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(54) **DISHWASHER WITH HUMIDIFIER CYCLE OF OPERATION**

(57) A method (200) and apparatus for operating a dishwasher as a humidifier. The method (200) includes, in response to an input indicating a humidifying cycle of operation, implementing the humidifying cycle (202) of operation. The humidifying cycle (202) of operation can include generating moisture-laden air (204) within a treating chamber (16) of the dishwasher (10) and emitting the generated moisture-laden air (206) to an exterior surrounding the dishwasher (10).

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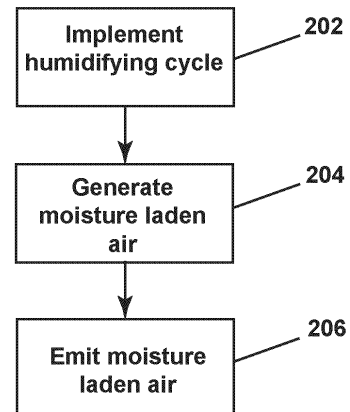


FIG. 5

Description**TECHNICAL FIELD**

[0001] This disclosure generally relates to a dishwasher, and more specifically, operating a dishwasher as a humidifier.

BACKGROUND

[0002] Dishwashers are a ubiquitous household appliance, which serve a very useful function of washing dirty dishes, relieving the consumer of an undesirable household task. Most dishwashers have a heated drying phase where the treating chamber holding the dishes is heated to evaporate water remaining on the dishes. During the heated drying phase, warm, moisture-laden air is expelled from the treating chamber, and often has the appearance of steam, fog, water vapor, etc., which can be concerning to some consumers. Thus, the visual appearance to the consumer of the moisture-laden air is undesirable and dishwashers often process the moisture-laden air within the dishwasher or control its venting from the dishwasher to conceal or reduce the visual impact, or eliminate the moisture-laden air altogether by passing the moisture-laden air through condensers.

BRIEF DESCRIPTION

[0003] One aspect of the disclosure relates to a method of operating a dishwasher as a humidifier, the method comprising in response to an input indicating a humidifying cycle of operation, implementing the humidifying cycle of operation by generating moisture-laden air within a treating chamber of the dishwasher, and emitting the generated moisture-laden air to an exterior surrounding the dishwasher, without the simultaneous implementation of a dish treating cycle of operation.

[0004] Another aspect of the disclosure relates to a dishwasher for treating dishes according to a dish treating cycle of operation, the dishwasher comprising a tub at least partially defining a treating chamber, a door assembly for selectively closing the treating chamber, a water supply system fluidly coupling a household water supply to the treating chamber, a ventilation system for exhausting moisture-laden air from the treating chamber, a controller located within the dishwasher housing, wherein the controller includes information related to a humidifying cycle of operation and the dish treating cycle of operation, and a receiver located within the housing and in communication with the controller, wherein the receiver receives a humidity signal indicative of a humidity level of an environment exterior of the dishwasher, wherein the controller selectively operates the humidifying cycle of the dishwasher in response to the humidity signal received by the receiver and communicated to the controller.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] In the drawings:

5 FIG. 1 is a right-side perspective view of an automatic dishwasher having multiple systems for implementing an automatic cycle of operation.

FIG. 2 is a schematic view of the dishwasher of FIG. 1 and illustrating at least some of the plumbing and electrical connections between at least some of the multiple systems.

FIG. 3 is a schematic view of an alternative user interface for the dishwasher of FIGS. 1 and 2.

FIG. 4 is a schematic view of a controller of the dishwasher of FIGS. 1 and 2.

FIG. 5 is a flow chart illustrating a method of operating the dishwasher of FIG. 1-4 to increasing indoor humidity.

FIG. 6 is a schematic illustration of a steam dryer having multiple systems for implementing a cycle of operation and a humidifying cycle of operation.

DETAILED DESCRIPTION

25 [0006] FIG. 1 illustrates a household appliance as an automatic dishwasher 10 capable of implementing a dish treating cycle of operation or a humidifying cycle of operation. The dish treating cycle of operation and the humidifying cycle of operation can be automatic cycles performed by the dishwasher 10. The humidifying cycle of operation can be implemented by a user selecting a corresponding cycle input, with the selection being local, such as selecting a cycle input on a user interface of the dishwasher, or it can be remotely selected, such as by the user selecting a cycle on an electronic device, such as a smart phone or tablet, which communicates, typically wirelessly, with the dishwasher. The humidifying cycle of operation can also be implemented by a sensor input to the dishwasher. The sensor can be part of the dishwasher or can be a remote sensor, which can remotely communicate with the dishwasher, such as by WI-FI, Bluetooth, etc. A possible remote sensor is a household HVAC controller having a humidity sensor.

30 [0007] As used in this description, the term "dish(es)" is intended to be generic to any item, single or plural, that can be treated in the dishwasher 10, including, without limitation, dishes, plates, pots, bowls, pans, glassware, and silverware. As illustrated, the dishwasher 10 is a built-in dishwasher implementation, which is designed for mounting under a countertop. However, this description is applicable to other dishwasher implementations such as a stand-alone, drawer-type or a sink-type, for example.

35 [0008] The dishwasher 10 has a variety of systems, some of which are controllable, to implement the automatic cycle of operation of treating dishes or the automatic cycle of humidification. A chassis is provided to support the variety of systems needed to implement the

automatic cycle of operation of treating dishes or the automatic cycle of humidification. As illustrated, for a built-in implementation, the chassis includes a frame in the form of a base 12 on which is supported an open-faced tub 14, which at least partially defines a treating chamber 16, having an open face 18, for receiving the dishes. A closure in the form of a door assembly 20 is pivotally mounted to the base 12 for movement between opened and closed positions to selectively open and close the open face 18 of the tub 14. Thus, the door assembly 20 provides selective accessibility to the treating chamber 16 for the loading and unloading of dishes or other items. While illustrated as a single panel, multiple parts can together define the door assembly 20.

[0009] An opening assembly 21 can be used to push or release the door assembly 20 into an at least partially open position. When at least partially open the treating chamber 16 is fluidly coupled to an exterior 112 of the dishwasher 10. The opening assembly 21 can automatically open the door assembly 20, maybe slightly ajar, during or at the conclusion of the dish treating cycle of operation or the humidifying cycle of operation.

[0010] The chassis, as in the case of the built-in dishwasher implementation, can be formed by other parts of the dishwasher 10, like the tub 14 and the door assembly 20, in addition to a dedicated frame structure, like the base 12, with them all collectively forming a uni-body frame to which the variety of systems are supported. In other implementations, like the drawer-type dishwasher, the chassis can be a tub that is slidable relative to a frame, with the closure being a part of the chassis or the countertop of the surrounding cabinetry. In a sink-type implementation, the sink forms the tub and the cover closing the open top of the sink forms the closure. Sink-type implementations are more commonly found in recreational vehicles.

[0011] The systems supported by the chassis, while essentially limitless, can include dish holding system 30, spray system 40, recirculation system 50, drain system 60, water supply system 70, drying system 80, water heating assembly 90, filter system 100, and venting system 110. These systems are used to implement the dish treating cycle of operation.

[0012] The water supply system 70, the water heating assembly 90, and the venting system 110 can be collectively controlled to function as a humidifier assembly 130.

[0013] The humidifying cycle of operation or the dish treating cycle of operation can include automatic cycles performed by the dishwasher 10. The dish treating cycle of operation includes at least a basic traditional automatic wash cycle. The humidifying cycle of operation includes at least a basic automatic humidification cycle where the basic automatic humidification cycle can be implemented by a user selecting a cycle or by a sensor input provided to the dishwasher 10.

[0014] A basic traditional automatic wash cycle of operation has a wash phase, where a detergent/water mixture is recirculated and then drained, which is then fol-

lowed by a rinse phase where water alone or with a rinse agent is recirculated and then drained. An optional drying phase can follow the rinse phase. More commonly, the automatic wash cycle has multiple wash phases and multiple rinse phases. The multiple wash phases can include a pre-wash phase where water, with or without detergent, is sprayed or recirculated on the dishes, and can include a dwell or soaking phase. There can be more than one pre-wash phases. A wash phase, where water with detergent is recirculated on the dishes, follows the pre-wash phases. There can be more than one wash phase; the number of which can be sensor controlled based on the amount of sensed soils in the wash liquid. One or more rinse phases will follow the wash phase(s), and, in some cases, come between wash phases. The number of wash phases can also be sensor controlled based on the amount of sensed soils in the rinse liquid. The wash phases and rinse phases can include the heating of the water, even to the point of one or more of the phases being hot enough for long enough to sanitize the dishes. A drying phase can follow the rinse phase(s). The drying phase can include a drip dry, heated dry, condensing dry, air dry or any combination.

[0015] The basic automatic humidification cycle includes generating moisture-laden air within the treating chamber 16 of the dishwasher 10. The moisture-laden air can be generated by heating liquid. Once generated, the moisture-laden air is vented to the exterior 112 of the dishwasher 10 via the venting system 110, which optionally includes an automatic door opener. The humidifying cycle of operation can be any one of many humidifying cycles of operation. The humidifying cycles can differ, for example, in duration or volume of moisture-laden air exhausted to the exterior 112.

