

Nov. 13, 1962

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3,063,459

DISHWASHING MACHINE

Filed May 25, 1959

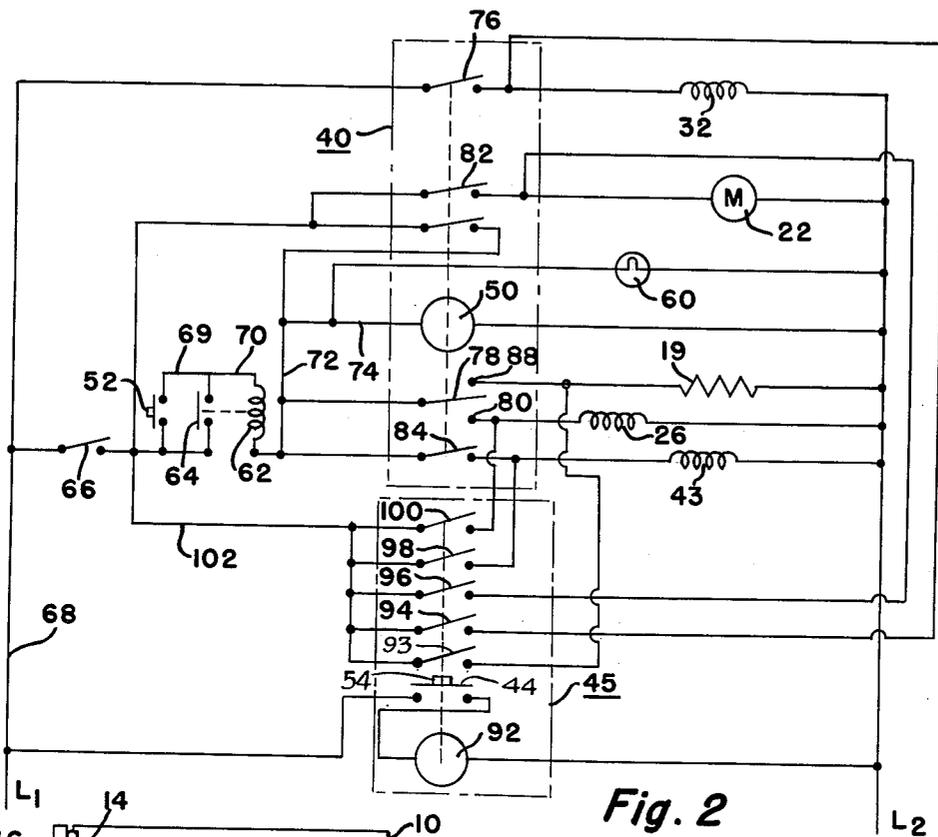


Fig. 2

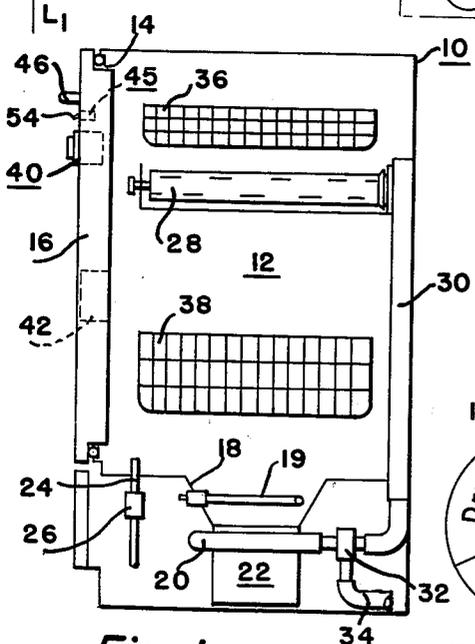


Fig. 1

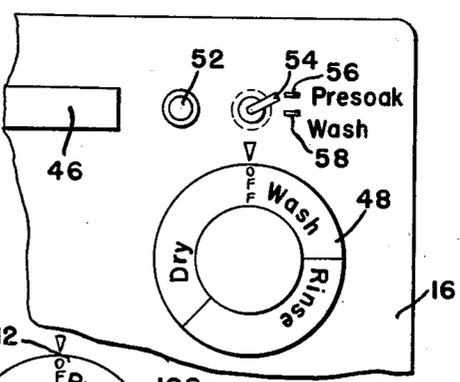


Fig. 3

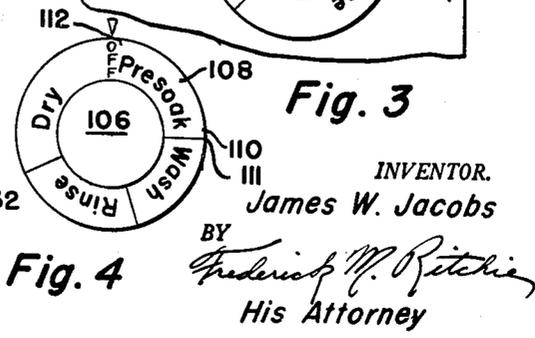


Fig. 4

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3,063,459

DISHWASHING MACHINE

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Filed May 25, 1959, Ser. No. 815,477

7 Claims. (Cl. 134-58)

This invention relates to a domestic appliance and more particularly to an improved cycle for a dishwasher.

With the development of the dishwashing art, the load capacity of dishwashing machines has increased. In using current production models, it is known that the operator thereof generally uses the machine but once a day. It is present practice to add soiled dishes and utensils to the dishwasher as they are dirtied and to initiate a dishwashing cycle only when the dishwasher is full. This procedure results in the breakfast dishware being placed in the washing apparatus in the morning, the noon dishware in the middle of the day, and the evening dishes near the end of the day. It has been determined further that the longer food soil remains on the dishes prior to washing, the more difficult it is to remove. To the solution of these problems the teachings of this invention are directed.

Accordingly, it is an object of this invention to provide a dishwasher with means for soaking dishware and utensils when they are placed in the dishwasher prior to a washing cycle.

It is also an object of this invention to provide a washing apparatus with a first timer for controlling a normal washing cycle and an auxiliary timer for controlling a prewashing cycle.

A further object of this invention is to provide a timer for a washing apparatus with a first portion adapted to control said apparatus in a normal operating function and a second portion adapted to control said apparatus in an auxiliary function.

A still further object of this invention is the provision in the timer of the last mentioned object wherein said first and second timer portions may be either sequentially operated in continuous fashion or independently operated.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 is a generally schematic representation of a dishwasher suitable for use with this invention.

