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(54) **DISHWASHER SYSTEM WITH AN AIR BARRIER FOR DOOR CONDENSATION**

(57) A dishwasher system for cleaning dishes may include a dishwasher cabinet defining an opening and a tub (104) configured to house dishes therein and run a dishwasher cycle, a door assembly (110) configured to selectively open and close the opening, and an air distribution duct (103) arranged around the opening of a

dishwasher, the duct (103) defining nozzles (146) at each of the top and sides of the opening for distributing air out of the duct (103) towards the opening to force hot and moist air from within the cabinet outward and away from the cabinet.

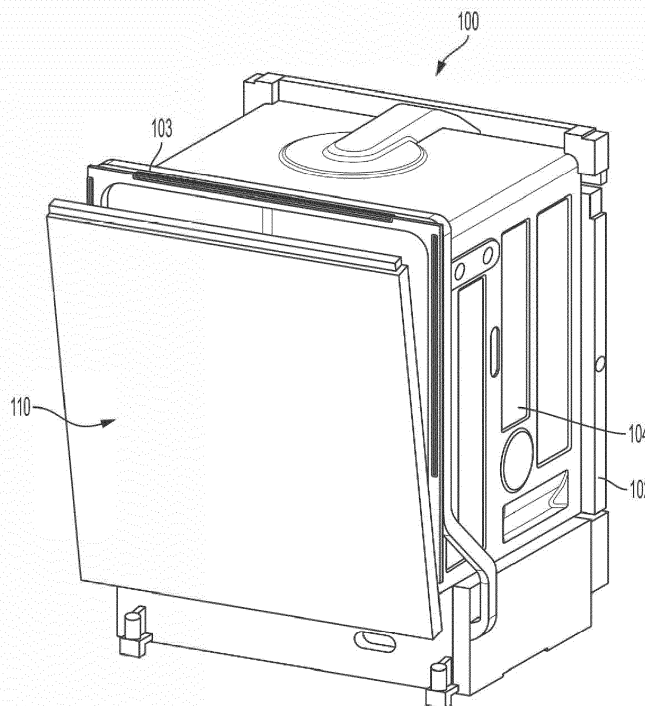


FIG. 1

Description

FIELD OF DISCLOSURE

[0001] Disclosed herein are air barriers for a dishwasher.

DESCRIPTION OF RELATED ART

[0002] Dishwashers are often arranged under a countertop and within or adjacent to cabinetry, walls, etc. Upon opening a dishwasher door during a drying phase of a cycle, warm and/or humid air may escape the dishwasher, exposing the countertop or cabinetry to high temperature and high humidity air. Such exposure may cause damage to the countertop or cabinetry, as well as the user interface arranged on the dishwasher door assembly.

SUMMARY

[0003] A dishwasher system for cleaning dishes may include a dishwasher cabinet defining an opening and a tub configured to house dishes therein and run a dishwasher cycle, a door assembly configured to selectively open and close the opening, and an air distribution duct arranged around the opening of a dishwasher, the duct defining nozzles at each of the top and sides of the opening for distributing air out of the duct towards the opening to force hot and moist air from within the cabinet outward and away from the cabinet.

[0004] In one embodiment, the duct forms a single piece U-shaped duct configured to receive fresh air via a fan at the base of the dishwasher.

[0005] In another example, a dishwasher frame defines the cabinet and at least one foam seal on each of the sides of the dishwasher, wherein the duct is at least partially formed at the sides between the frame and the foam seal.

[0006] In another embodiment, a plastic plate is arranged at the top of the dishwasher cabinet, wherein the duct is at least partially formed at the top of the dishwasher between the frame and the plastic plate.

[0007] In one embodiment, a tub duct is fluidly connected to the air distribution duct at the base of the dishwasher, the tub duct configured to selectively vent fresh air into the dishwasher cabinet to aid in drying dishes.

[0008] In another example, a flap is arranged between the air distribution duct and the tub duct to selectively close one of the ducts allowing fresh air into the other duct, and a controller in communication with the flap and programmed to control the position of the flap based on at least one of a cycle status and door position.

[0009] In another embodiment, the flap is configured to selectively block airflow to one of the tub duct and the air distribution duct, wherein selectively blocking the tub duct allows the air distribution duct to force the hot and moist air from within the cabinet outward and away from

the cabinet and wherein selectively blocking the air distribution duct allows for air to vent into the dishwasher cabinet to aid in drying dishes.