[0016] A controller 22 can also be included in the dishwasher 10 and operably couples with and controls the various components of the dishwasher 10 to implement the cycle of operation. The controller 22 can be located within the door assembly 20 as illustrated, or it can alternatively be located somewhere within the chassis. The controller 22 can also be operably coupled with a control panel or user interface 24 for receiving user-selected inputs and communicating information to the user. The user interface 24 can include operational controls such as dials, lights, switches, and displays enabling a user to input commands, such as a dish treating cycle of operation or humidification cycle of operation, to the controller 22 and receive information.

[0017] At least one local humidity sensor 25 can be coupled to the dishwasher 10. While the location of the humidity system can vary, it is contemplated that it can be located at the base 12, the tub 14, or the door assembly 20. The at least one local humidity sensor 25 can be used to sense one or both of the ambient air surrounding the dishwasher or the moisture-laden air emitted from the dishwasher, although most likely being used to sense the moisture of the ambient air. The at least one local humidity sensor 25 can be in communication with the

controller 22 via a wired or wireless connection.

[0018] Additionally, or alternatively, at least one remote humidity sensor 23 can be separate or remote from the dishwasher 10. The at least one remote humidity sensor 23 can be in communication with the controller 22 via a wired or wireless connection, although most likely wireless. That is, the at least one remote humidity sensor 23 can communicate with the controller 22 using, for example, Wireless Fidelity (Wi-Fi), WiMax, Bluetooth, ZigBee, Code Division Multiple Access (CDMA) wireless signal, Global System for Mobile communication (GSM), 3G wireless signal, 4G wireless signal, 5G wireless signal, Long Term Evolution (LTE) signal, Ethernet, or any combinations thereof. It will also be understood that the particular type or mode of wired or wireless communication is not critical to this disclosure, and later-developed wired or wireless networks or communications are certainly contemplated as within the scope of this disclosure.

[0019] The user interface 24 can include a humidity cycle selector 26. While illustrated as a single input/output, the humidity cycle selector 26 can include any number of input and output portions at or adjacent the user interface 24.

[0020] The dish holding system 30 can include any suitable structure for holding dishes within the treating chamber 16. Exemplary dish holders are illustrated in the form of upper dish racks 32 and lower dish rack 34, commonly referred to as "racks", which are located within or moveably received by the treating chamber 16. The upper dish racks 32 and the lower dish rack 34 are typically mounted for slidable movement in and out of the treating chamber 16 through the open face 18 for ease of loading and unloading. Drawer guides/slides/rails 36 are typically used to slidably mount the upper dish rack 32 to the tub 14. The lower dish rack 34 typically has wheels or rollers 38 that roll along rails formed in sidewalls of the tub 14 and onto the door assembly 20, when the door assembly 20 is in the opened position.

[0021] Dedicated dish holders can also be provided. One such dedicated dish holder is a third level rack 28 located above the upper dish rack 32. Like the upper dish rack 32, the third level rack 28 is slidably mounted to the tub 14 with drawer guides/slides/rails 36 and movably received within the treating chamber 16. The third level rack 28 is typically used to hold utensils, such as tableware, spoons, knives, spatulas, etc., in an on-the-side or flat orientation. However, the third level rack 28 is not limited to holding utensils. If an item can fit in the third level rack, it can be washed in the third level rack 28. The third level rack 28 generally has a much shorter height or lower profile than the upper and lower dish racks 32, 34. Typically, the height of the third level rack is short enough that a typical glass cannot be stood vertically in the third level rack 28 and the third level rack 28 still slide into the treating chamber 16.

[0022] Another dedicated dish holder can be a silverware basket (not shown), which is typically carried by one of the upper or lower dish racks 32, 34 or mounted

to the door assembly 20. The silverware basket typically holds utensils and the like in an upright orientation as compared to the on-the-side or flat orientation of the third level rack 28.

[0023] A dispenser assembly 48 is provided to dispense treating chemistry, e.g. detergent, anti-spotting agent, etc., into the treating chamber 16 during the dish treating cycle of operation. The dispenser assembly 48 can be mounted on an inner surface of the door assembly 20, as shown, or can be located at other positions within the chassis. The dispenser assembly 48 can dispense one or more types of treating chemistries. The dispenser assembly 48 can be a single-use dispenser or a bulk dispenser, or a combination of both.

[0024] The venting system 110 fluidly couples the treating chamber 16 and the exterior 112 of the dishwasher 10. As illustrated, by way of example, the venting system 110 can include an inlet 114 at the door assembly 20 that is fluidly coupled to at least one outlet illustrated as a vent 116. One or more conduits 115 can couple the inlet 114 and the outlets or the vents 116. It is also contemplated that within the conduit is an exhaust fan 117. While illustrated in the conduit 115, it is contemplated that the exhaust fan 117 can be any number of exhaust fans located in or fluidly coupled to the treating chamber 16.

[0025] While illustrated at a side portion of the door assembly 20, it is contemplated that the vent 116 can be located at a front side 29 of the door assembly 20. It is further contemplated that the venting system 110 can include any number of inlet or outlet vents located at the door assembly 20 or other portion(s) of the base 12 or tub 14. For example, since a substantial portion of the door assembly 20 tends to be hollow, the vent 116 can be located along all or portions of the bottom edge of the door assembly 20, where the vent 116 is not seen by the user.

[0026] The inlet 114 or the vent 116 can be selectively opened, closed, or partially opened. The selection of opened, closed, or partially opened of the inlet 114 or the vent 116 can be independently controlled or align with the activation or deactivation of the fan 117. Optionally, flow directors can be located at the inlet 114 or the vent 116. The flow directors can be fixed or movable.

[0027] Optionally, the venting system 110 can include one or more conduits 118. The one or more conduits 118 can fluidly couple the treating chamber 16 to a heating, ventilation and air conditioning (HVAC) system 120, a heat recovery ventilator (HRV), a heat exchanger, or other household or business duct work. That is, the one or more conduits 118 of the venting system 110 can fluidly couple the treating chamber 16 to the exterior 112 of dishwasher 10 via, for example, one or more registers 121 in the HVAC system 120.

[0028] The venting system 110 can include any number of inlets 114, outlets or vents 116, flow directors, conduits, fans, impellers, heat exchangers, or valve systems to control or promote the ventilation of moisture-

laden air from the treating chamber 16 to the exterior 112 of the dishwasher 10. Portions of the venting system 110, such as the inlet 114, outlet(s) or vent 116, flow directors, conduits fans, impellers, heat exchangers, valve systems, can be located in the door assembly 20, the tub 14, the base 12, or treating chamber 16.

[0029] The venting system 110 can optionally include the opening assembly 21 that can automatically open the door assembly 20 to fluidly couple the treating chamber 16 and the exterior 112 of the dishwasher 10.

[0030] Turning to FIG. 2, the spray system 40 is provided for spraying liquid in the treating chamber 16 and can have multiple spray assemblies or sprayers, some of which can be dedicated to a particular one of the dish holders, to particular area of a dish holder, to a particular type of cleaning, or to a particular level of cleaning, etc. The sprayers can be fixed or movable, such as rotating, relative to the treating chamber 16 or dish holder. Six exemplary sprayers are illustrated and include, an upper spray arm 41, a lower spray arm 42, a third level sprayer 43, a deep-clean sprayer 44, and a spot sprayer 45. The upper spray arm 41 and lower spray arm 42 are illustrated as rotating spray arms, located below the upper dish rack 32 and the lower dish rack 34, respectively, and rotate about a generally centrally located and vertical axis. However, it is contemplated that the upper spray arm 41 or the lower spray arm 42 can be fixed. The third level sprayer 43 is located above the third level rack 28. The third level sprayer 43 is illustrated as being fixed, but could move, such as in rotating. In addition to the third level sprayer 43 or in place of the third level sprayer 43, a sprayer 49, illustrated as a stationary sprayer, can be located at least in part below a portion of the third level rack 28. The sprayer 49 is illustrated as having a fixed or stationary sprayer housing or tube, carried by the third level rack 28, but the sprayer housing or tube could move, such as, but not limited to, rotating about a longitudinal axis.

[0031] The deep-clean sprayer 44 is a manifold extending along a rear wall of the tub 14 and has multiple nozzles 46, with multiple apertures, generating an intensified and/or higher pressure spray than the upper spray arm 41, the lower spray arm 42, or the third level sprayer 43. The nozzles 46 can be fixed or move, such as in rotating. The spray emitted by the deep-clean sprayer 44 defines a deep clean zone, which, as illustrated, would like along a rear side of the lower dish rack 34. Thus, dishes needing deep cleaning, such as dishes with baked-on food, can be located in the lower dish rack 34 to face the deep-clean sprayer 44. The deep-clean sprayer 44, while illustrated as only one unit on a rear wall of the tub 14 could comprises multiple units and/or extend along multiple portions, including different walls, of the tub 14, and can be provide above, below or beside any of the dish holders with deep-cleaning is desired.

