

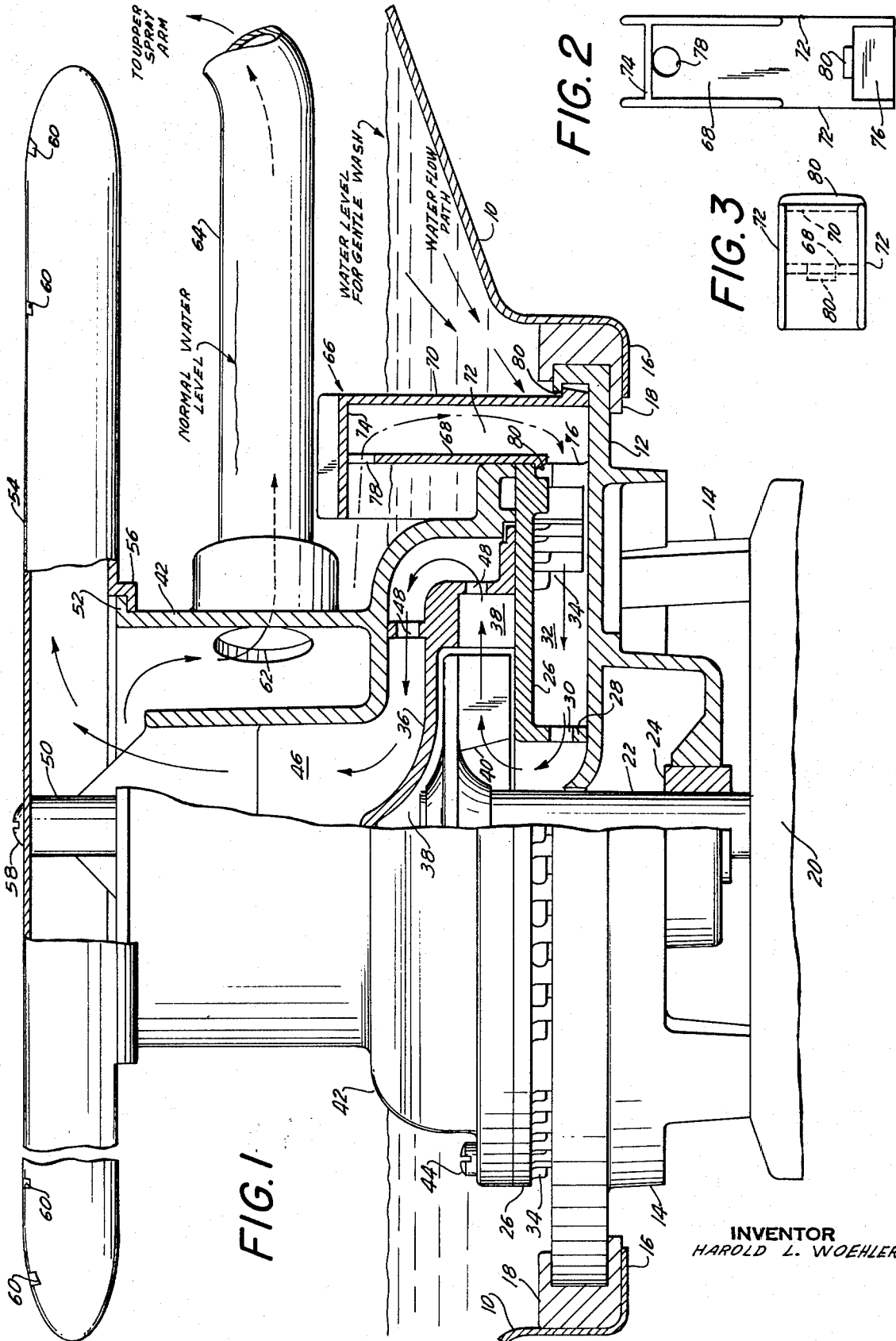
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GENTLE WASH MECHANISM FOR A DISHWASHER

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GENTLE WASH MECHANISM FOR A DISHWASHER

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6 Claims

ABSTRACT OF THE DISCLOSURE

A conduit member extends in an upwardly direction from an inlet of a water pump at the bottom of a dishwasher tank. The conduit has an opening formed there-through having a lower end in communication with the pump inlet and an upper end positioned at a specified level above the bottom of the tank. The pump draws wash water from the wash tank and delivers it under pressure to a spray arm where it is sprayed onto dishes. Water level controls are provided so that for normal washing cycles the water level within the tank is above the upper end of the standpipe; however, for a gentle wash cycle, the water level is maintained below the upper end of the conduit. During a gentle wash cycle, air is aspirated into the pump inlet causing aeration, thereby reducing pump efficiency and the velocity of water leaving the spray arm.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to a dishwasher having a gentle wash cycle that is controlled by varying the water level in the dishwasher tank.