FIGURE 2 is a schematic wiring diagram for controlling a dishwasher in accordance with the teachings of this invention.

FIGURE 3 is a fragmentary elevational view of the dishwasher control panel for this invention.

FIGURE 4 shows a modified arrangement for the control knob shown in FIGURE 3 where a single timer is utilized.

In accordance with this invention and with reference to FIGURE 1, a dishwasher 10 is shown having a dishwashing chamber 12. The chamber 12 is formed with a front access opening 14 closed by a horizontally pivotal door 16. At the bottom of the chamber 12 a sump 18 is provided which leads to a pump 20 powered by any conventional motor 22. A heater 19 is supported within the sump 18 so that the heater may be selectively inundated and energized for heating the liquid in the sump. For admitting water to the sump 18, a water inlet line 24 has interposed therein a solenoid actuated water inlet valve 26 which, in turn, is connected to any convenient domestic hot water supply. Also within the chamber 12

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and disposed in an upper portion thereof is a rotatably mounted spray tube 28. A water conduit 30 is connected at its upper end to the spray tube 28 and serves to transmit water impelled by the pump 20 from the sump 18.

Intermediate the pump 20 and the spray tube 28 is a solenoid actuated, normally closed drain valve 32 which may be selectively energized to direct water either to the spray tube conduit 30 or to a drain line 34. Support baskets 36 and 38 are positioned within the dishwashing chamber 12 in a manner to subject the utensils or dishes to the most effective spray from the rotating tube 28. A sequentially operated dishwashing control timer 40 may be provided within the door 16 along with any suitable dispenser, such as 42. In accordance with one aspect of this invention, a presoak selector button or switch 54 may be placed in close proximity to the timer 40 and arranged to bypass the dishwashing timer in initiating an auxiliary presoak timer 45. For opening and closing the door 16, any suitable handle 46 may be included. For the purpose of this invention, the above description is believed to be adequate. Additional structural details of a dishwasher suitable for use with this invention may be found in the patent to Abresch et al., 2,808,063, issued October 1, 1957.

