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(54) **DISHWASHER WITH SINGLE PUMP AND
FILTER UNIT FOR MULTIPLE
COMPARTMENTS**

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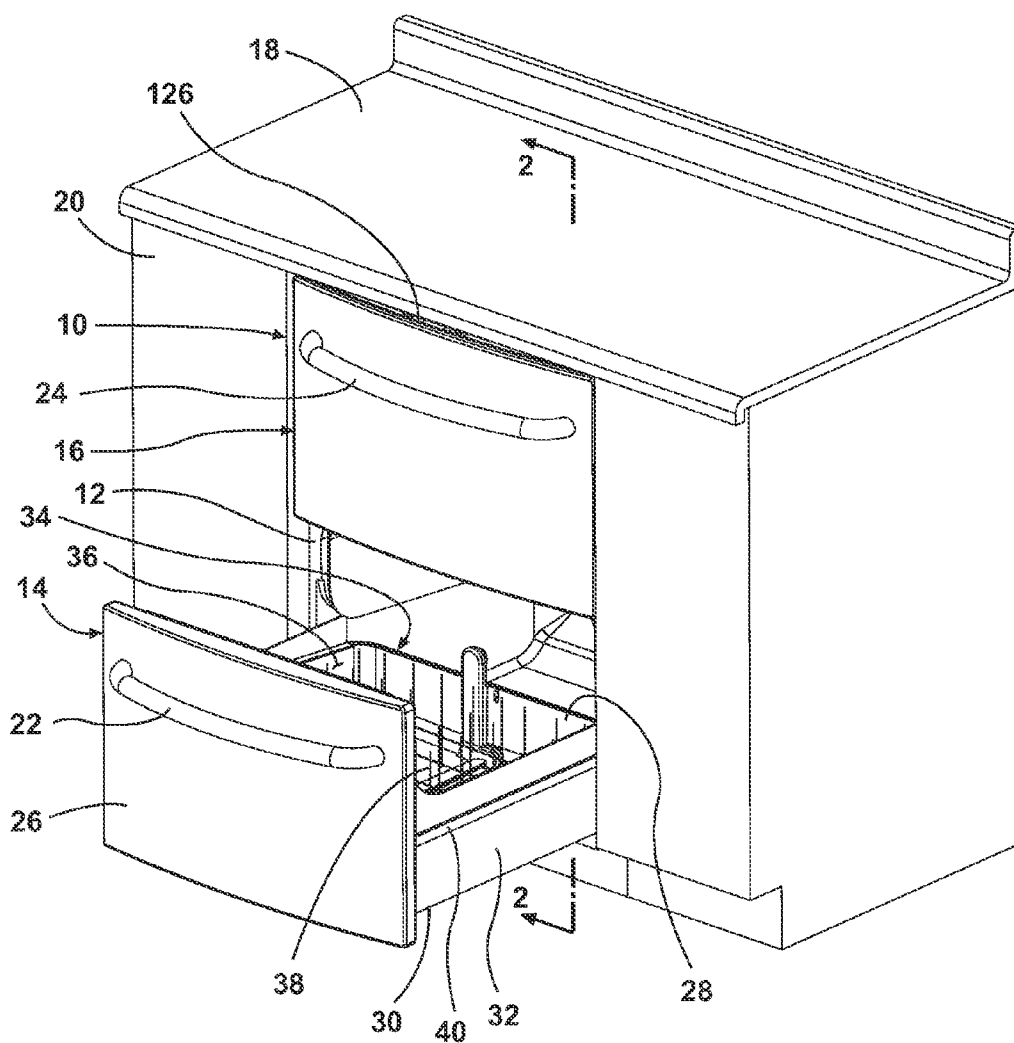
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(57) **ABSTRACT**

A dishwasher with multiple, physically separate treating chambers includes a pump and filter unit and a system for coupling the separate treating chambers to the pump and filter unit.

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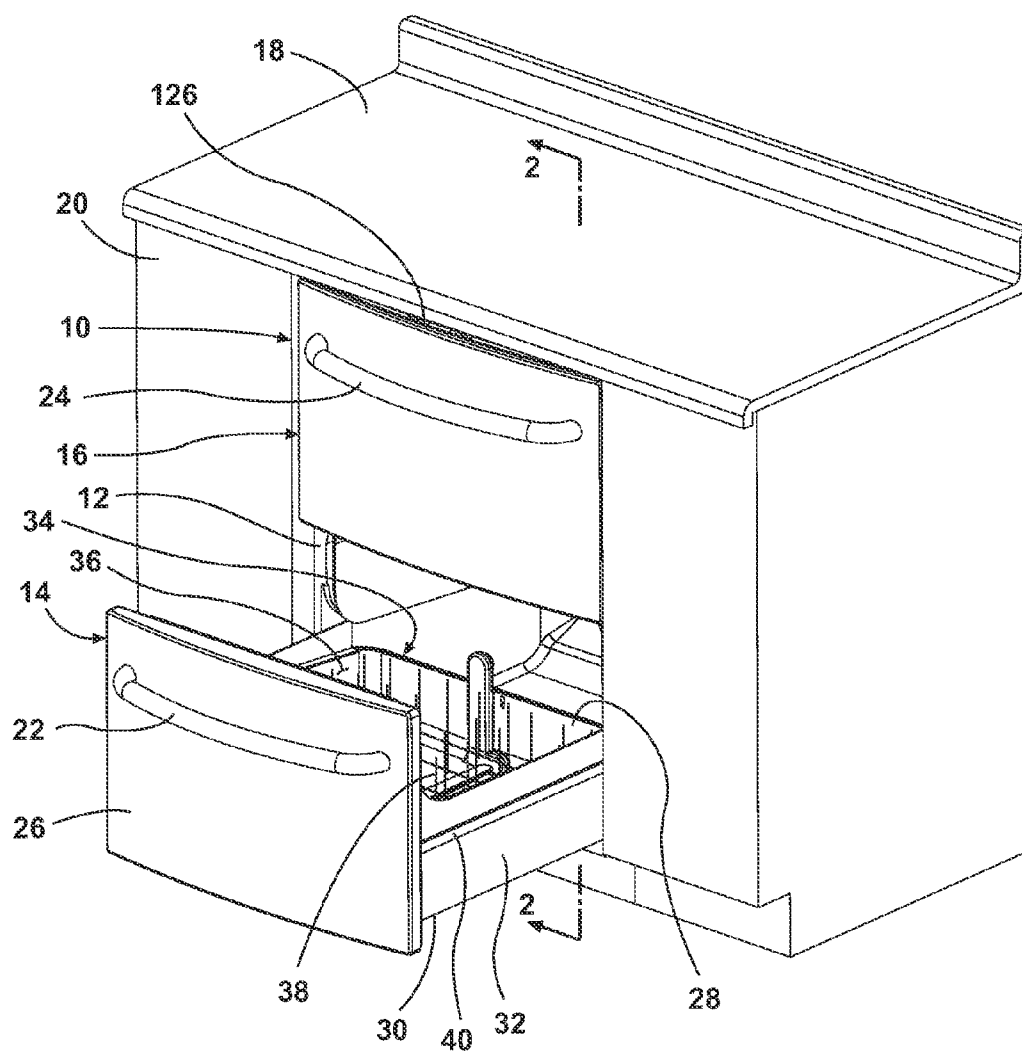