[0032] The spot sprayer 45, like the deep-clean sprayer, can emit an intensified and/or higher pressure spray, especially to a discrete location within one of the

dish holders. While the spot sprayer 45 is shown below the lower dish rack 34, it could be adjacent any part of any dish holder or along any wall of the tub where special cleaning is desired. In the illustrated location below the lower dish rack 34, the spot sprayer can be used independently of or in combination with the lower spray arm 42. The spot sprayer 45 can be fixed or can move, such as in rotating.

[0033] These six sprayers are illustrative examples of suitable sprayers and are not meant to be limiting as to the type of suitable sprayers.

[0034] The recirculation system 50 recirculates the liquid sprayed into the treating chamber 16 by the sprayers of the spray system 40 back to the sprayers to form a recirculation loop or circuit by which liquid can be repeatedly and/or continuously sprayed onto dishes in the dish holders. The recirculation system 50 can include a sump 51 and a pump assembly 52. The sump 51 collects the liquid sprayed in the treating chamber 16 and can be formed by a sloped or recess portion of a bottom wall of the tub 14. The pump assembly 52 can include one or more pumps such as recirculation pump 53. The sump 51 can also be a separate module that is affixed to the bottom wall and include the pump assembly 52. The recirculation system 50 can be active during the dish treating cycles of operation. That is, the recirculation system 50 provides liquid sprayed into the treating chamber 16 by the sprayers of the spray system 40 back to the sprayers. However, during the humidifying cycle(s) of operation, it is contemplated that portions the recirculation system 50 are inactive. That is, for example, while water is supplied to the sump 51 via a portion of the recirculation system 50 to maintain a proper fluid level for the humidifying cycle of operation, the liquid in the sump 51 is not returned to one or more portions of the spray system 40. During the humidifying cycle of operation, since there is no need to treat dishes, there is no reason to run the recirculation system 50 and waste the consumed energy.

[0035] Multiple supply conduits 54, 55, 56, 57, 58 fluidly couple the sprayers 43, 44, 45, 49 to the recirculation pump 53. A recirculation valve 59 can selectively fluidly couple each of the conduits 54-58 to the recirculation pump 53. While each sprayer 43, 44, 45, 49 is illustrated as having a corresponding dedicated supply conduit 54-58 one or more subsets, comprising multiple sprayers from the total group of sprayers 43, 44, 45, 49, can be supplied by the same conduit, negating the need for a dedicated conduit for each sprayer. For example, a single conduit can supply the upper spray arm 41 and the third level sprayer 43. Another example is that the sprayer 49 is supplied liquid by the conduit 56, which also supplies the third level sprayer 43.

[0036] The recirculation valve 59, while illustrated as a single valve, can be implemented with multiple valves. Additionally, one or more of the conduits can be directly coupled to the recirculation pump 53, while one or more of the other conduits can be selectively coupled to the recirculation pump with one or more valves.

[0037] The water heating assembly 90 can include an inline heater 91 or a heating element 92. While illustrated as having both the inline heater 91 and the heating element 92, it is contemplated that the water heating assembly 90 can include any number of heating or elements, including just one of the inline heater 91 or the heating element 92.

[0038] The inline heater 91 is illustrated as downstream of the recirculation pump 53 and upstream of the recirculation valve 59. The inline heater 91 can heat liquid flowing through the inline heater 91 to provide heated liquid to the treating chamber 16. Additionally, or alternatively, for the humidifying cycle of operation, the flow-rate of the liquid supplied to the inline heater 91 can be controlled such that in addition to hot water, the inline heater 91 can provide water vapor or steam in the form of moisture-laden air to the treating chamber 16. It is contemplated that the inline heater 91 can be multiple heating assemblies located in one or more portions of the recirculation system 50 or the water supply system 70.

[0039] There are essentially an unlimited number of plumbing schemes to connect the inline heater 91 and the recirculation system 50 or the spray system 40. The illustrated plumbing is not limiting.

[0040] The heating element 92 is illustrated as a submersible heater or immersion heater, that is illustrated, by example as located in the sump 51 of the treating chamber 16. It is contemplated that the heating element 92 can be one or more heating elements located in the treating chamber 16.

[0041] A drain system 60 drains liquid from the treating chamber 16. The drain system 60 includes a drain pump 62 fluidly coupled the treating chamber 16 to a drain line 64. As illustrated the drain pump 62 fluidly couples the sump 51 to the drain line 64.

[0042] While separate recirculation and drain pumps 53 and 62 are illustrated, a single pump can be used to perform both the recirculating and the draining functions. Alternatively, the drain pump 62 can be used to recirculate liquid in combination with the recirculation pump 53. When both a recirculation pump 53 and drain pump 62 are used, the drain pump 62 is typically more robust than the recirculation pump 53 as the drain pump 62 tends to have to remove solids and soils from the sump 51, unlike the recirculation pump 53, which tends to recirculate liquid which has solids and soils filtered away to some extent.

[0043] A water supply system 70 is provided for supplying fresh water to the dishwasher 10 from a household water supply via a household water valve 71. The water supply system 70 includes a water supply unit 72 having a water supply conduit 73 with a siphon break 74. While the water supply conduit 73 can be directly fluidly coupled to the tub 14 or any other portion of the dishwasher 10, the water supply conduit is shown fluidly coupled to a supply tank 75, which can store the supplied water prior to use. The supply tank 75 is fluidly coupled to the sump 51 by a supply line 76, which can include a controllable

valve 77 to control when water is released from the supply tank 75 to the sump 51.

[0044] The supply tank 75 can be conveniently sized to store a predetermined volume of water, such as a volume required for a phase of the dish treating cycle of operation or humidifying cycle of operation, which is commonly referred to as a "charge" of water. The storing of the water in the supply tank 75 prior to use is beneficial in that the water in the supply tank 75 can be "treated" in some manner, such as softening or heating prior to use.

[0045] A water softener 78 is provided with the water supply system 70 to soften the fresh water. The water softener 78 is shown fluidly coupling the water supply conduit 73 to the supply tank 75 so that the supplied water automatically passes through the water softener 78 on the way to the supply tank 75. However, the water softener 78 could directly supply the water to any other part of the dishwasher 10 than the supply tank 75, including directly supplying the tub 14. Alternatively, the water softener 78 can be fluidly coupled downstream of the supply tank 75, such as in-line with the supply line 76. Wherever the water softener 78 is fluidly coupled, it can be done so with controllable valves, such that the use of the water softener 78 is controllable and not mandatory.

[0046] A drying system 80 is provided to aid in the drying of the dishes during the drying phase. The drying system as illustrated includes a condensing assembly 81 having a condenser 82 formed of a serpentine conduit 83 with an inlet fluidly coupled to an upper portion of the tub 14 and an outlet fluidly coupled to a lower portion of the tub 14, whereby moisture-laden air within the tub 14 is drawn from the upper portion of the tub 14, passed through the serpentine conduit 83, where liquid condenses out of the moisture-laden air and is returned to the treating chamber 16 where it ultimately evaporates or is drained via the drain pump 62. The serpentine conduit 83 can be operated in an open loop configuration, where the air is exhausted to atmosphere, a closed loop configuration, where the air is returned to the treating chamber, or a combination of both by operating in one configuration and then the other configuration.

[0047] To enhance the rate of condensation, the temperature difference between the exterior of the serpentine conduit 83 and the moisture-laden air can be increased by cooling the exterior of the serpentine conduit 83 or the surrounding air. To accomplish this, an optional cooling tank 84 is added to the condensing assembly 81, with the serpentine conduit 83 being located within the cooling tank 84. The cooling tank 84 is fluidly coupled to at least one of the spray system 40, recirculation system 50, drain system 60 or water supply system 70 such that liquid can be supplied to the cooling tank 84. The liquid provided to the cooling tank 84 from any of the systems 40-70 can be selected by source and/or by phase of dish treating cycles of operation such that the liquid is at a lower temperature than the moisture-laden air or even lower than the ambient air.

[0048] As illustrated, the liquid is supplied to the cooling

tank 84 by the drain system 60. A valve 85 fluidly connects the drain line 64 to a supply conduit 86 fluidly coupled to the cooling tank 84. A return conduit 87 fluidly connects the cooling tank 84 back to the treating chamber 16 via a return valve 79. In this way a fluid circuit is formed by the drain pump 62, drain line 64, valve 85, supply conduit 86, cooling tank 84, return valve 79 and return conduit 87 through which liquid can be supplied from the treating chamber 16, to the cooling tank 84, and back to the treating chamber 16. Alternatively, the supply conduit 86 could fluidly couple to the drain line 64 if re-use of the liquid is not desired.

[0049] To supply cold water from the household water supply via the household water valve 71 to the cooling tank 84, the water supply system 70 would first supply cold water to the treating chamber 16, then the drain system 60 would supply the cold water in the treating chamber 16 to the cooling tank 84. It should be noted that the supply tank 75 and cooling tank 84 could be configured such that one tank performs both functions.