Referring now to FIGURE 3, the simplified control arrangement of the dishwasher here set forth is best seen. At one corner of the dishwasher door 16, the controls may consist of an operating knob or timer dial 48 connected directly with a primary timer motor 50 for the wash timer 40. A start button switch 52 is utilized for initiating the normal washing cycle and a presoak switch lever or button 54 is operatively connected to the presoak cycle position 56 or an open wash cycle position 58.

In a conventional dishwashing operation, the control circuit of FIGURE 2 operates the various components in a conventional manner. For additional details on the cycle of normal operation, reference may be had to the aforementioned patent to Abresch et al., 2,808,063. To accomplish a normal dishwashing cycle, the dishwasher 10 is provided with a control circuit which includes the fill solenoid 26, a solenoid 43 to actuate the dispenser 42, the heater 19 which is effective generally during the drying cycle but which may be energized at other times to heat any liquid retained in the sump 18, a drain valve solenoid 32 and the motor 22 for driving the pump 20. In addition, the circuit may be provided with a pilot light 60 to indicate when the machine is in operation and a holding circuit for starting the normal wash cycle which includes a start solenoid 62, a solenoid operated start switch 64 and the manually operated switch button 52. As a still further refinement, the circuit may include a door switch 66 which is closed simultaneously with the closing of dishwasher door 16.

Thus, the normal washing operation is initiated by closing the switch 52. Current then flows from L1, line 68, door switch 66, line 69, line 70, the start solenoid 62, line 72, line 74, primary or wash timer motor 50 to L2. With the energization of the timer motor 50, the timer actuated switches are selectively manipulated. For instance, a timer switch 76 will be closed briefly to cause the energization of the normally closed drain valve solenoid 32. This will prevent water from collecting in the sump 18 while the dishwashing chamber 12 is being flushed out. At the same time, a timer switch 78 engages a contact 80 to energize the solenoid 26 for opening the inlet water valve. Generally speaking the timer 40 is designed to energize the drain valve solenoid 32 until the cold water standing in the pipes between the water heater and the dishwasher has been flushed to drain. Also, at about the same time, the timer switch 82 is closed to ener-

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gize the pump motor 22 and water is thereby circulated from the sump 18 through conduit 30 to the spray tube 28. To facilitate the washing cycle, the timer switch 34 is next closed to energize the dispenser solenoid 43 to admit any suitable washing agent from the dispenser 42 to the dishwashing chamber 12. Water will continue to be circulated for a predetermined period in accordance with the design of timer 40 until the wash spray portion of the wash cycle is completed. The timer switch 76 will then be closed sequentially to energize the drain valve solenoid 32 and permit the soiled water to be removed to drain line 34. The rinsing operation will be initiated after the soiled water is drained and the drain valve 32 again returns to its normally closed position to permit the sump retention of clean rinse water admitted through the again energized inlet valve 26. During the rinsing operation, water will be circulated as it was during wash. It should be realized that one or more wash cycles or one or more rinse cycles may be provided simply by so designing the timer 40 for repetitive action of the timer switches involved. At the conclusion of the rinse cycle, the timer switch 76 is again closed to permit the draining of the rinse water and timer switch 78 is moved to engage a contact 88 which will energize the heater 19. The heater 19 will remain energized for a period sufficiently long to dry the dishware or utensils held within the baskets 36 and 38. Of course, the heater 19 may be energized intermittently throughout the dishwashing cycle to maintain satisfactory water temperatures within the washing chamber sump 18.

The foregoing sets forth a conventional dishwashing cycle which will be effective to clean dishes where they are washed immediately following their loading into the dishwashing chamber 12. Where, however, soiled dishware and utensils are placed in the dishwasher 10 throughout an extended period, those dishes first placed within the dishwasher tend to have the soil become caked thereon. This caked soil is more difficult to remove than when the soil is still soft. Thus, with prior art dishwashers, which are progressively loaded in the just described manner, the wash results are variable depending on how soon the dishes were washed after being placed within the dishwasher.