Fig. 1

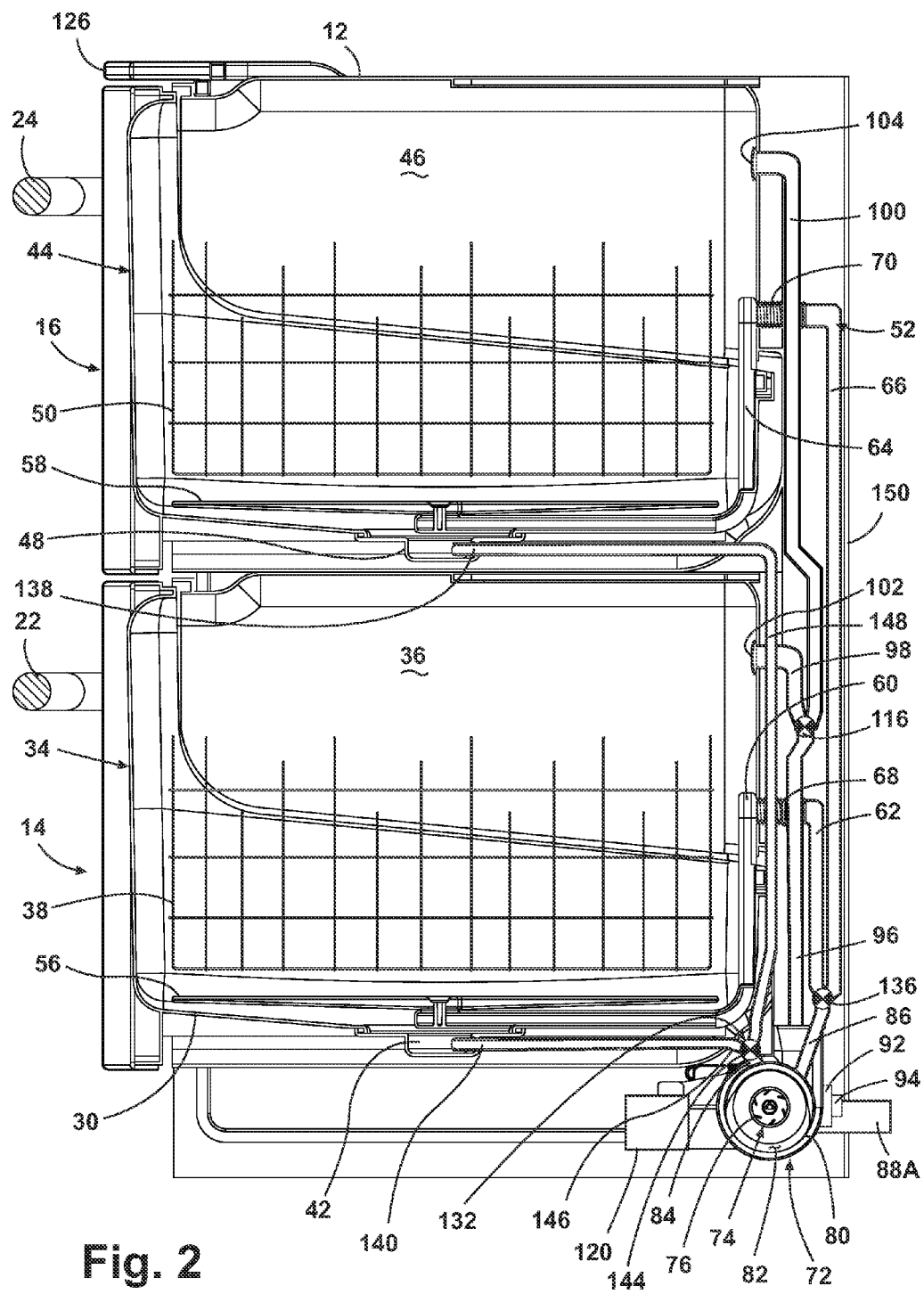


Fig. 2

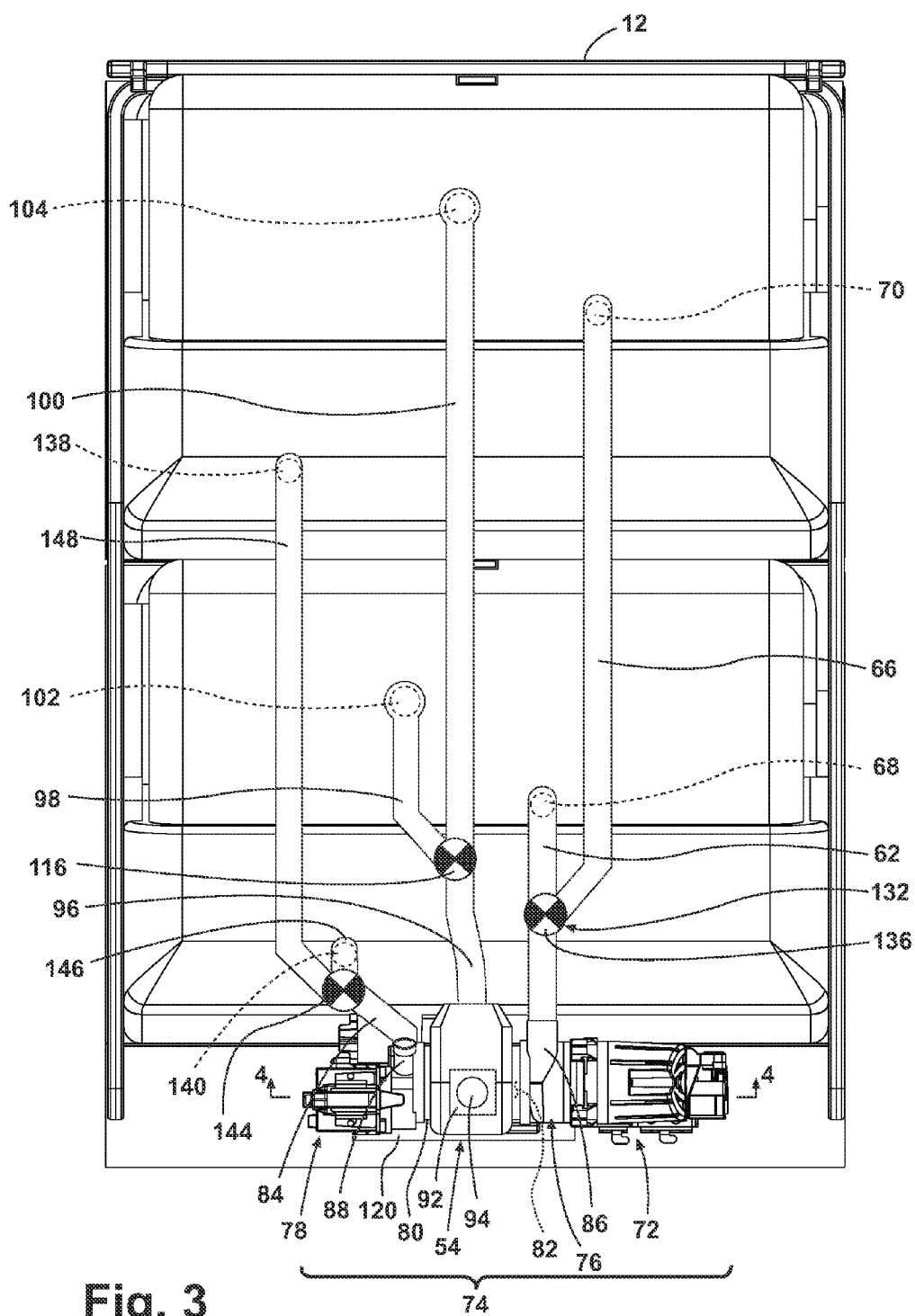


Fig. 3

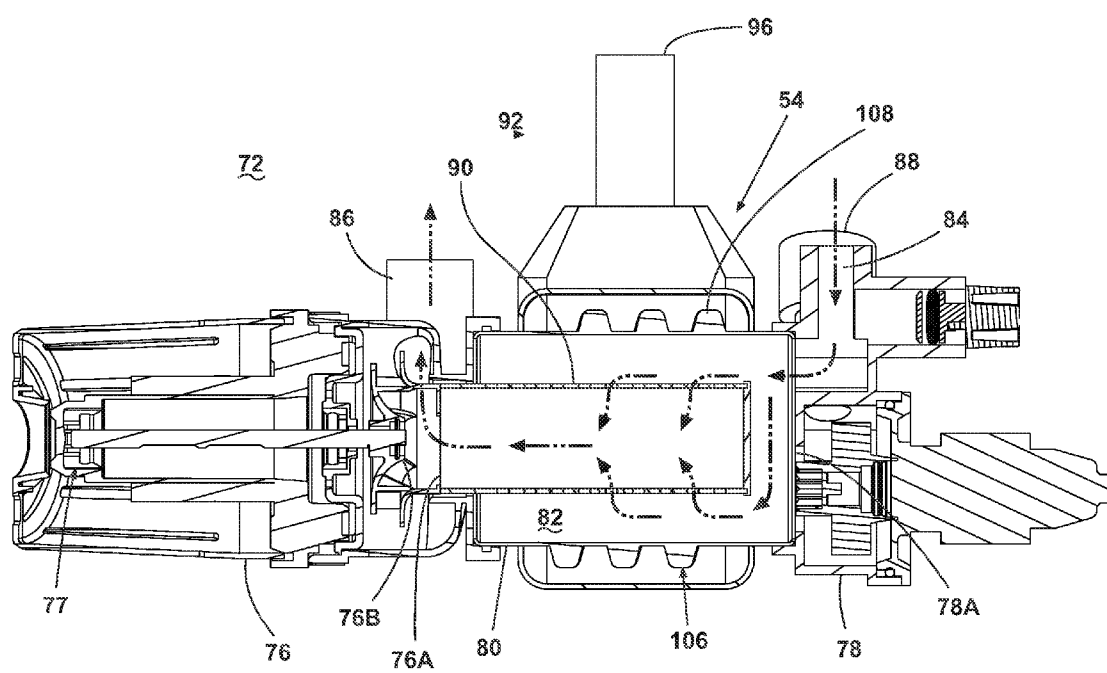


Fig. 4

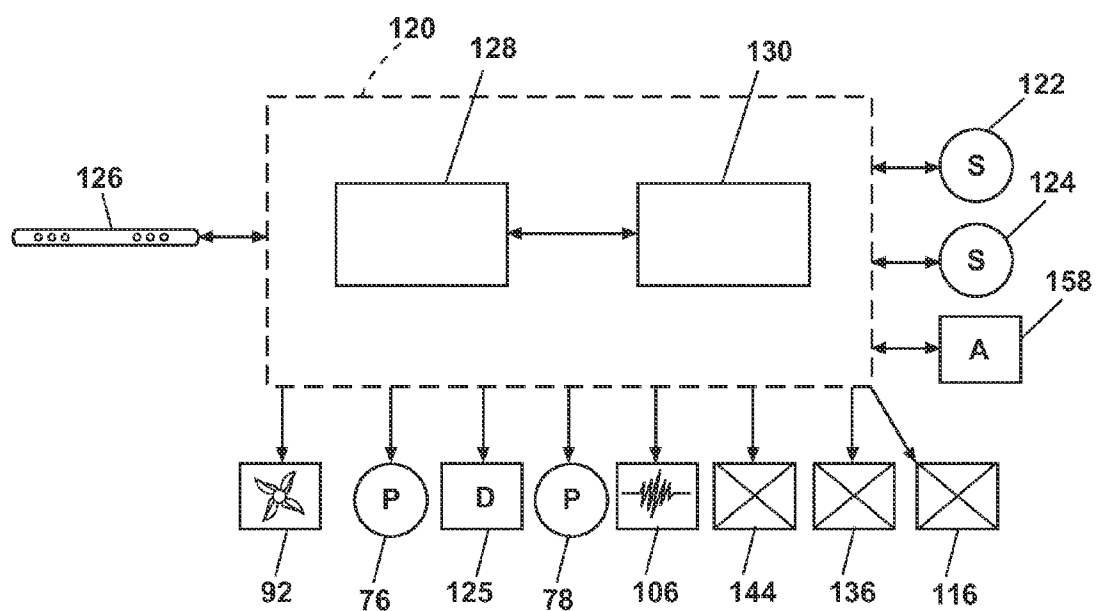


Fig. 5

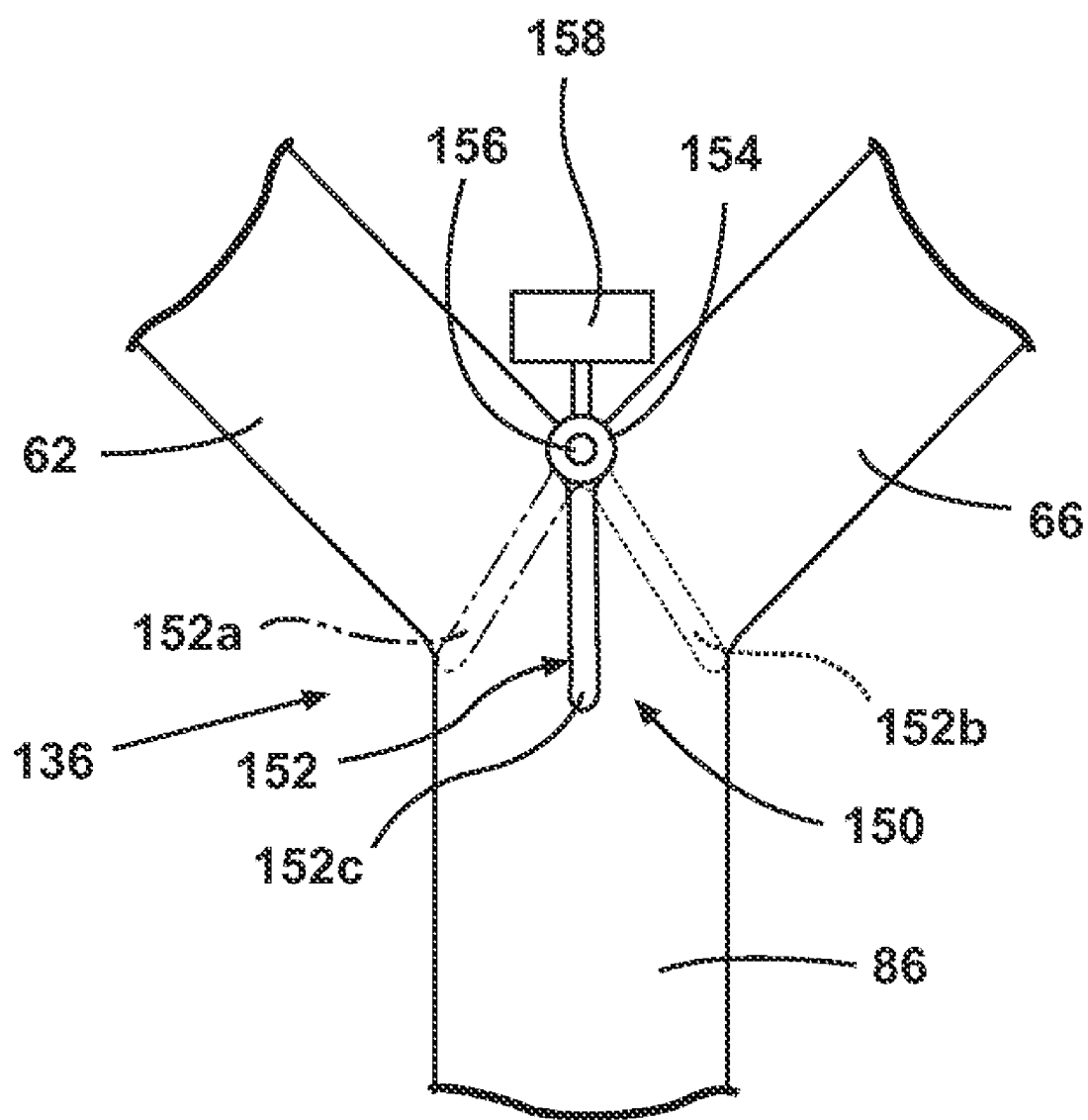


Fig. 6

DISHWASHER WITH SINGLE PUMP AND FILTER UNIT FOR MULTIPLE COMPARTMENTS

BACKGROUND OF THE INVENTION

[0001] Dishwashers may include multiple compartments in the form of multiple drawers or pull-out compartments slidably mounted in a chassis. Each compartment may include a tub at least partially defining a treating chamber. Typically, a utensil rack and liquid sprayers are provided in each treating chamber to support and apply liquid to the utensils, respectively, during a treating cycle of operation. A liquid system for supplying liquid to the sprayers is provided within the chassis and coupled to the sprayers. In most multi-compartment dishwashers, a cycle of operation may be performed in one or both of the treating chambers to wash utensils contained therein.

SUMMARY OF THE INVENTION

[0002] The invention relates to a dishwasher having multiple physically separate treating chambers, a common pump and filter unit, and a liquid diverter system for selectively fluidly coupling the separate treating chambers to the pump and filter unit to selectively control liquid movement within and between the separate treating chambers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] In the drawings:

[0004] FIG. 1 is a perspective view of a multi-compartment dishwasher in accordance with the present invention having an upper compartment in a closed position and a lower compartment in an open position.