[0050] The drying system 80 can use ambient air, instead of cold water, to cool the exterior of the serpentine conduit 83. In such a configuration, a blower 88 is connected to the cooling tank 84 and can supply ambient air to the interior of the cooling tank 84. The cooling tank 84 can have a vented top 89 to permit the passing through of the ambient air to allow for a steady flow of ambient air blowing over the serpentine conduit 83.

[0051] The cooling air from the blower 88 can be used in lieu of the cold water or in combination with the cold water. The cooling air will be used when the cooling tank 84 is not filled with liquid. Advantageously, the use of cooling air or cooling water, or combination of both, can be selected on the site-specific environmental conditions. If ambient air is cooler than the cold water temperature, then the ambient air can be used. If the cold water is cooler than the ambient air, then the cold water can be used. Cost-effectiveness can also be considered or accounted for when selecting between cooling air and cooling water. The blower 88 can be used to dry the interior of the cooling tank 84 after the water has been drained. Suitable temperature sensors for the cold water and the ambient air can be provided and send their temperature signals to the controller 22, which can determine which of the two is colder at any time or phase of the dish treating cycle of operation.

[0052] The drying system 80 can be active during the dish treating cycles of operation. That is, the drying system 80 can remove the moisture from the air of the treating chamber 16 prior to returning the air to the treating chamber 16 during a cycle of operation for dishes. However, during the humidifying cycle(s) of operation, it is contemplated that portions the drying system 80 are inactive. That is, for example, the moisture-laden air is not recirculated back to the treating chamber 16, rather the moisture-laden air is vented. It is contemplated that portions of the drying system 80 can be used in the venting system 110.

[0053] Optionally, a heating circuit 93 having a heat exchanger 94, illustrated as a serpentine conduit 95, can be located within the supply tank 75, with a supply conduit 96 supplying liquid from the treating chamber 16 to the serpentine conduit 95, and a return conduit 97 fluidly coupled to the treating chamber 16. The heating circuit 93 is fluidly coupled to the recirculation pump 53 either directly or via the recirculation valve 59 such that liquid that is heated as part of the dish treating cycle of operation or the humidifying cycle of operation can be recirculated through the heat exchanger 94 to transfer the heat to the charge of fresh water residing in the supply tank 75. As most wash phases use liquid that is heated by the inline heater 91 or the heating element 92 that can then be recirculated through the heating circuit 93 to transfer the heat to the charge of water in the supply tank 75, which is typically used in the next phase of the dish treating cycle of operation or in future cycle such as a humidifying cycle of operation.

[0054] A filter system 100 is provided to filter undissolved solids from the liquid in the treating chamber 16. The filter system 100 includes a coarse filter 102 and a fine filter 104, which can be a removable basket 106 residing the sump 51, with the coarse filter 102 being a screen 108 circumscribing the removable basket 106. Additionally, the recirculation system 50 can include a rotating filter in addition to or in place of the either or both of the coarse filter 102 and fine filter 104. Other filter arrangements are contemplated such as an ultrafiltration system.

[0055] FIG. 3 schematically illustrates an alternative user interface 124 located at the front side 29 of the door assembly 20. The alternative user interface 124 is similar to the user interface 24 (FIG. 1) illustrated at a top portion 27 of the door assembly 20, where the alternative user interface 124 can be used instead of or with the user interface 24. It is contemplated that the user interface 24 or the alternative user interface 124 or a portion of the user interface 24 or the alternative user interface 124 can be on the side of the door assembly 20 or projected on the floor adjacent the door assembly 20.

[0056] The door assembly 20 can include a handle assembly 131 for selectively opening and closing the treating chamber 16. A dish cycle selector 132 can be included as a portion of the alternative user interface 124. The dish cycle selector 132 can include multiple selection or communication regions, illustrated as cycle selection 132a and options selection 132b. The cycle selection 132a can allow for a user to select from dish cycles that include heavy, normal, 1 hour wash, sensor/automatic, or custom. The options selection 132b can allow for a user to select complimentary feature to the selected dish cycle. By way of non-limiting example, a user, at the options selection 132b, can select one or more of sanitary rinse, heat dry, high temperature wash, or repeat.

[0057] A humidity cycle selector 126, similar to the humidity cycle selector 26, can be included in or adjacent the alternative user interface 124. The humidity cycle se-

lector 126 can include any number of screens, buttons, or other communication devices to communicate with the user. For example, the humidity cycle selector 126, can include an on/off 126a where the user can select to turn on or turn off the automatic humidifying cycle of operation. It is also contemplated that, at the humidity cycle selector 126, the user can select a humidity threshold 126b, wherein when a sensed humidity is below the selected humidity threshold, the automatic humidifying cycle of operation will be performed. It is further contemplated that a current humidity level 126c of the exterior 112 of the dishwasher 10 can be provided at the humidity cycle selector 126. Time of operation 126d, delayed start for the humidifying cycle of operation, and other controls, selections, or displays are contemplated at the humidity cycle selector 126.

[0058] Optionally, a vent 216, similar to the vent 116, can be more than one vent, illustrated as a first vent 216a and a second vent 216b. The first vent 216a and the second vent 216b are located, by way of example, at the front side 29 of the door assembly 20 adjacent the handle assembly 131. It is contemplated that the first vent 216a and the second vent 216b can be used to exhaust air from the treating chamber 16 (FIG. 2) during one or more of the humidifying cycle of operation or the dish treating cycle of operation.

[0059] As illustrated schematically in FIG. 4, the controller 22 can be coupled with components or subcomponents of the dishwasher 10. Components that are coupled to the controller 22 can send and receive signals. Additionally, the controller 22 can sense, monitor, and control the electricity supplied to the coupled components. Further, if the component has subcomponents, for example a sensor and a motor, the subcomponents (motor and sensor) can independently communicate with the controller 22.

[0060] The controller 22 is coupled to and can selectively activate the inline heater 91 or the heating element 92 based on the dish treating cycle of operation or the humidifying cycle of operation.

[0061] The controller 22 is coupled to the drain pump 62 for draining liquid from the treating chamber 16 during the dish treating cycle of operation.

[0062] The recirculation pump 53 can be coupled to the controller 22 for recirculating the wash liquid during the dish treating cycle of operation or for providing liquid to the treating chamber 16 during the humidifying cycle of operation.

[0063] The at least one remote humidity sensor 23 or the at least one local humidity sensor can be coupled to the controller 22. The communication between the humidity sensors 23, 25 and the controller 22 can be direct or via a wireless communication device 142. The wireless communication device 142 can include at least a wireless receiver for receiving signals from the at least one remote humidity sensor 23 or the at least one local humidity sensor 25.

[0064] The controller 22 can also send signals or re-

ceive input from one or more sensors 140. Non-limiting examples of sensors that can be communicably coupled with the controller 22 include, to name a few, ambient air temperature sensor, treating chamber air temperature sensor, treating chamber liquid temperature, liquid temperature in one or more portions of the recirculation system 50, the water supply system 70, door open/close sensor, and turbidity sensor. Optionally, the one or more sensors 140 can directly or wirelessly communicate with the controller 22.

[0065] The opening assembly 21 can be actuated by the controller 22. That is, based on the dish treating cycle of operation or the humidifying cycle of operation, the controller 22 can provide a signal to the opening assembly 21 to open the door assembly 20 by pushing or releasing the door assembly 20 away from the tub 14.

[0066] The controller 22 can also communicate with the recirculation valve 59, the household water valve 71, the controllable valve 77, the return valve 79, and the valve 85.

[0067] A memory 150 and a central processing unit (CPU) 152 can be included in or in communication with the controller 22.

[0068] The memory 150 can be used for storing control software or lookup information used by the CPU 152. The stored information can include completing any number of dish treating cycles of operation and humidifying cycles of operation cycle using the dishwasher 10 and any additional software. For example, the memory 150 can store one or more pre-programmed automatic cycles of operation for dish treating or humidifying that can be selected by a user and executed by the dishwasher 10.

[0069] The controller 22 is coupled to the user interface 24. The controller 22 can receive input from a user at the user interface 24. Additionally, the controller 22 can provide an output via the user interface 24 to provide information to the user.

[0070] Optionally, the controller 22 can include or communicate with a wireless communication device 142. The wireless communication device 142 can, for example, allow the user from a mobile device, to select automatic cycles of operation for dish treating or humidifying. Additionally, or alternatively, the wireless communication device 142 can be a receiver in communication with the at least one remote humidity sensor 23 or the one or more sensors 140. That is, the wireless communication device 142 can receive a wirelessly transmitted signal from the at least one remote humidity sensor 23 or the one or more sensors 140.

[0071] FIG. 5 illustrates a method 200 of operating the dishwasher 10 as a humidifier. At 202, in response to an input indicating the humidifying cycle of operation, the humidifying cycle of operation is implemented. The implementation of humidifying cycle of operation does not permit the simultaneous implementation of the dish treating cycle of operation. The humidifying cycle of operation and the dish treating cycle of operation can operate se-

rially. The term "serially" as used herein means one after the other, successive, and not concurrent or together. The humidifying cycle of operation and the dish treating cycle of operation do not run at the same time. That is, the dishwasher 10 implements the humidifying cycle without the simultaneous implementation of the dish treating cycle of operation.