Such varying degrees of cleanliness in a progressively loaded dishwasher are believed overcome by the teachings of this invention wherein a presoaking operation is added to the conventional dishwasher 10. The operation of this presoak cycle permits the user to expose the soiled dishware to a spray of water or washing solution immediately after loading the dishes into the machine. This initial scrubbing or presoaking operation will retain the soil in a softened condition until the machine is sufficiently loaded to warrant a normal wash operation. To effect this improved system, an auxiliary or presoak timer 45 is provided which may override the control operations of the normal wash cycle timer 40. The auxiliary timer 45 includes an auxiliary timer motor 92 which selectively positions a timer switch 94 for controlling the dishwasher drain solenoid 32, a timer switch 96 for controlling the pump motor 22, a timer switch 98 for controlling the dispenser solenoid 43 and a timer switch 100 for controlling the fill valve solenoid 26. Each time that a quantity of dishes is placed in the dishwasher, the door 16 is closed and the switch knob 54 moved to the presoak position. This will close the switch 44 within the auxiliary timer 90 to energize the auxiliary timer motor 92. This arrangement will effectively bypass the control which is imposed by the primary timer 40 during a normal wash cycle. Initially, current will flow from L1 through line 68, the door switch 66, line 102 to the auxiliary timer cam actuated switches 94, 96, 98 and 100.

For the purposes of this invention, a presoak cycle could include the closing of switches 96 and 100 to start the presoak cycle with the admission of hot water to the dishwasher sump 18. After the desired amount of water has been admitted, the timer switch 100 will open to

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energize the fill valve solenoid 26. At approximately the same time the dispenser solenoid 43 may be energized with the closure of the auxiliary timer switch 98. When the detergent has been dispensed, the switch 98 will be opened.

Throughout a time period predetermined by the closure of switch 96, the solution of warm or hot water and washing agent may be circulated by the pump 20 to the spray tube 28. The surfaces of the utensils being supported in baskets 36 and 38 will be thoroughly exposed to the solvent and softening action of this solution. This period may last for three or four minutes but is not believed critical in accordance with the teachings of this invention. At the conclusion of the water circulation period timer switch 96 will open to stop the pump and timer switch 94 will close to open the drain valve 32. The pre-soak cycle will terminate when the auxiliary timer motor 92 moves the switch 44 to open or "Wash" position to stop the timer motor 92, thereby returning primary control of the dishwasher 10 to the primary timer 40. After the presoaking operation, the solvent action of the washing solution sprayed over the dishes will continue and, thus, the soiled dishes will remain in an easily cleanable condition until the normal dishwashing cycle is started. Note that the heater 19 is not energized after the dishes are soaked with washing solution. This allows the dissolving action to continue after the presoak cycle has been concluded. Note also that the presoak cycle may be repeated as often as dishes and utensils are placed in the dishwasher 10 in advance of a normal dishwashing cycle.

This invention also contemplates retaining the soiled washing solution within the sump 18 of the dishwashing chamber 12 for a plurality of presoak cycles until the normal dishwashing cycle is initiated. In this way it would not be necessary to supply individual detergent for each progressive loading and presoak cycle of the dishwasher. This modification could be accomplished simply by programming several presoak cycles on the 360° periphery of the auxiliary timer cams for operating the timer switches 96, 98 and 100 in FIGURE 2 and by eliminating the function of the drain timer switch 94 when the presoak cycles terminate. In this situation, only the first presoak cycle would include a water fill period. The following cycles programmed on the cam would not close switch 100 to the fill valve. Then when the normal dishwashing cycle is energized by flipping the lever 54 to "Wash," turning the knob or dial 48 of timer 40 to the "Wash" position and pressing the start button 52, the soiled washing solution could drain from the sump 18 during that brief period referred to hereinbefore for the washing cycle in which the drain solenoid valve 32 is held open to allow hot water to reach the dishwasher 10 through the supply 24. The auxiliary timer cams would also be returned in any suitable manner to set up the cams for the first presoak cycle in which the fill valve is operative. Where the presoak or detergent solution is retained in the sump 18 for a plurality of presoak cycles, it may be desirable to include a timer switch 93 in the auxiliary timer 45 which could selectively energize the submerged heater 19. Thus, the detergent solution in sump 18 could be heated as the first timed step in each presoak cycle.

Another modification of this invention would include a single timer having one portion thereof to perform the function of the normal wash cycle timer 40 and another portion thereof for the presoak functions of auxiliary timer 45. For this purpose a single knob 106 (FIGURE 4) could be utilized in which the presoak portion 108 precedes the wash, rinse and dry portions of the cycle. In this design the initiation of the presoak cycle would be terminated at 110 prior to the initiation of the wash cycle. Thus, the user could select either the presoak by initiating the operation at 112 or the normal washing cycle by setting the knob 106 at the wash cycle start point 111. It is believed well within the skill of the art to pro-

vide the necessary timer switches to accomplish this last combination timer arrangement.