[0005] FIG. 2 is a cross-sectional view through line 2-2 of FIG. 1, with the upper and lower compartments both shown in the closed position.

[0006] FIG. 3 is a rear view of the dishwasher of FIG. 1 with the rear wall removed.

[0007] FIG. 4 is a cross-sectional view through line 4-4 of FIG. 3.

[0008] FIG. 5 is a schematic view of a controller of the dishwasher of FIG. 1.

[0009] FIG. 6 is a schematic view of an embodiment of a diverter for use in the dishwasher of FIG. 1.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0010] FIG. 1 is a perspective view of a multi-compartment dishwasher 10 according to an embodiment of the invention. Although the actual dishwasher 10 into which the embodiments of the invention may be incorporated may vary, the invention is shown in the environment of the dishwasher 10 depicted as a multi-compartment drawer-type dishwasher. The dishwasher 10 includes a chassis 12, which defines an interior. The chassis 12 may be a cabinet or a frame, with or without exterior panels. Built-in dishwashers typically have only a frame without panels, whereas stand alone dishwashers have a frame with decorative panels covering the frame. The dishwasher 10 is illustrated as including a lower compartment 14 and an upper compartment 16 arranged below a kitchen countertop 18 between cabinets 20, which may include one or more drawers or cabinet doors (not shown), although it is within the scope of the invention for the dishwasher 10 to be used in any setting in which it is desired to treat one or more utensils.