Description of the prior art

Heretofore, dishwashers having gentle wash cycles utilized one of three standard methods of controlling the gentle wash cycle. Firstly, some of the prior art dishwashers utilized a motor speed control to reduce pump speed and thereby reduce the pump pressure and the velocity of the water leaving the spray arm. Motor speed controls are very expensive and made this method of initiating a gentle wash cycle undesirable because of the resulting high cost of the dishwasher. Secondly, some of the prior art devices initiated a gentle wash cycle by controlling the level of the wash water in the dishwasher tank so that the water partially closed the pump intake opening, which was disposed at one particular level. This method required precise control of the water level because too little water would cause pump surging and too much water would increase the pump pressure resulting in a washer action similar to a normal wash cycle. Pump surging was undesirable because it caused the spray arm rotation to be intermittent resulting in improperly washed dishes. Thirdly, some of the prior art devices selectively introduced air into the pump intake thereby reducing pump efficiency and water velocity. This method required the use of an air inlet tube connected from the pump intake to a position on the dishwasher above the water level where a separate control was used to open the air inlet tube and initiate the gentle wash cycle.

Thus, the first and third methods used in the prior art to initiate a gentle wash cycle required additional components thereby increasing the cost and complexity of the dishwasher and reducing its maintainability and reliability. The second method used in the prior art did not provide satisfactory results and its use was quickly discontinued.

SUMMARY OF THE INVENTION

The present invention contemplates a dishwasher having a gentle wash cycle that is initiated by controlling the water level within the dishwasher tank. One method of controlling the water level contemplates a dishwasher timer which controls a water inlet valve. When a gentle wash cycle is desired, the water fill period of a wash or rinse cycle is reduced by a predetermined time. The dishwasher has both upper and lower reaction type spray arms and a motor driven pump for drawing water from the bottom of the dishwasher tank and providing pressurized water to the spray arms where the water is expelled through orifices causing the spray arms to rotate. An upstanding air intake member is mounted to the bottom of the dishwasher tank and is associated with the pump inlet. The air intake member has an opening formed therethrough with a lower end in communication with the pump inlet and an upper end disposed at a predetermined level above the bottom of the dishwasher tank.

For normal wash cycles, the water level within the dishwasher tank is controlled so as to be substantially above the opening in the air intake member so that the pump operates at maximum efficiency and the wash water leaves the spray arm at maximum velocity. When a gentle wash cycle is to be initiated, the dishwasher timer is set so that the water fill periods are abbreviated causing the water level to be below the upper opening in the air intake member. When the pump is activated, air is aspirated through the opening in the air intake member and said air mixes with the water causing aeration and reduced pump efficiency. The reduced pump efficiency causes a lower pump outlet pressure and reduced velocity of the water leaving the spray arms thereby initiating a gentle action cycle.

The main objective of the present invention is to provide for automatic initiation of a gentle action cycle without the use of additional controls and valves.

Another objective of the present invention is to provide a gentle wash cycle in a dishwasher that is initiated by controlling the water level within the dishwasher tank.

Another objective of the present invention is to provide a water level controlled dishwasher gentle action cycle that is not subject to surging as were water level controlled devices of the prior art.

The foregoing objectives and advantages of the invention will appear more fully hereinafter from a consideration of the detailed description which follows, taken together with the accompanying drawing, wherein one embodiment of the invention is illustrated by way of example. It is to be expressly understood, however, that the drawing is for illustrative purposes only and is not to be considered as defining the limits of the invention.

DESCRIPTION OF THE DRAWING

FIG. 1 is a cut away elevational view, shown partially in section, of a portion of a dishwasher constructed in accordance with the present invention.

FIG. 2 is an elevational view of an air intake member utilized in FIG. 1.

