized that the fitting 98 may be merely a drain valve whenever the bypass strainer 118 of the alternative method is being used. The FIGURE 5 arrangement, wherein a portion of the recirculating washing fluid is bypassed, has the advantage that any accumulation of food soil on the screen will not reduce the amount of washing fluid being recirculated to the spray tube. During the wash and rinse cycles, water is pumped upward to the spray tube 18 and a portion of the water is also pumped upward through the filter or strainer 118. Since the wash and rinse cycles are fairly long, all of the water eventually is pumped through the filter unit 118 and the insoluble food particles are trapped thereby. If the filter becomes plugged, however, the functioning of the dishwasher is not altered and the pump 90 will continue to pump a full head of 12. The Past dishwasher design has provided access within the support baskets 58 for holding silverware and cutlery in position to be spray-cleansed by the rotating spray tube 18. However, this frequently results in the silverware being bunched up in a manner to preclude the complete coverage of the silverware by the cleansing spray. Accordingly, one of the objects of this invention is to utilize space which would otherwise be wasted within the interior of the door 22 (FIGURE 3). To effect this, the inner door panel 62 is depressed to form a cavity 140. The cavity 140 may be partitioned into compartments by dividers 142 and a strap 144 placed thereacross and fastened at the ends thereof to the inner panel 62 of the door. Silverware may then be placed in any of the compartments, the strap 144 serving to retain these items in position to receive a complete cleansing bath from the spray tube 18. A modification of this idea is illustrated in FIGURE 4 wherein the strainer 118 receives a removable silverware basket or tray 146 having a handle 148 which can be utilized in conveniently removing the basket to the dining area where the silverware and cutlery may be conveniently placed therein. In any arrangement such, any suitable means such as a tab or bracket 150 can be arranged to cooperate with the basket 146 to retain the strainer 118 in the annular channel 116.

Past design efforts with dishwashers have also met with the disadvantage of inadequate spray patterns within the dishwashing chamber 12. Thus, many surfaces of the
displays and items being washed are shielded from impingement by the jets of water issuing from the spray tube 18. Reference may now be had to FIGURE 7 wherein the improved cleansing techniques of this invention are embodied in deflecting means for the spray patterns within the dishwashing chamber 12. The support basket 58 is shown slidably supported in a slide bracket 152 secured to the sidewall 15 of the washing chamber. With dishes and glassware mounted as shown in phantom in FIGURE 7, the spray pattern from the rotating spray tube 18 is indicated by the arrows and shows the pattern effected by the spray as the tube rotates. The top wall 42 in this instance is embossed or raised to provide a baffle or vane 154 which deflects the spray indicated at 156 across the bottom of a tumbler 158 thereby effecting an added cleansing effect to glassware of this type. Similarly, the sidewall 15 of the washing chamber 12 is embossed outwardly at 160. A movable baffle 162 may be pivotally mounted therein and arranged to deflect the water indicated at 164 across the bottoms of dishes placed within the side portion of the rack 58. The baffle 162 may be positioned manually by the operator before initiating the wash cycle and in accordance with the size of dishwashing chamber being washed. It is also within the purview of this invention to intermittingly actuated a selector switch 182, a detergent selector switch 184 operating between a heavy soil detergent supply contact 186 and a light soil detergent supply contact 188, and a water-fill switch 190 operating between a high water-fill contact 192 and a low water-fill contact 194. The dispenser 167 may also include a main ON/OFF switch 196 and a safety switch 198 which closes whenever the door 22 is in a closed position.