[0072] The input indicating the humidifying cycle of operation can be a user selection on the user interface 24 or the humidity cycle selector 26. The user selection can be made between at least one of the humidifying cycle of operation and the dish treating cycle of operation. For example, at the user interface 24 the user can provide input at the humidity cycle selector 26 to implement the humidifying cycle of operation. Alternatively, the user can implement the dish treating cycle of operation at the dish cycle selector 132.

[0073] Additionally, or alternatively, the input indicating the humidifying cycle of operation can be an output from the at least one remote humidity sensor 23 or the at least one local humidity sensor 25. For example, the controller 22 can receive a wirelessly transmitted input in the form of a signal generated from the at least one remote humidity sensor 23 spaced, distinct, or separate from the dishwasher 10. By way of further non-limiting example, the controller 22 can receive a directly (wired) transmitted input in the form of a signal generated from the at least one local humidity sensor 25 coupled to or located at the dishwasher 10. The signal or transmitted input can be a humidity signal received by the dishwasher 10, where the humidity signal can be indicative of a humidity level of an environment. The environment can be an indoor home or business, illustrated as the exterior 112 of the dishwasher 10.

[0074] The output or humidity signal transmitted from the at least one remote humidity sensor 23 can be received by the dishwasher 10 at 142 in communication with the controller 22. Once received by the controller 22, the dishwasher 10 can use the humidity signal to determine the humidity level. The humidity level can be compared to a humidity threshold. If the humidity level is below the humidity threshold and the dishwasher is not operating a dish treating cycle, the controller 22 can implement the humidifying cycle of operation.

[0075] The at least one local humidity sensor 25 or the at least one remote humidity sensor 23 can be prompted, by the controller 22 for example, to provide the humidity signal. Alternatively, the humidity signal can be continuously supplied to the controller 22 by the at least one local humidity sensor 25 or the at least one remote humidity sensor 23 located at or coupled to the dishwasher 10.

[0076] At 204, moisture-laden air is generated within the treating chamber 16 of the dishwasher 10. By way of non-limiting example, the moisture-laden air can be generated by heating liquid within the dishwasher 10. Liquid can be provided to the sump 51 via the water supply system 70 or the recirculation pump 53. The liquid in the

sump 51 can be heated by the heating element 92 in the form of a submersible heater. Additionally, or alternatively, the liquid can be heated by flowing liquid through the inline heater 91.

[0077] The volume, number of heating element 92 elements activated, or other aspects of generating moisture-laden air portion of the humidifying cycle of operation can be adjusted by the controller 22 based on the determined humidity level of the exterior 112 of the dishwasher 10.

[0078] At 206, the generated moisture-laden air in the treating chamber 16 is exhausted to the exterior 112 of the dishwasher 10. By way of non-limiting example, the moisture-laden air can be exhausted via venting the moisture-laden air from the treating chamber 16 to the exterior 112 surrounding the dishwasher 10 via one or more vents 116. The venting of the moisture-laden air can include operating the exhaust fan 117.

[0079] It is contemplated that venting the generated moisture-laden air from the treating chamber 16 can include at least partially opening the door assembly 20. The opening assembly 21 can push or release the door assembly 20 from the tub 14 to allow the moisture-laden air from the treating chamber 16 to flow to the exterior 112 of the dishwasher 10.

[0080] It is further contemplated that the exhausting of the moisture-laden air from the treating chamber 16 can be via the conduit 118 coupled to the HVAC system 120, which is fluidly coupled to the exterior of the dishwasher 10. That is, the moisture-laden air from the treating chamber 16 can flow to the exterior 112 via the HVAC system 120 or any other household or business duct system.

[0081] Optionally, after a predetermined amount of time, the implementing of the humidifying cycle of operation can be terminated. Alternatively, the implementing of the humidifying cycle of operation can be terminated in response to an additional humidity signal received by the dishwasher 10. That is, if the additional humidity signal received by the controller 22 determines the humidity level stratifies the predetermined threshold, the humidifying cycle of operation can initiate the end or termination portion of the humidifying cycle.

[0082] The humidifying cycle of operation provides the opportunity for a two in one dishwasher that can perform as a traditional dishwasher and a humidifier. While capable of implementing two operations; the humidifying cycle of operation and the dish treating cycle, the two operations differ and cannot be co-implemented.

[0083] During the implementation of the humidifying cycle of operation, the treating chemistry from the dispenser assembly 48 is not dispensed into the treating chamber 16. However, it is contemplated that a humidifier additive that enhances the smell of the moisture-laden air or further purifies the liquid to be vaporized can be added during the implementation of the humidifying cycle of operation.

[0084] Optionally, during the implementation of the humidifying cycle of operation, liquid is provided to the treat-

ing chamber 16, but is not recirculated in the treating chamber 16, for example, from the sump 51 back to the sprayers 43, 44, 45, 49.

[0085] FIG. 6 is a schematic illustration of a steam dryer 310 for treating clothing items. The steam dryer 310 is similar to the dishwasher 10, therefore, similar functioning parts will be identified with like numerals increased by 300, with it being understood that the description of the like parts of the dishwasher 10 can apply to the steam dryer 310.

[0086] The steam dryer 310 has a variety of systems, some of which are controllable, to implement an automatic cycle of operation of treating clothing items or an automatic cycle of humidification. The steam dryer 310 can include a tub 314, which at least partially defines a treating chamber 316 that can receive clothing items. Optionally, a closure in the form of a door assembly 320 is mounted for movement between opened and closed positions to selectively open and close an opening to the tub 314.

[0087] The systems supported by the chassis, while essentially limitless, can include a drain system 360, a water supply system 370, a drying system 380, a water heating assembly 390, and venting system 410. These systems are used to implement a clothing item or laundry treating cycle of operation.

[0088] The water supply system 370, the water heating assembly 390, and the venting system 410 can be collectively controlled to function as a humidifier assembly 430.

[0089] The drain system 360 drains liquid from the treating chamber 316. The drain system 360 can include a drain pump 362 fluidly coupling the treating chamber 316 to a drain line 364. The drain line 364 can be connected to a household drain (not shown) exterior of the steam dryer 310.

[0090] The water supply system 370 is provided for supplying fresh water to the steam dryer 310 from a household water supply 371 via one or more valves. The water supply system 370 includes a valve or water supply unit 372 that can directly fluidly couple the household water supply 371 to the tub 314. Additionally, or alternatively, the water supply unit 372 can fluidly couple the household water supply 371 to one or more components of the water heating assembly 390, such as an inline heater or steam generator 391. The steam generator 391 is then fluidly coupled to the treating chamber 316 via one or more valves or conduits and can provide moisture-laden air to the treating chamber 316.

[0091] The water heating assembly 390 can include the steam generator 391 or a heating element 392. While illustrated as having both the steam generator 391 and the heating element 392, it is contemplated that the water heating assembly 390 can include any number of heating or elements, including just one of the steam generator 391 or the heating element 392.

[0092] The heating element 392 is illustrated as a submersible heater or immersion heater, that is illustrated,

by example as located in the treating chamber 316. That is, the heating element 392 can be used to heat water in the treating chamber 316 to generate moisture-laden air. It is contemplated that the heating element 392 can be one or more heating elements located in or adjacent the treating chamber 316.

[0093] The drying system 380 is provided to aid in the drying of the clothing items during the laundry treating cycle of operation. The drying system 380 can include one or more components of the water heating assembly 390 such as a heating element 392, where the heating element 392 can be used to heat one or more portions or the interior of the tub 314.

[0094] Optionally, the drying system 380 can include a drive system 381 for rotating or otherwise moving the tub 314 or the treating chamber 316.

[0095] The venting system 410 fluidly couples the treating chamber 316 and the exterior 412 of the steam dryer 310. As illustrated, by way of example, the venting system 410 can fluidly couple the treating chamber 316 to the exterior 412 via one or more conduits and at least one outlet illustrated as a vent 416. It is also contemplated that within the one or more conduits is an exhaust fan 117.

[0096] The venting system 410 can include any number of inlets, outlets or vents, flow directors, conduits, fans, impellers, heat exchangers, or valve systems to control or promote the ventilation of moisture-laden air from the treating chamber 316 to the exterior 412.

[0097] A controller 322 can be located in the steam dryer 310. Similar to the controller 22, the controller 322 can be coupled with components or subcomponents of the steam dryer 310 controlling the components or subcomponents according to the laundry treating cycle of operation or the humidifying cycle of operation.

[0098] The controller 22 is coupled to and can selectively activate valves for the household water supply 371 and the water supply unit 372. Further the controller 22 is coupled to the steam generator 391 and the heating element 392.