FIG. 3 is a plan view of the air intake member shown in FIG. 2.

DESCRIPTION OF THE INVENTION

Referring to FIG. 1, there is shown the bottom 10 of a dishwasher tank that slopes towards the center and has an opening 12 formed in the lowest portion. A motor support member 14 partially extends through opening 12 and is supported by an edge 16 of bottom 10. A gasket 18 forms a seal between the motor support member and the bottom of the dishwasher tank.

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A motor 20 having a shaft 22 is mounted to motor support member 14 in such a manner that the shaft extends through an opening in the motor support member. A seal 24 is disposed between the shaft and the motor support member to prevent leakage of wash water between the shaft and the support member.

A lower pump housing 26 in the form of a circular plate has an opening formed in the center thereof and a downwardly depending sleeve 28 formed about the center opening. The housing is positioned around shaft 22 and the sleeve rests on the top of motor support member 14. The plate portion of lower pump housing 26 is spaced from motor support member 14 thereby defining a chamber 32 that is in communication with the dishwasher tank through an inlet particle screen 34 which is disposed about the periphery of the lower pump housing 26. Sleeve 28 has openings 30 formed therein for communicating chamber 32 with the center opening of the lower pump housing. An inner pump housing 36 is positioned above the lower pump housing 26 and has a hollow interior defining a chamber 38. An impeller 40 is mounted on shaft 22 and is positioned in chamber 38. An upper pump housing 42 is positioned above inner pump housing 36 and the lower pump housing 26 and is secured in place by screws 44 which extend through the lower pump housing and into the motor support member 14 for holding an entire pump assembly in place. The upper pump housing 42 is spaced from the inner pump housing 36 to define conduits 46. The inner pump housing 36 has openings 48 for communicating chamber 38 with conduits 46.

Upper pump housing 42 has an upstanding post 50 formed in the center and an outwardly extending flange 52 formed around the periphery of an upper edge. A hollow spray arm 54 has an opening in the lower surface thereof and a bearing member 56 formed about the periphery of the opening. Bearing member 56 is adapted to engage the lower surface of the outwardly extending flange 52 to provide a smooth bearing surface for the lower spray arm when the spray arm is pressurized. The spray arm is also secured to the upper pump housing by means of a screw 58 which extends through the top of the spray arm and into the upstanding post 50. Spray arm 54 has orifices 60 formed and positioned in a manner well known in the art for communicating the hollow interior of the spray arm with the dishwasher tank.

The upper pump housing also has an opening 62 formed in a side wall thereof said opening being in communication with a tube 64 for providing wash water to an upper spray arm which is not shown in the figure.

Thus far what has been described is a standard type of construction for a dishwasher wherein motor 20 drives impeller 40 through shaft 22 so that wash water is drawn from the bottom of the dishwasher tank through the inlet particle screen 34 and on into conduits 46 for delivery to the upper and lower spray arms.

An air intake member 66 is positioned adjacent the pump inlet particle screen and is secured between the lower pump housing 26 and the motor support member 14 by a snap fit. Air intake member 66 is formed of a plastic material such as Celcon M 90 which has some degree of flexibility so that it may be snapped in place. Air intake member 66 is essentially a hollow upstanding member having rectangular cross section. The member is defined by a front wall 68, a rear wall 70, side walls 72 and a top 74. The bottom of member 66 is open and the front wall 68 is shorter than the other three walls so as to provide an opening 76 communicating the hollow interior of member 66 with the pump inlet. Wall 68 also has a circular opening 78 formed in the uppermost portion thereof at a level above the level of the pump inlet. Walls 68 and 70 have outwardly extending lips 80 for engaging the lower pump housing and the motor support member. The side walls 72 extend above top 74 and forward of front wall 68 to form baffles and prevent excessive water agitation around opening 78. Top 74 also extends forward of front wall 68

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to provide support for the extended portions of side walls 72 and to prevent wash water dripping from the dishes from being drawn into opening 78.

In normal operation, the dishwasher has a wash water inlet valve that is controlled by a timer to allow a specified amount of wash water to enter the dishwasher tank. The normal water level is shown in FIG. 1 and is substantially above the top of the air intake member 66 so that when the pump is operating water is drawn through the inlet particle screen and also through opening 78 in the air intake member thereby providing for maximum pump efficiency. When the pump is operating at maximum efficiency, the pressure of the wash water entering spray arm 54 is at a maximum and the water leaving orifices 60 is also at a maximum velocity providing for a normal wash action.