[0011] As illustrated in FIG. 1, the lower and upper compartments 14, 16 may take the form of slide-out drawers, each having a handle 22, 24, respectively, for facilitating movement of the drawer units between an open and closed position. However, one compartment 14, 16 may have a small or medium capacity so as to be used for washing smaller or more delicate utensils, such as glassware and the like, while the other compartment 14, 16 may be a larger capacity drawer for washing larger or more robust utensils, such as dinnerware, cookware and other large sized objects. Also, the dishwasher 10 could include a combination single pull-out drawer unit and a conventional dishwashing unit, with a hinged door. As used in this description, the term “utensil(s)” is intended to be generic to any item, single or plural, that may be treated in the dishwasher 10, including, without limitation: dishes, plates, pots, bowls, pans, glassware, and silverware.

[0012] Lower compartment 14 is shown in the open position in FIG. 1, and includes a front wall 26, a rear wall 28, a bottom wall 30 and opposing side walls 32 that collectively form a lower tub 34 that at least partially defines a first or lower treating chamber 36. A utensil rack 38 for supporting various objects, such as utensils and the like, to be exposed to a treating operation is provided in the tub 34. Lower compartment 14 may be slidably mounted to the chassis 12 through a pair of extendible support guides, one of which is indicated at 40. In this manner, the lower compartment 14 may carry the tub 34 between the open and closed positions.