[0099] Optionally, the controller 322 is coupled to the user interface 324. The controller 322 can receive input from a user at the user interface 324. Additionally, the controller 322 can provide an output via the user interface 324 to provide information to the user.

[0100] The controller 322 can also be in communication with the drive system 381, the fan 417, and the drain pump 362.

[0101] At least one humidity sensor 323 can be separate or coupled to the steam dryer 310. The at least one humidity sensor 323 can be in communication with the controller 322 via a wired or wireless connection, although most likely wireless.

[0102] It is contemplated that the steam dryer 310 can be a laundry treating appliance such as a washer/dryer combo or washing machine having a variety of systems, some of which are controllable, to implement an automatic cycle of operation of treating clothing items or an automatic cycle of humidification. It is also contemplated

that the steam dryer 310 can be a cooking appliance having a variety of systems, some of which are controllable, to implement an automatic cycle of operation of cooking a food item or an automatic cycle of humidification.

[0103] Benefits of aspects of the disclosure include a 2 in 1 household appliance where the dishwasher can operate as a humidifier where the user receives the benefits of both a dishwasher and a humidifier. Operating as a humidifier, the dishwasher can provide health benefits for the user (i.e. reduced virus transmission, sinus and respiratory benefits, and a reduction in cracked lips/dry skin).

[0104] Another benefit is that the dishwasher, operating as a humidifier, can also improve the heating efficiency of the home. Moist air can hold heat longer than dry air, creating fewer cycles of operation for the home heating apparatus.

[0105] Yet another benefit is a space savings. The dishwasher having the humidifying assembly reduces the need for additional home humidifiers.

[0106] Further, there is a cost savings, as the user does not need to buy both a dishwasher and a humidifier, rather the dishwasher can execute (at separate or distinct times) both the dish treating cycle of operation and the humidifying cycle of operation.

[0107] Further still, the dishwasher can receive information about the home or business humidity level from a remote device such as, but not limited to, a thermostat, mobile device, HVAC system, or other remote or local humidity sensor.

[0108] To the extent not already described, the different features and structures of the various aspects can be used in combination with each other as desired. That one feature cannot be illustrated in all of the aspects is not meant to be construed that it cannot be, but is done for brevity of description. Thus, the various features of the different aspects can be mixed and matched as desired to form new aspects, whether or not the new aspects are expressly described. Combinations or permutations of features described herein are covered by this disclosure.

[0109] This written description uses examples to disclose aspects of the disclosure, including the best mode, and also to enable any person skilled in the art to practice aspects of the disclosure, including making and using any devices or systems and performing any incorporated methods. While aspects of the disclosure have been specifically described in connection with certain specific details thereof, it is to be understood that this is by way of illustration and not of limitation. Reasonable variation and modification are possible within the scope of the forgoing disclosure and drawings without departing from the spirit of the disclosure, which is defined in the appended claims.

[0110] Further aspects of the disclosure are provided by the subject matter of the following clauses:

[0111] A method of operating a dishwasher as a hu-

midifier, the method comprising in response to an input indicating a humidifying cycle of operation, implementing the humidifying cycle of operation by generating moisture-laden air within a treating chamber of the dishwasher, and emitting the generated moisture-laden air to an exterior surrounding the dishwasher, without the simultaneous implementation of a dish treating cycle of operation.

[0112] The method of any preceding clause, wherein the input indicating the humidifying cycle of operation comprises a user selection on a user interface of the dishwasher.

[0113] The method of any preceding clause, wherein the user selection is made between at least one of the humidifying cycle of operation and the dish treating cycle of operation.

[0114] The method of any preceding clause, wherein the input indicating the humidifying cycle of operation comprises a wirelessly transmitted signal received by the dishwasher.

[0115] The method of any preceding clause, wherein the wirelessly transmitted signal is generated from a humidity sensor remote from the dishwasher.

[0116] The method of any preceding clause, wherein the input indicating the humidifying cycle of operation is an output from a humidity sensor.

[0117] The method of any preceding clause, wherein the generating moisture-laden air comprises heating liquid within the dishwasher.

[0118] The method of any preceding clause, wherein the heating liquid within the dishwasher comprises at least one of flowing liquid through an inline heater within the dishwasher or heating liquid within a sump of the dishwasher.

[0119] The method of any preceding clause, wherein the emitting the generated moisture-laden air comprising venting the generated moisture-laden air from the treating chamber of the dishwasher.

[0120] The method of any preceding clause, wherein the venting the generated moisture-laden air from the treating chamber comprises operating an exhaust fan in the dishwasher.

[0121] The method of any preceding clause, wherein the exhaust fan emits the generated moisture-laden air through a closure to the treating chamber.

[0122] The method of any preceding clause, wherein the venting the generated moisture-laden air from the treating chamber comprises opening a closure to the treating chamber.

[0123] The method of any preceding clause, wherein liquid is not recirculated in the treating chamber during the implementing of the humidifying cycle of operation.

[0124] The method of any preceding clause, wherein treating chemistry is not dispensed into the treating chamber during the implementing of the humidifying cycle of operation.

[0125] The method of any preceding clause, wherein the implementing of the humidifying cycle of operation is

terminated after a predetermined amount of time.

[0126] The method of any preceding clause, wherein the implementing of the humidifying cycle of operation is terminated in response to a humidity signal received by the dishwasher.

[0127] A dishwasher for treating dishes according to a dish treating cycle of operation, the dishwasher comprising a tub at least partially defining a treating chamber, a door assembly for selectively closing the treating chamber, a water supply system fluidly coupling a household water supply to the treating chamber, a ventilation system for exhausting moisture-laden air from the treating chamber, a controller located within the dishwasher housing, wherein the controller includes information related to a humidifying cycle of operation and the dish treating cycle of operation, and a receiver located within the housing and in communication with the controller, wherein the receiver receives a humidity signal indicative of a humidity level of an environment exterior of the dishwasher, wherein the controller selectively operates the humidifying cycle of operating of the dishwasher in response to the humidity signal received by the receiver and communicated to the controller.

[0128] The dishwasher of any preceding clause, wherein the receiver is a wireless receiver and receives the humidity signal from a humidity sensor remote of the dishwasher.

[0129] The dishwasher of any preceding clause, further comprising an inline heater upstream of the treating chamber or a submersible heater to heat liquid to generate the moisture-laden air within the treating chamber.

[0130] The dishwasher of any preceding clause, wherein the ventilation system further comprises a conduit fluidly coupling the treating chamber and a heating, ventilation, and air conditioning system.

Claims

- 1. A method (200) of operating a dishwasher (10) as a humidifier, the method (200) comprising: in response to an input indicating a humidifying cycle of operation, implementing the humidifying cycle (202) of operation by generating moisture-laden air (204) within a treating chamber (16) of the dishwasher (10), and emitting the generated moisture-laden air (206) to an exterior surrounding the dishwasher (10), without the simultaneous implementation of a dish treating cycle of operation.
- 2. The method (200) of claim 1, wherein the input indicating the humidifying cycle of operation (202) comprises a user selection on a user interface (24) of the dishwasher (10).
- 3. The method (200) of claim 2, wherein the user selection is made between at least one of the humidifying cycle of operation and the dish treating cycle

of operation.

- 4. The method (200) of claim 1, wherein the input indicating the humidifying cycle of operation comprises a wirelessly transmitted signal received by the dishwasher (10).
- 5. The method (200) of claim 4, wherein the wirelessly transmitted signal is generated from a humidity sensor (25) remote from the dishwasher (10).
- 6. The method (200) of claim 1, wherein the input indicating the humidifying cycle of operation is an output from a humidity sensor (25).
- 7. The method (200) of claim 1, wherein the generating moisture-laden air (204) comprises heating liquid within the dishwasher (10).
- 8. The method (200) of claim 7, wherein the heating liquid within the dishwasher (10) comprises at least one of flowing liquid through an inline heater (91) within the dishwasher (10) or heating liquid within a sump (51) of the dishwasher (10).
- 9. The method (200) of claim 7, wherein the emitting the generated moisture-laden air (204) comprising venting the generated moisture-laden air (204) from the treating chamber (16) of the dishwasher (10).
- 10. The method (200) of claim 9, wherein the venting the generated moisture-laden air (204) from the treating chamber (16) comprises operating an exhaust fan (117) in the dishwasher (10).
- 11. The method (200) of claim 10, wherein the exhaust fan (117) emits the generated moisture-laden air (204) through a closure (20) to the treating chamber (16).
- 12. The method (200) of claim 9, wherein the venting the generated moisture-laden air (204) from the treating chamber (16) comprises opening a closure (20) to the treating chamber (16).
- 13. The method (200) of claim 1, wherein liquid is not recirculated in the treating chamber (16) during the implementing of the humidifying cycle (202) of operation.
- 14. The method (200) of claim 13, wherein treating chemistry is not dispensed into the treating chamber (16) during the implementing of the humidifying cycle (202) of operation.
- 15. The method (200) of claim 1, wherein the implementing of the humidifying cycle (202) of operation is terminated after a predetermined amount of time.