When certain types of delicate dishes are to be washed and a gentle washing action is desirable, the dishwasher timer is set for shorter water fill periods so that the water level is below openings 78 as indicated in FIG. 1. When the water level is below opening 78, air is aspirated through opening 78 and the hollow interior of the intake member and is then mixed with the wash water being drawn into the pump. This mixture causes aeration and results in greatly reduced pump efficiency thereby lowering the output pressure and the velocity of the water leaving orifices 60. Thus, by controlling the water level in the dishwasher tank, a gentle wash action can be provided for delicate dishes.

The invention has been described with a water level control comprising a timer for controlling a water inlet valve. There are many other ways of controlling the water level all of which are familiar to the art and therefore the invention should not be limited to a timer control. A controlled discharge valve could be used to reduce the amount of water to a desired level. Float valves could also be used to shut off inlet water when a particular level is reached.

Pump surging is prevented by facing opening 78 toward the pump housing and by providing baffles formed by the forwardly extended sides 72 of air intake member 66. The baffles prevent turbulence adjacent opening 78 and reduce the tendency of water to splash into opening 78 causing surges in pump efficiency which results in an erratic washing action and may cause damage to the delicate dishes when they are sprayed with the high velocity water.

The present invention does not require the use of additional controls or valves to initiate a gentle wash cycle. Instead, the dishwasher timer is merely set to provide a different fill level than for a normal wash cycle. With the mechanism of the present invention, the water level does not have to be precisely controlled because it is only required that for normal wash cycles the water be substantially above the air inlet hole and for gentle wash cycles the water level must be below the inlet hole. Thus, the present invention eliminates the tendency towards surging that was experienced with many of the prior art dishwashers having gentle wash actions that were initiated by water level control. The gentle action wash mechanism taught by the present invention is more reliable, maintainable and less expensive because of the elimination of the need for additional controls and valves to initiate the gentle wash cycle.

What is claimed is:

1. A dishwasher, comprising:

a wash tank;

water inlet means for providing water to the tank;

a pump having a water inlet and outlet, the water inlet being positioned at a first level in the wash tank for receiving water;

a spray arm having an inlet in communication with the pump outlet and output orifices for spraying water delivered by the pump;

upstanding air intake member having an opening formed therethrough, a lower end of which is positioned adja-

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cent to and in communication with the pump inlet and an upper end of which is positioned at a second level above the first level in the wash tank; and means for selectively controlling the water level in the wash tank so that the water level is above the second level when normal wash action is desired and between the first and second levels when gentle wash action is desired whereby air is aspirated into the pump inlet for reducing pump efficiency and the velocity of the wash water leaving the spray arm.

2. A dishwasher as described in claim 1, wherein the means for selectively controlling the water level is a timer for controlling the water inlet means and for varying the period during which water is supplied to the wash tank.

3. A dishwasher as described in claim 1, wherein the air intake member comprises a hollow upstanding member having the upper end of the opening formed in the side and positioned adjacent the top of the member; and

baffle means positioned adjacent the upper end of the opening for minimizing water turbulence adjacent the opening so that wash water is not drawn into the opening during the gentle wash action.

4. A dishwasher as described in claim 3, additionally including a top that extends above the upper end of the opening to prevent wash water from dripping into the upper end of the opening.

5. In a dishwasher of the type having a pump including an inlet for drawing water into the pump and an outlet for providing pressurized water to a spray arm which establishes a spray of water to clean the dishes, a gentle wash mechanism, comprising:

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a hollow upstanding member having a lower opening positioned adjacent to and in communication with the pump inlet and an upper opening positioned at a specified level above the pump inlet; and

water level control means for controlling the amount of water so that the water level is above the upper opening in the member for normal wash cycles and the water level is between the upper and lower openings for gentle wash cycles, whereby air is aspirated into the pump inlet causing reduced pump efficiency and velocity of the spray water during a gentle wash cycle.

6. A gentle wash mechanism as described in claim 5, wherein the upstanding member includes baffle means adjacent the upper opening for reducing water turbulence adjacent the opening and thereby preventing water from splashing into the opening.

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