To initiate a dishwashing cycle in accordance with the concepts here advanced, dishes are loaded on the racks 58 and placed within the dishwashing chamber 12. The closing of door 22 will close switch 190 and the normal positioning of the timer 168 to a “start” position will cause switch 192 to energize the timer motor 174 and start the sequential advance of the timer cams. With the soil selector switch 166 set for “Heavy Soil” operation, speed selector switch 178 will be on high speed contact 180, detergent selector switch 184 on heavy soil detergent supply contact 186 and water-fill selector switch blade 190 on high fill contact 192. As the timer 168 advances timer switch 199 will close a circuit energizing the fill valve solenoid 78 for a period of time sufficient to introduce the desired amount of water through the conduit 84 and the suds trap and fill device 66 to the dishwashing chamber 12. If “Light Soil” has been selected, timer switch 201 would have energized the solenoid 78 through low water fill contact 194. At the conclusion of the fill period, timer switch 196 will close to energize the motor 94 in accordance with the desired speed—in this case, high speed. During the fill period the detergent dispensing solenoid 172 is energized by the timer switch 198 for a period required to admit the preset amount of detergent from a conventional dispenser 167 to the dishwashing chamber 12. Thus, the motor 94 will operate the pump 90 at a high rate of speed and water will be directed through the conduit 96 to the spray tube 18, which will rotate and omit more forceful jets of water over the dishes carried in the racks 58. After a predetermined period, timer switch 200 will close and the drain solenoid 111 will energize the drain valve 106 to place valve portion 110 in blocking engagement with valve outlet 102 in the conduit 96. Thus, pump 90 will not operate, directing the soiled water within the sump 16 to drain. After this, solenoid 111 will be deenergized and the valve 106 will return valve portion 108 into blocking engagement with the drain opening 104. Subsequently, the fill valve 76 will be again energized to admit a predetermined quantity of water for the next dishwashing cycle. The pump 90 will continue to operate at high speed during the rinse portion of the cycle and...
the dishes will be thoroughly rinsed. Of course, there may be more than one rinse, if desired. However, this operation would merely be a repeat of that explained immediately hereinafter.

All the conclusions of the rinse cycle the timer switches 196, 197, 198, 199, 200, and 201 will be open and timer switch 202 closed to energize the heater 170. This heater will remain energized for a predetermined period while the dishes are drying. During the washing and rinsing operations, of course, the soil filtering arrangement described hereinbefore will be effective to remove the soil particles being circulated. Furthermore, the spray pattern may be altered during the washing cycle by altering the position of deflectors 162.

The dishwasher operation was explained in conjunction with a selection of "Heavy Soil" on switch 166. It should be apparent that "Light Soil" selection will produce the same sequence of functions. The "Light Soil" cycle will distinguish in that timer switch 197 will cooperate with light soil detergent supply contact 188, timer switch 201 with light soil short fill contact 194 and the motor 94 will run at low speed in causing pump 99 to produce a less forceful spray.

It should now be seen that a dual cycle dishwasher has been provided to effect a high speed and a low speed pumping action in accordance with the soiled condition of the dishes or pans being washed. Further, numerous modifications have been made to the circulating system to filter the washing fluid being circulated and to alter the spray pattern thereof. In further addition to the improved circulating system of this washing machine, modifications have been made to improve the dishwashing chamber for better supporting silverware and cutlery in the path of the washing fluid.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In combination, a cleaning apparatus for dishes or the like having a washing chamber, a spray tube in said chamber, means including a pump having a two-speed motor for circulating a first or second quantity of washing fluid to said spray tube to produce a first or second force spray operation on one portion of said dishes or the like, means in the path of the spray from said spray tube for deflecting said spray onto another portion of the dishes or the like, means for admitting first and second amounts of fluid to said chamber, means for dispensing first and second quantities of cleaning agent to said chamber, and preselectable means for selectively energizing said motor to circulate either said first or second quantity of washing fluid, and means responsive to the preselection of said first or second circulating quantity for energizing said dispening means for said first or second quantity of cleaning agent respectively and for energizing said fluid admitting means for said first or second amounts of fluid respectively.

2. The combination of claim 1 wherein said spray deflecting means is comprised of a baffle in said chamber.

3. The combination of claim 1 wherein said spray deflecting means is comprised of an adjustable baffle in said chamber.

4. In combination, a cleaning apparatus for dishes or the like having a washing chamber, means for spraying in said chamber, said spraying means having a two-speed motor for circulating a first or second quantity of washing fluid to produce a first or second force spray operation on one portion of said dishes or the like, means in the path of the spray from said spraying means for deflecting said spray onto another portion of the dishes or the like, means for admitting first and second amounts of fluid to said chamber, means for dispensing first and second quantities of cleaning agent to said chamber, and preselectable means for selectively energizing said motor to circulate either said first or second quantity of washing fluid, and means responsive to the preselection of the first or second circulating quantity for energizing said dispensing means for said first or second quantity of cleaning agent respectively and for energizing said fluid admitting means for said first or second amounts of fluid respectively.

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