16. The method (200) of claim 1, wherein the implementing of the humidifying cycle (202) of operation is terminated in response to a humidity signal received by the dishwasher (10).

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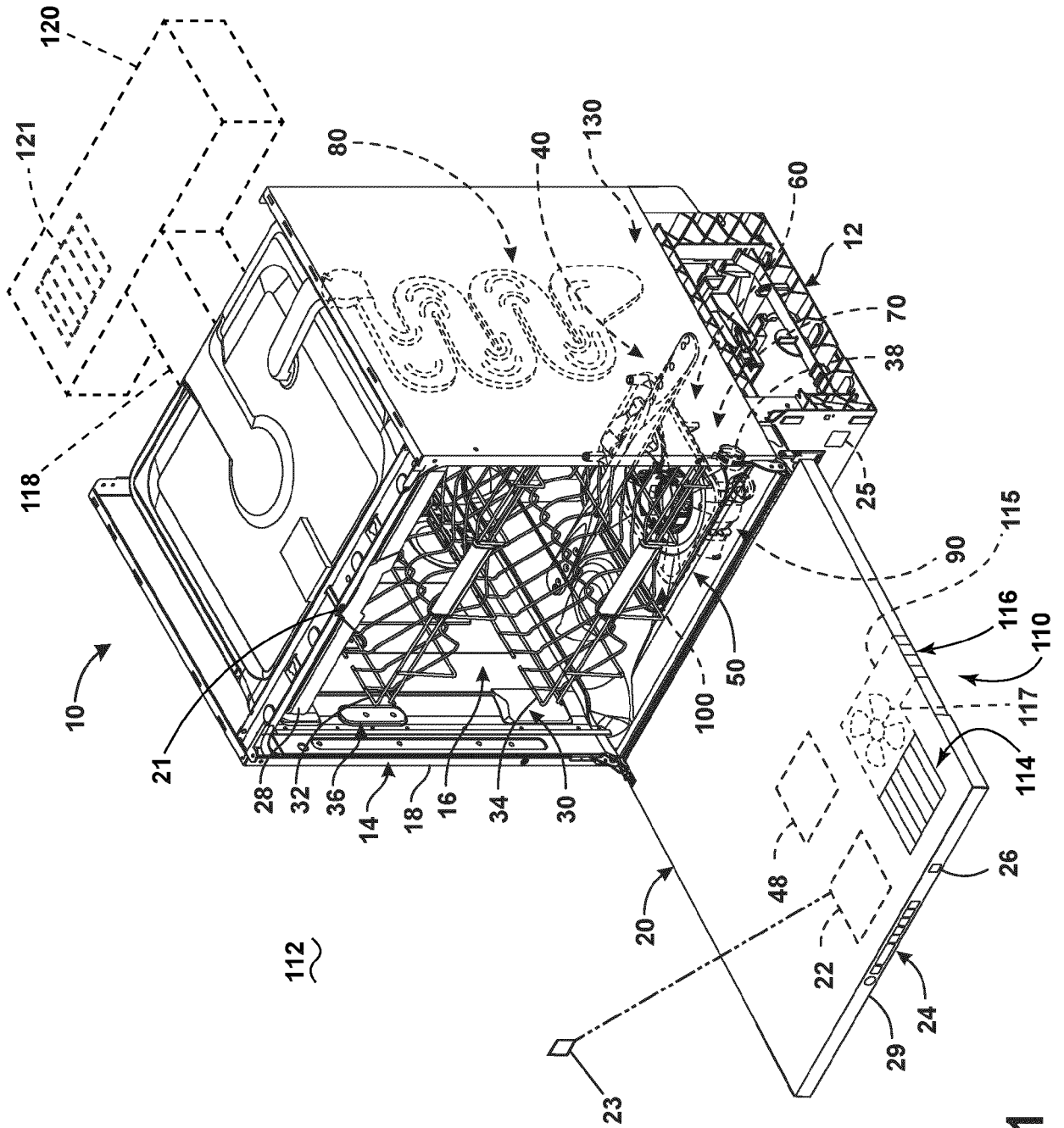