[0013] FIG. 2 is a cross-sectional view through line 2-2 of FIG. 1, with both the lower and upper compartments 14, 16 shown in the closed position. Each of the lower and upper compartments 14, 16 have separate liquid inlets and separate liquid outlets. As illustrated in FIG. 2, the bottom wall 30 of the lower tub 34 may be sloped to define a lower tub region or lower sump 42, which provides a first liquid outlet for the lower treating chamber 36. The lower sump 42 manages a flow of liquid leaving the lower compartment 14.

[0014] Similar to the lower compartment 14, although not shown, the upper compartment 16 similarly includes front, rear, bottom and opposing side walls that collectively form an upper tub 44, which at least partially defines a second or upper treating chamber 46 having an upper sump 48, which provides a second liquid outlet for the upper treating chamber 46. The upper treating chamber 46 is physically separate from the lower treating chamber 36. The upper tub 44 may also be provided with a utensil rack 50 for supporting various utensils and the like. Like the lower compartment 14, upper compartment 16 is slidably mounted to the chassis 12 through a pair of extendible support guides (not shown). In this manner, the upper compartment 16 carries the tub 44 between an open and closed position.

[0015] The dishwasher 10 also includes a recirculation system 52, which includes a remote pump and filter unit 72 for selectively supplying, recirculating and draining liquid from the lower and upper treating chambers 36, 46. The recirculation system 52 includes a lower spray arm assembly 56, which provides a first liquid inlet to the lower treating chamber 36. The lower spray arm assembly 56 is illustrated as being positioned in the lower tub 34 beneath the utensil rack 38. The recirculation system 52 also includes an upper spray arm assembly 58, which provides a second liquid inlet to the upper treating chamber 46. The upper spray arm assembly 58 is illustrated as being positioned in the upper tub 44 beneath the utensil rack 50.

[0016] Each lower and upper spray arm assembly 56, 58 is configured to rotate in their respective lower and upper treating chamber 36, 46 and generate a spray of liquid in a generally upward direction, over at least a portion of an interior of their respective treating chamber 36, 46, typically directed to treat utensils located in the utensil racks 38, 50. While the spray arm assemblies 56, 58 are illustrated as rotating spray arms, the spray arm assemblies may be of any structure and configuration, such as fixed spray heads, for example. Additional spray arms or nozzles may also be provided. It is also within the scope of the invention for the spray arm assemblies to be provided at different locations within the treating chambers 36, 46, such as above the utensil racks 38, 50 or on the rear walls of the lower and upper compartments 14, 16. It is also within the scope of the invention for a combination of spray arm assemblies and/or nozzles to be provided at a multiple locations within the treating chambers 36, 46.

[0017] The recirculation system 52 also includes a first spray arm conduit 60 provided in the lower tub 34 and is coupled at a first end to the lower spray arm assembly 56. The first spray arm conduit 60 extends along the bottom wall 30 of the lower tub 34 from the lower spray arm assembly 56 and upwardly along the rear wall 28 of the lower compartment 14. A first supply conduit 62 is fluidly coupled to the first spray arm conduit 60 at a second end for supplying liquid to the spray arm assembly 56 via the first spray arm conduit 60. In a similar manner, liquid is supplied to the second spray arm assembly 58 in the upper tub 44 through a second spray arm conduit 64, which is fluidly coupled with a second supply conduit 66.

[0018] Because the lower and upper spray arm assemblies 56, 58 are positioned within the lower and upper tubs 34, 44, the lower and upper spray arm assemblies 56, 58 and the first and second spray arm conduits 60, 64 must be able to move with the lower and upper compartments 14, 16 as they move between the open and closed positions. As such, a flexible manifold tube 68, 70 may be fluidly coupled between each of the lower and upper spray arm conduits 60, 64 and their associated lower and upper supply conduits 62, 66 to allow for such movement. Alternatively, it has been contemplated that a docking type connection may be used instead of the flexible manifold tubes.

[0019] The recirculation system 52 may also include a liquid diverter system 132 to selectively control the liquid movement within and between the lower and upper treating chambers 36, 46. The liquid diverter system 132 may include a tub inlet diverter 136 that selectively fluidly couples the remote pump and filter unit 72 to the first and second inlets or spray arm assemblies 56, 58 through the first and second supply conduits 62, 66.

[0020] The liquid diverter system 132 may also include a tub outlet diverter 144, which may selectively fluidly couple the first and second tub outlets or lower and upper sumps 42, 48, respectively, to the remote pump and filter unit 72. More specifically, the lower sump 42 is fluidly coupled with a first sump conduit 140, which is arranged within the dishwasher 10 below the lower tub 34. As illustrated, the first sump conduit 140 extends along the underside of the lower tub 34 from the lower sump 42 to a rear wall 28 of the lower compartment 14. A first outlet conduit 146 is fluidly coupled to the first sump conduit 140 for supplying liquid from the lower sump 42 to the remote pump and filter unit 72. In a similar manner, the upper tub 44 is provided with a second sump conduit 138 that is fluidly coupled with the upper sump 48 and

a second outlet conduit 148 that is fluidly coupled with the second sump conduit 138 at a first end and the remote pump and filter unit 72 at a second end. Again, because the lower sump 42 and upper sump 48 must be able to move with the lower and upper compartments 14, 16 as they move between the open and closed positions, flexible manifold tubes (not shown) may be fluidly coupled between each of the first and second outlet conduits 146, 148 and the first and second sump conduits 140, 138, respectively, to allow for such movement. The first and second outlet conduits 146, 148 are both in fluid communication with the tub outlet diverter 144 which in turn is fluidly coupled with the remote pump and filter unit 72 to collect liquid supplied to both the lower and upper tubs 34, 44.

[0021] Referring now to FIG. 3, the remote pump and filter unit 72 is illustrated as including a pump assembly 74 that may be fluidly coupled to the recirculation system 52 to aid in the supply, recirculation and draining of liquid to the lower and upper compartments 14, 16. The remote pump and filter unit 72 may include a housing 80, which is physically separate from the lower and upper tubs 34, 44 and the lower and upper compartments 14, 16. The housing 80 may have an interior, defining a remote sump 82. The housing 80 may also include a housing inlet 84 fluidly coupled to both the lower and upper treating chambers 36, 46 to receive liquid from the lower and upper treating chambers 36, 46 such that the housing 80 defines a remote sump 82, separate from the lower and upper sumps 42, 48, for the lower and upper treating chambers 36, 46.

[0022] The pump assembly 74 may include a wash or recirculation pump 76 having a pump outlet conduit 86 that is fluidly coupled with the lower and upper supply conduits 62, 66 through the tub inlet diverter 136 for selectively supplying and/or recirculating liquid to and between the lower and upper treating chambers 36, 46. The pump assembly 74 may also include a drain pump 78 having a drain outlet 88 that is fluidly coupled with the first and second outlet conduits 146, 148 through the tub outlet diverter 144 for selectively draining liquid from the lower and upper treating chambers 36, 46. The tub inlet diverter 136 and tub outlet diverter 144 may be valve type diverters or other diverter assemblies with one inlet and two outlets capable of diverting all or some of the liquid therein.