While the embodiments of the present invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A dishwasher comprising, a dishwashing chamber having a sump, means for admitting water to said chamber, means for draining water from said chamber, water distributing means connected to said sump for circulating said water in a wash period and a rinse period, washing agent dispensing means associated with said chamber, means for heating said chamber and said water, a first timer means for controlling said water distributing means, said water admitting means, said water draining means, said dispensing means, and said heating means through a washing cycle having sequentially an initial drain period, a fill period, a dispensing period, a wash period, a rinse period, a final drain period, and a drying period, and a second timer means independent of and in parallel with said first timer means for overriding said first timer means to control said water admitting means, said dispensing means, and said water distributing means to effect a plurality of presoak cycles separately actuatable from each other and separately actuatable from said washing cycle and having a fill period, a dispensing period and a plurality of separate water distribution periods, whereby the same presoak water may be distributed over the dishes periodically as they are loaded into the dishwasher.

2. A dishwasher comprising, a dishwashing chamber, means for admitting water to said chamber, means for distributing said water for washing and rinsing, washing agent dispensing means associated with said chamber, means for heating in said chamber, a first timer means for controlling said distributing means, said admitting means, said dispensing means, and said heating means through a washing cycle having a fill period, a dispensing period, a wash period, a rinse period and a drying period, and a second timer means independent of said first timer means for controlling said admitting means, said dispensing means, and said distributing means to effect a plurality of separately actuatable presoak cycles having a fill period, a dispensing period and a plurality of water distribution periods.

3. In combination with a dishwasher adapted for progressive loading and having a water fill valve, a drain valve and means to presoak dishes by distributing water after each loading while said dishes are stored therein prior to washing, a primary timer means for controlling said dishwasher in a complete dishwashing cycle, and an auxiliary timer for controlling said dishwasher in a plurality of presoak cycles and for overriding said primary timer means, said auxiliary timer including means to actuate said fill valve at the start of said plurality of said presoak cycles to supply an amount of water to said dishwasher, said drain valve being effective to retain said amount of water in said dishwasher for the duration of said plurality of said presoak cycles, and said auxiliary timer including means to actuate said presoak means in a separate water distribution operation during each of said plurality of said presoak cycles.

4. A control system for a dishwashing apparatus having a drain valve, a motor operated pump, a heater, a fill valve and a washing agent dispenser comprising, a

first sequentially operated timer means for controlling said drain valve, said motor operated pump, said heater, said fill valve and said dispenser during a wash operation, and an independently operated sequentially actuated second timer means for controlling said apparatus in a plurality of successive, separately actuatable presoak cycles, said second timer means including means to actuate said motor actuated pump in each of said presoak cycles and said fill valve at the start of said presoak cycles in a repeatable dish soaking operation prior to said washing operation.

5. A dishwasher comprising, a dishwashing chamber, means for admitting water to said chamber, means for distributing said water for washing and rinsing, means for heating in said chamber, a first timer means for controlling said distributing means, said admitting means and said heating means through a washing cycle having a fill period, a wash period, a rinse period and a drying period, and a second timer means independent of said first timer means for controlling said admitting means and said distributing means to effect a plurality of separately actuatable presoak cycles having a fill period and a plurality of water distribution periods.

6. In combination with an apparatus for washing dishes or the like and adapted for progressive loading of said dishes or the like, said apparatus having a liquid fill means, a drain means and means for distributing said fluid after each loading to presoak said dishes or the like while said dishes or the like are stored therein prior to washing, a timer arrangement including a first timer portion having timing means for controlling said apparatus in a complete washing cycle and a second timer portion for controlling said apparatus in a plurality of separately actuatable presoak cycles, said second timer portion including timing means to actuate said liquid fill means at the start of said plurality of presoak cycles to supply an amount of liquid to said apparatus, said drain means actuated by one of said timing means to retain said amount of liquid in said apparatus for the duration of said plurality of presoak cycles, and said second timer portion including timing means to actuate said distributing means in a separate fluid distribution operation during each of said plurality of presoak cycles.

7. The combination of claim 6 wherein said apparatus includes a heating means in heat transfer relationship to the retained amount of liquid and said second timer portion includes timing means to actuate said heating means to heat said retained amount of liquid during some of said plurality of presoak cycles.

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