FIG. 1

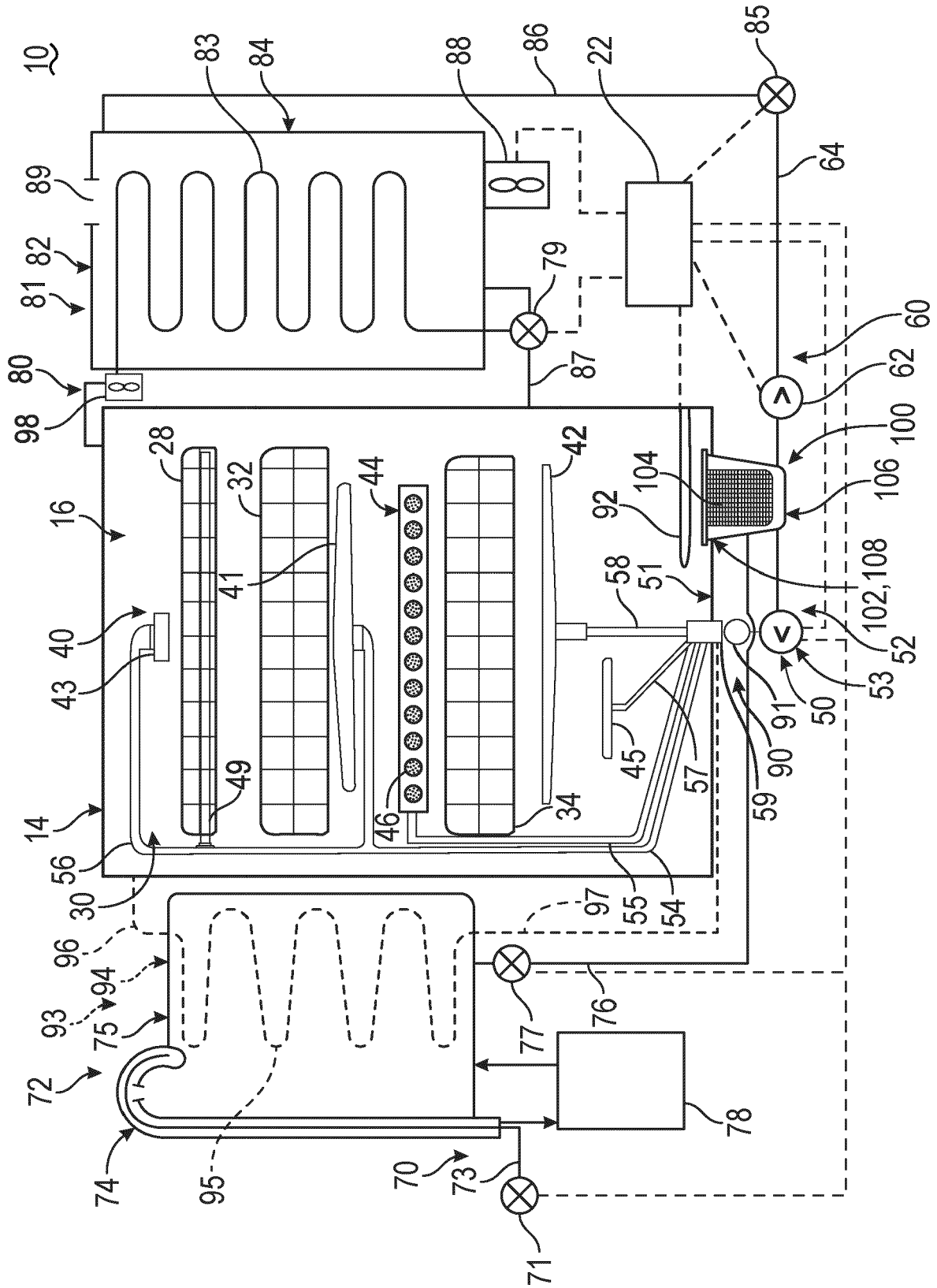


FIG. 2

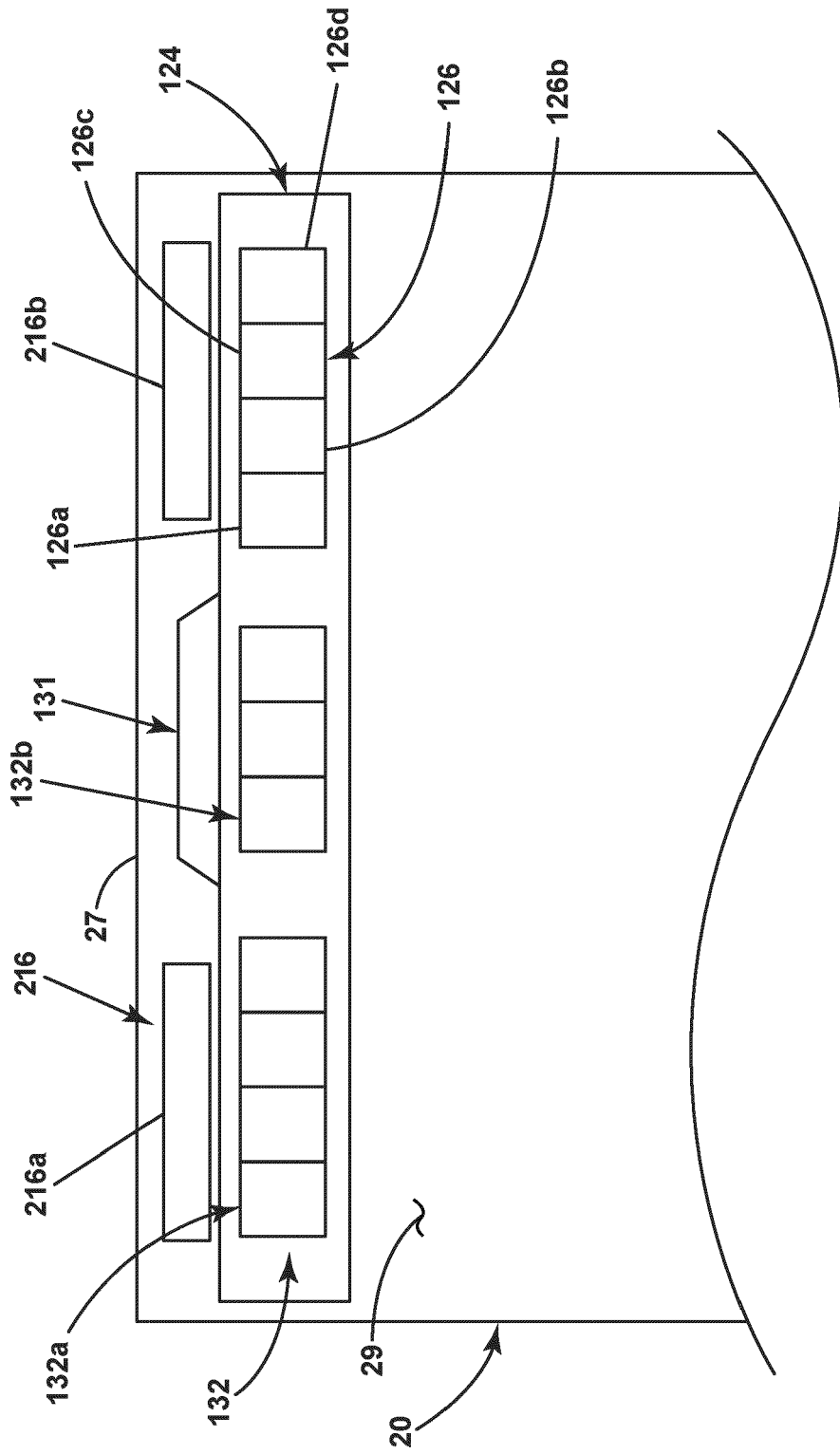


FIG. 3

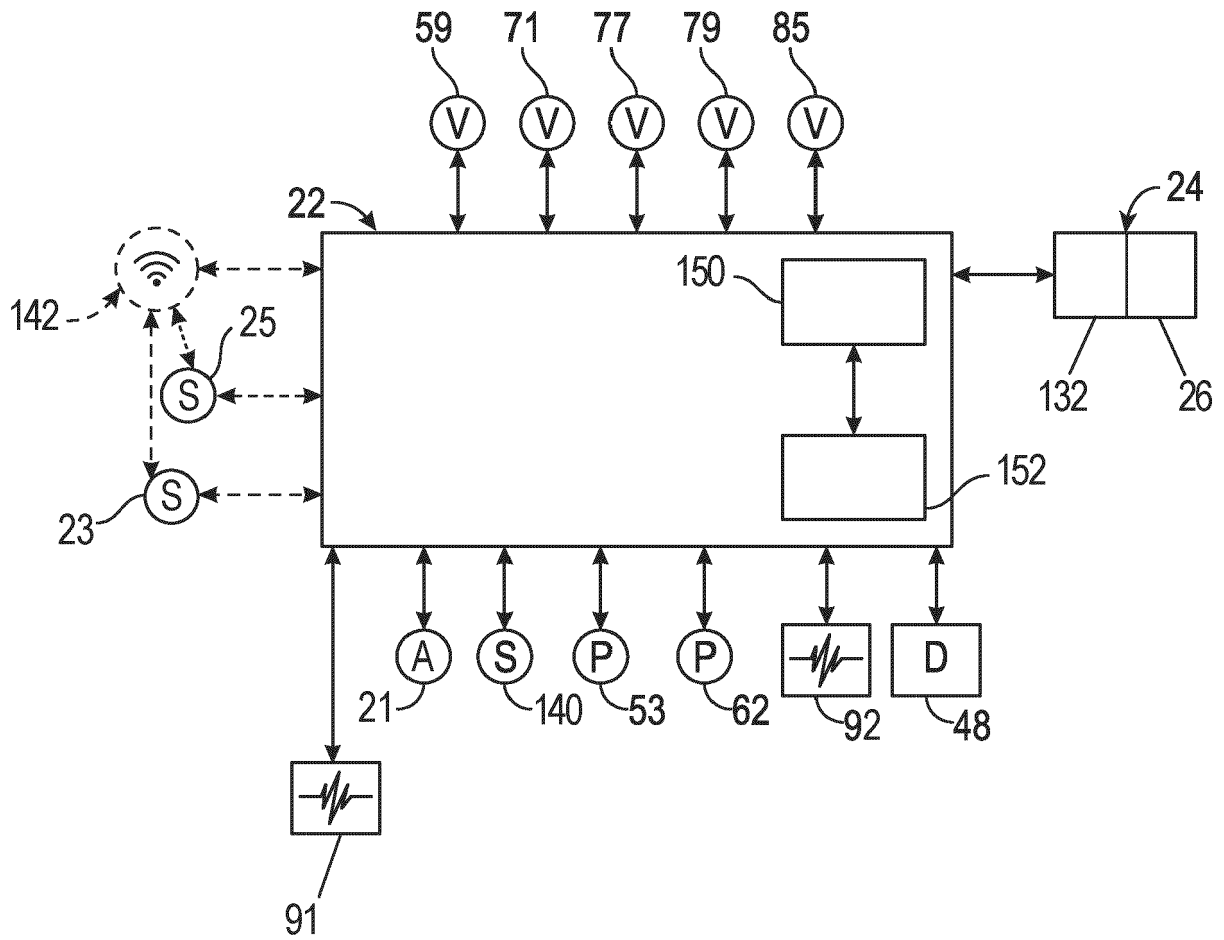


FIG. 4

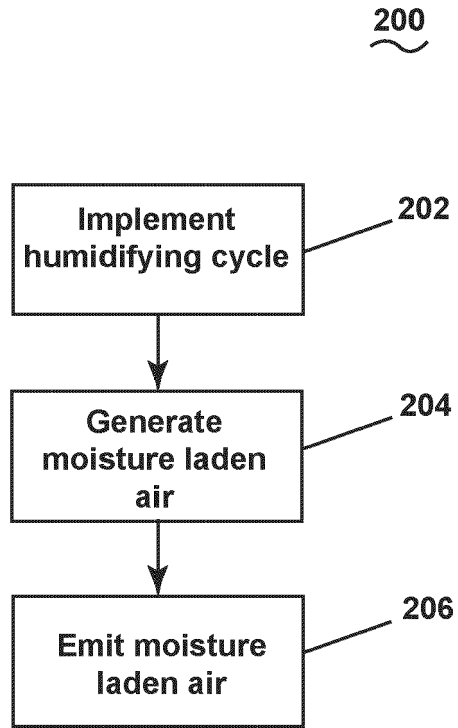


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
EP 23 17 2950

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	<p>KR 200 364 254 Y1 (DOOWON PRECISION CO., LTD.) 19 October 2004 (2004-10-19) * the whole document *</p> <p>-----</p>	1-16	<p>INV. A47L15/42</p>
A	<p>FR 2 041 884 A6 (MAURIN ROGER) 5 February 1971 (1971-02-05) * claim 6 *</p> <p>-----</p>	1-16	
A	<p>US 2022/104685 A1 (WOLOWICZ MATEUSZ MICHAL [PL] ET AL) 7 April 2022 (2022-04-07) * the whole document *</p> <p>-----</p>	1-16	
A	<p>US 2010/156259 A1 (MAY BRIAN W [US] ET AL) 24 June 2010 (2010-06-24) * the whole document *</p> <p>-----</p>	1-16	
A	<p>EP 2 371 258 A2 (V ZUG AG [CH]) 5 October 2011 (2011-10-05) * the whole document *</p> <p>-----</p>	1-16	
A	<p>US 2020/214537 A1 (SANKARAN VEERABHAGU THIYAGARAJAN [US] ET AL) 9 July 2020 (2020-07-09) * the whole document *</p> <p>-----</p>	1-16	<p>TECHNICAL FIELDS SEARCHED (IPC)</p> <p>A47L</p>
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 October 2023	Examiner Lodato, Alessandra
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p>		<p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 23 17 2950

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-10-2023

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