[0023] The remote pump and filter unit 72 may also include an air supply system 54, which is illustrated as including a fan or blower 92 having a blower inlet conduit 94 in fluid communication with the air external to the remote pump and filter unit 72 to intake air from the exterior of the dishwasher 10 and a blower outlet conduit 96 for providing air to the lower and upper treating chambers 36, 46. The air supply system 54 includes a first air conduit 98 fluidly coupled between the blower outlet conduit 96 and the lower tub 34 for supplying air to the lower treating chamber 36 and a second air conduit 100 fluidly coupled between the blower outlet conduit 96 and the upper tub 44 for supplying air to the upper treating chamber 46. An air diverter 116 may be provided for selectively directing air from the blower outlet conduit 96 to one of the first and second air conduits 98, 100.

[0024] A portion of the blower outlet conduit 96 may wrap around the housing 80, such that the housing 80 defines an inner wall of the blower outlet conduit 96. In this manner, the housing 80 is a shared wall of the recirculation system 52 and the air supply system 54, which places the recirculation system 52 and the air supply system 54 in conductive contact. One or more flaps or other closing means (not shown) may be

used to close off the fluid connection between the blower outlet conduit 96 and the lower and upper tubs 34, 44 during certain portions of a cycle of operation so that liquid does not enter the blower outlet conduit 96. Inlet vents 102, 104 may be provided in each of the lower and upper compartments 14, 16, and may be in fluid communication with air conduits 98, 100 for passing air into the lower and upper treating chambers 36, 46. Additional outlet vents (not shown) may be provided in each of the lower and upper compartments 14, 16 and may be in fluid communication with the surrounding air, either internal or external to allow air in the lower and upper treating chambers 36, 46 to be discharged exteriorly of the tubs 34, 44. In some configurations, one or more additional blowers (not shown) may be provided to force air out through the outlet vents to increase the drying speed.

[0025] FIG. 3 also illustrates that a single controller 120 may be provided for both the lower and upper compartments 14, 16, and may be operably coupled to various components of the dishwasher 10 to implement a treating cycle of operation in one or both of the lower and upper compartments 14, 16.

[0026] Referring now to FIG. 4, which is a cross-sectional view through line 4-4 of FIG. 3, it may be seen that the recirculation pump 76 may have an inlet 76A fluidly coupled to the housing 80 and an outlet 86. The recirculation pump 76 includes an impeller 76B rotatably mounted within the recirculation pump 76 and expelling liquid from the remote sump 82 through the outlet conduit 86 of the recirculation pump 76. A motor 77 may be operably coupled to the impeller 76B to rotate the impeller 76B.

[0027] A filter 90 is illustrated as being located within the housing 80 and fluidly separates the housing inlet 84 from the recirculation pump inlet 76A such that soil and foreign objects may be filtered from the liquid. The filter 90 may be a fine filter, which may be utilized to remove smaller particles from the liquid. The filter 90 may be a rotating filter as is set forth in detail in U.S. patent application Ser. No. 12/643,394, filed Dec. 21, 2009, and titled "Rotating Drum Filter for a Dishwashing Machine," which is incorporated herein by reference in its entirety. The rotating filter according to U.S. patent application Ser. No. 12/643,394 may be rotatably mounted in the housing 80 and driven by the impeller 76B of the recirculation pump 76. The filter 90 may be directly mounted to the impeller 76B. When the impeller 76B is rotated by the motor 77 the filter 90 is also rotated.

[0028] In addition to the filter 90, it is also within the scope of the invention for the dishwasher 10 to include one or more additional filters or coarse strainers. For example, at least one additional filter may be located between the lower and upper tub sumps 42, 48 and the remote sump 82 to filter larger soils and debris but allow smaller particles to pass through. An additional filter may also be provided for each lower and upper compartment 14, 16, such as a strainer which is provided at each of the lower and upper tub sumps 42, 48.

[0029] The drain pump 78 may also be fluidly coupled to the housing 80. The drain pump 78 may have an inlet 78A fluidly coupled to the housing 80 to draw liquid from the housing 80 and to pump the liquid through a drain pump outlet 88 to a household drain conduit 88A (FIG. 2) for draining. It should be noted that the filter 90 does not fluidly separate the remote sump 82 formed by the housing 80 from the drain pump inlet 78A such that the liquid being drained is not filtered. Although separate recirculation and drain pumps have been illustrated, it is possible for the two pumps to be

replaced by a single pump, which may be operated to supply liquid to either the household drain 88A or to the recirculation system 52.

[0030] The remote pump and filter unit 72 may further include a heating element 106 common to both the recirculation system 52 and the air supply system 54 for heating the liquid and air supplied to the lower and upper treating chambers 36, 46. As illustrated, the heating element 106 is mounted to an exterior of the housing 80. More specifically, the heating element 106 is illustrated as mounted to an exterior of the housing 80 where the blower outlet conduit 96 wraps around the housing 80. In this location, the heating element 106 may heat air and liquid at the same time.

[0031] The heating element 106 may be a resistive heating element that is activated by a suitable electrical supply, such as a standard house line voltage to the heating element 106. A standard house line voltage may be between about 110 and 120 volts in the United States, however, it is also within the scope of the invention for the house line voltage to vary, depending on the installation location of the dishwasher 10 and the house line voltage standard for that area. The heating element 106 may also be a variable thermal energy heater, which may be accomplished by altering the duty cycle (ratio of on/off states per unit time) of a fixed wattage heater, a variable wattage heater, or a combination of both. The heating element 106 may have a power rating of less than about 1800 watts. In general, the heating system may supply electricity at 15 amps with a voltage in the range of about 110 to 120 volts to the heating element.

[0032] As illustrated, the heating element 106 may be a flow-through heater incorporated with the recirculation pump 76 and having three rings 108 encircling the housing 80. The three rings 108 may be an integral unit or may function independently of each other. As an integral unit, the rings 108 may be part of a heating coil that uses a variable duty cycle to vary the thermal energy output by the heating element 106. As independent rings 108, a desired number of rings 108 may be selectively actuated to obtain the desired thermal energy output. For example, if the heating element 106 is to run at $\frac{1}{3}$ thermal energy output, then only one of the three rings 108 may be continuously actuated. A combination of both approaches may be used as well, such as continuously running a subset of all of the rings 108, while operating another one or more of the rings 108 according to a duty cycle.

[0033] In addition to a coiled heater or multiple-ring heater, other heating element configurations may be used. For example, it has been contemplated that the heating element 106 may be a thin-film heater mounted on the housing 80. The thin-film heater may comprise one film or multiple films in much the same manner that the rings 108 may be a coil or individual elements.

[0034] It has also been contemplated that the heating element 106 may be mounted to the housing 80 and positioned such that it abuts a portion of the blower outlet conduit 96. In this manner, the blower outlet conduit 96 need not wrap fully around the housing 80. Instead the blower outlet conduit 96 may abut or partially envelope the housing 80. In such an instance, the heating element 106 may be mounted to the housing 80 where the blower outlet conduit 96 abuts or partially envelops the housing 80 such that the heating element 106 may heat the liquid in the housing 80 and the air in the blower outlet conduit 96. It should be noted that while the blower 92 has been illustrated as being fluidly coupled with the blower outlet conduit 96 upstream from the heating ele-

ment 106 such that heated air does not pass through the blower 92, the blower 92 may also be located downstream from the heating element 106 such that heated air is passed through the blower 92.

[0035] As illustrated in FIG. 5, the controller 120 may be coupled with the recirculation pump 76, tub inlet diverter 136, and tub outlet diverter 144 for circulation of liquid in the lower and upper treating chambers 36, 46 and the drain pump 78 for drainage of liquid from the dishwasher 10. The controller 120 may also be operably coupled with the blower 92 to provide air into the lower and upper treating chambers 36, 46. The controller 120 may also be coupled with the heating element 106 to heat the liquid and/or air depending on the step being performed in the cycle of operation. If the heating element 106 is capable of supplying different wattages, then the controller 120 may also control that aspect of the heating element 106. The controller 120 may also be coupled with one or more temperature sensors 122, which are known in the art, such that the controller 120 may control the duration of the steps of the cycle of operation based upon the temperature detected in the lower and upper treating chambers 36, 46 or in one of various conduits of the dishwasher 10. The controller 120 may also receive inputs from one or more other additional sensors 124, examples of which are known in the art. Non-limiting examples of additional sensors 124 that may be communicably coupled with the controller include a moisture sensor, a door sensor, a detergent and rinse aid presence/type sensor(s). The controller 120 may also be coupled to dispensers 125 provided in each of the lower and upper compartments 14, 16, which may dispense a detergent during a wash step of a cycle of operation or a rinse aid during a rinse step of a cycle of operation, for example. Alternatively, a single dispenser may be shared by both compartments 14, 16.

[0036] The dishwasher 10 may be preprogrammed with a number of different treating cycles from which a user may select one treating cycle to treat a load of utensils. Examples of treating cycles include normal, light/china, heavy/pots and pans, and rinse only. A control panel or user interface 126 for use in selecting a treating cycle may be provided on the dishwasher 10 and coupled to the controller 120. The user interface 126 may be provided above the upper compartment 16 and may include operational controls such as dials, lights, switches, and displays enabling a user to input commands to the controller 120 and receive information about the selected treating cycle. Alternately, the treating cycle may be automatically selected by the controller 120 based on soil levels sensed by the dishwasher 10 to optimize the performance of the dishwasher 10 for a particular load of utensils.

[0037] The controller 120 may also be provided with a memory 128 and a central processing unit (CPU) 130. The memory 128 may be used for storing control software that may be executed by the CPU 130 in completing a cycle of operation using one or both lower and upper compartments 14, 16 of the dishwasher 10 and any additional software. For example, the memory 128 may store one or more pre-programmed cycles of operation that may be selected by a user and completed by one of the lower and upper compartments 14, 16. A cycle of operation for the lower and upper compartments 14, 16 may include one or more of the following steps: a wash step, a rinse step, and a drying step. The wash step may further include a pre-wash step and a main wash step. The rinse step may also include multiple steps such as one or more additional rinsing steps performed in addition to a first rinsing. The amounts of water and/or rinse aid used during each of

the multiple rinse steps may be varied. The drying step may have a non-heated drying step (so called "air only"), a heated drying step or a combination thereof. These multiple steps may also be performed by the lower and upper compartments 14, 16 in any desired combination.

[0038] As illustrated herein, the controller 120 may be part of the remote pump and filter unit 72 to provide a compact and modular assembly for installation within the dishwasher 10, which also includes the pump assembly 74, filter 90, and heating element 106. However, one or more components shown as integrated with each other in the remote pump and filter unit 72 may also be provided separately. For example, while the heating element 106 is shown as integrated with other components in the remote pump and filter unit 72, each of the components may also be provided within its own independent heating system.

[0039] Referring back to FIG. 2, the above-described dishwasher 10 may be used to implement a method for operating a dishwasher having multiple, physically separate lower and upper treating chambers 36, 46. In operation, the dishwasher 10 may selectively supply liquid through the tub inlet diverter 136 to only one of the lower and upper compartments 14, 16 or to both of the lower and upper compartments 14, 16 simultaneously.

[0040] For example, liquid may be supplied to one of the lower and upper treating chambers 36, 46 by selectively diverting the liquid supplied to the outlet conduit 86 using the tub inlet diverter 136. In this manner, the liquid diverter system 132 may selectively establish a recirculation path between the recirculation pump 76 and one of the lower and upper treating chambers 36, 46. In such an instance, the tub inlet diverter 136 may selectively fluidly couple the outlet conduit 86 of the recirculation pump 76 to one of the first and second supply conduits 62 or 66. The controller 120 may operate the inlet diverter 136 such that liquid may be selectively circulated from the recirculation pump 76 through the tub inlet diverter 136 to one of the first and second supply conduits 62, 66, which supply liquid to one of the lower and upper spray arm assemblies 56, 58, respectively. Liquid supplied to the one of the lower and upper treating chambers 36, 46 may then exit through the corresponding lower and upper sumps 42, 48 and travel through the outlet diverter 144 back to the recirculation pump 76 where it may be recirculated again.

[0041] The lower and upper tub sumps 42, 48, conduits 60-66, 138, 140, 146, 148, tub outlet diverter 144, sump inlet conduit 84, remote sump 82, recirculation pump 76, spray arm assemblies 56, 58, and tub inlet diverter 136, collectively form a liquid flow path of the recirculation system 52. In this way, the pump assembly 74 may draw liquid collecting in the remote sump 82 and distribute the liquid through the tub inlet diverter 136, and conduits 60-66 to the one or both of the lower and upper spray arm assemblies 56, 58 and into the lower and upper treating chambers 36, 46, where the liquid flows back to the remote sump 82 via the lower and upper sumps 42, 48, conduits 138, 140, 146, 148 and outlet diverter 144, for recirculation or drainage, depending on the phase of the treating cycle. When the cycle of operation is done using the liquid, the drain pump 78 may be used to drain the liquid from the remote sump 82, through the drain conduit 88, and out of the dishwasher 10.

[0042] Alternatively, the liquid diverter system 132 may fluidly couple both the lower and upper treating chambers 36, 46 to the recirculation pump 76 simultaneously. In such an

instance, the tub inlet diverter **136** and the outlet diverter **144** may be operated by the controller **120** such that they may both fluidly couple the recirculation pump **76** to both the lower and upper treating chambers **36**, **46**. The tub inlet diverter **136** would fluidly couple the outlet conduit **86** of the recirculation pump **76** to both of the first and second supply conduits **62** and **66** and liquid supplied to both of the lower and upper treating chambers **36**, **46** would then exit through the lower and upper sumps **42**, **48** and travel through the outlet diverter **144** back to the recirculation pump **76** where it may be recirculated again.

[0043] In another example, the liquid may be supplied to the lower and upper treating chambers **36**, **46** in a staggered fashion. Depending on the cycle of operation being run in each of the lower and upper compartments **14**, **16** liquid, along with any wash aid therein, may be transferred from one compartment to the other and this may result in water, wash aid, and energy savings. For example, liquid may first be recirculated between the upper compartment **16** and pump assembly **74** for a period of time and then the tub inlet diverter **136** and outlet diverter **144** may be operated by the controller **120** such that the liquid is then only recirculated between the lower compartment **14** and pump assembly **74** for a period of time.

[0044] FIG. 6 illustrates a non-limiting example of a valve **150**, which may be used as a tub inlet diverter **136** and/or a tub outlet diverter **144**. For ease of explanation, the valve **150** will be explained with respect to the inlet diverter **136**, although it will be understood that the valve **150** may also be used as the tub outlet diverter **144**. As illustrated in FIG. 6, the valve **150** is of a flapper-valve variety having a flap member **152** which may be set against either of the first and second conduits **62**, **66** to close that respective conduit. More specifically, the flap member **152** is secured to a housing **154** by a pin **156**. The flap member **152** may be operably coupled to an actuator **158** such that it may be moveable between either of two closed positions to selectively close one of the first and second conduits **62**, **66**, or an open position by the actuator **158**. The actuator **158** may be operably coupled to the controller **120** (FIG. 5) such that the flap member **152** may be pivoted about the pin **156** when the actuator **158** is operated by the controller **120**.

[0045] The flap member **152** may be pivoted to a position as illustrated in phantom at **152a** to close the first conduit **62** and a position as illustrated in phantom at **152b** to close the second conduit **66**. An open position, in which liquid may flow through both of the first and second conduits **62**, **66** has been indicated at **152c**. It has been contemplated that various actuators including a spring, a lever, a pneumatic actuator, or an electric actuator may be employed to effect movement of the flap member **152**. It has also been contemplated that the flap member **152** may be moved through a variety of open positions such that the flow of liquid coming from the outlet conduit **86** may be allocated to the first and second conduits **62**, **66** in any desired ratio.

[0046] The dishwasher described above having a single pump and filtration system for a multi-compartment dishwasher offers many benefits. For example, current multi-compartment dishwashers use identical separate wash systems for each separate chamber. Such separate wash systems require multiple pumps, motors, electrical connections, etc., which increases the cost of producing such machines. The dishwasher described above eliminates the need for multiple wash systems and may thereby reduce the cost to produce such a dishwasher.

[0047] Further, having a common wash and filter unit also increases the space available within the chassis and this correlates to the ability to install larger wash tubs in the chassis. Larger wash tubs may result in a larger capacity for utensils, which allows for more utensils to be treated at one time. This results in a saving of both time and energy as the dishwasher needs to be run fewer times to treat the same amount of utensils. Further, the availability of more space allows a user to place larger utensils into the wash compartments with more flexibility with respect to loading patterns of the utensils.

[0048] Further, current multi-compartment dishwashers having separate wash systems for each compartment also require a certain minimum amount of liquid to be able to adequately operate the pump and filtration system. The dishwasher described above has the ability to use less water than similarly sized single and multi-compartment machines, because liquid may be recirculated through one or both compartments. The ability to have one pump and filter unit and to selectively divert liquid between the treating chambers provides a savings in water.

[0049] While the invention has been specifically described in connection with certain specific embodiments thereof, it is to be understood that this is by way of illustration and not of limitation. For example, although the above description relates to a multi-compartment dishwasher having two separate compartments it has been contemplated that the invention may work with multi-compartment dishwashers having three or more compartments. Reasonable variation and modification are possible within the scope of the forgoing disclosure and drawings without departing from the spirit of the invention which is defined in the appended claims.

What is claimed is:

1. A dishwasher system comprising:

- a first tub at least partially defining a first treating chamber with a first liquid inlet and a first liquid outlet;
- a second tub at least partially defining a second treating chamber, which is physically separate from the first treating chamber, and having a second liquid inlet and a second liquid outlet;
- a pump and filter unit comprising:
 - a housing defining an interior and having an inlet;
 - a wash pump having an inlet fluidly coupled to the housing and an outlet;
 - a filter located within the housing and fluidly separating the housing inlet from the wash pump inlet; and
 - a liquid diverter system selectively coupling the first and second tub liquid outlets to the housing inlet and the first and second tub liquid inlets to the wash pump outlet to selectively control liquid movement within and between the first and second treating chambers.

2. The dishwasher of claim 1, further comprising a chassis defining an interior, with both the first and second tubs being located within the interior.

3. The dishwasher of claim 2, further comprising a first drawer defining the first tub and a second drawer defining the second tub, with both the first and second drawers slidably mounted to the chassis.

4. The dishwasher of claim 1 wherein the housing is physically separate from the first and second tubs.

5. The dishwasher of claim 4 wherein the housing defines a remote sump for both the first and second tubs.

6. The dishwasher of claim 1 wherein the wash pump further comprises an impeller rotatably mounted within the

wash pump and expelling liquid from the housing interior through the wash pump outlet.

7. The dishwasher of claim 6 wherein the filter is rotatably mounted in the housing and driven by the impeller.

8. The dishwasher of claim 7 wherein the filter is mounted to the impeller.

9. The dishwasher of claim 7, further comprising a motor operably coupled with the impeller to rotate the impeller and wherein the rotation of the impeller by the motor also rotates the filter.

10. The dishwasher of claim 1, further comprising a drain pump having an inlet fluidly coupled to the housing to draw liquid from the housing interior for draining.

11. The dishwasher of claim 10 wherein the filter does not fluidly separate the housing from the drain pump inlet.

12. The dishwasher of claim 1 wherein the diverter system comprises a first diverter selectively fluidly coupling the first

and second outlets to the housing inlet and a second diverter selectively fluidly coupling the first and second inlets to the wash pump outlet.

13. The dishwasher of claim 12 wherein at least one of the first and second diverters comprises a valve.

14. The dishwasher of claim 13 wherein the valve is a flapper valve.

15. The dishwasher of claim 1 wherein the liquid diverter system selectively establishes a recirculation path between the wash pump and each of the first and second treating chambers.

16. The dishwasher of claim 1 wherein the liquid diverter system fluidly couples one of the first and second inlets to one of the second and first liquid outlets, respectively, to establish a fluid path between the first and second treating chambers.

17. The dishwasher of claim 1 wherein the liquid diverter system fluidly couples both the first and second liquid inlets to the pump outlet simultaneously.

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