[0010] A dishwasher system for cleaning dishes may include a dishwasher cabinet defining an opening and a tub configured to house dishes therein and run a dishwasher cycle, a door assembly configured to selectively open and close the opening, and a U-shaped duct arranged around the opening of a dishwasher, the duct defining nozzles at each of the top and sides of the opening for distributing air out of the duct towards the opening to force hot and moist air from within the cabinet outward and away from the cabinet.

[0011] In one embodiment, a fan is arranged at one side of the duct at the base of the dishwasher to provide fresh air to the duct.

[0012] In another example, a dishwasher frame defines the cabinet and at least one foam seal on each of the sides of the dishwasher, wherein the duct is at least partially formed at the sides between the frame and the foam seal.

[0013] In another embodiment, a plastic plate is arranged at the top of the dishwasher cabinet, wherein the duct is at least partially formed at the top of the dishwasher between the frame and the plastic plate.

[0014] In one embodiment, a tub duct is fluidly connected to the air distribution duct at the base of the dishwasher, the tub duct configured to selectively vent fresh air into the dishwasher cabinet to aid in drying dishes.

[0015] In another example, a flap is arranged between the air distribution duct and the tub duct to selectively close one of the ducts allowing fresh air into the other duct, and a controller in communication with the flap and programmed to control the position of the flap based on at least one of a cycle status and door position.

[0016] In another embodiment, the flap is configured to selectively block airflow to one of the tub duct and the air distribution duct, wherein selectively blocking the tub duct allows the air distribution duct to force the hot and moist air from within the cabinet outward and away from the cabinet and wherein selectively blocking the air distribution duct allows for air to vent into the dishwasher cabinet to aid in drying dishes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The embodiments of the present disclosure are pointed out with particularity in the appended claims. However, other features of the various embodiments will become more apparent and will be best understood by referring to the following detailed description in conjunction with the accompanying drawings in which:

FIG. 1 illustrates an example perspective view of a dishwasher with the door assembly being partially open and having a U-shaped duct in accordance with one example embodiment;

FIG. 2 illustrates an example perspective view of the duct of FIG. 1;

FIG. 3 illustrates an example perspective view of a dishwasher with the door assembly being partially open and having a U-shaped duct created by a dishwasher frame in accordance with one example embodiment;

FIG. 4 illustrates an example perspective view of the duct of FIG. 3;

FIG. 5 illustrates an example perspective view of a dishwasher with the door assembly being partially open and having a U-shaped duct similar to FIG. 1 with a vent feature in accordance with one example embodiment; and

FIG. 6 illustrates an example perspective view of the duct of FIG. 5;

FIG. 7A illustrates an example partial side view of the dishwasher of FIG. 3 illustrating airstreams; and

FIG. 7B illustrates an example partial side view of the dishwasher of FIG. 3 illustrating alternative airstreams.

DETAILED DESCRIPTION

[0018] As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention that may be embodied in various and alternative forms. The figures are not necessarily to scale; some features may be exaggerated or minimized to show details of particular components. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ the present invention.

[0019] Dishwashers are often arranged under a countertop and within or adjacent to cabinetry, walls, etc. Upon opening a dishwasher door after a wash or dry cycle, warm and/or humid air may escape the dishwasher, exposing the countertop or cabinetry to high temperature and high humidity air. Such exposure may cause damage to the countertop or cabinetry. Some users leave the door open after the dry cycle to further dry the dishes. Over time, exposure to the high temperature high humidity air may damage the adjacent cabinetry due to droplets of condensation that may form. In addition to damage to the surrounding cabinetry, the user interface on the dishwasher may also be overly exposed to hot and moist air. This exposure may cause unwanted steering inputs that may disturb the cycle of the dishwasher.

[0020] Door opening drying systems may open the door of the dishwasher after the rinse phase and let the

hot and moist air from the dishwasher vent out of the dishwasher. This may expedite the drying process, but can also cause the issues described above. In order to mitigate moisture build up around the cabinetry, some dishwasher systems deactivate the ability to open the dishwasher door during hot dry cycles. Some other solutions include a dedicated barrier, such as a protective foil, to be installed under the kitchen worktop. However, once a dishwasher is installed it may be difficult to add a barrier. Further, user satisfaction may be decreased with the inability to open the door during hot dry cycles.

[0021] Disclosed herein is an air circulation system configured to protect the cabinetry around the dishwasher as well as the user interface panel from moisture when a door opening system (DOS) is used. The air circulation system may also decrease the overall cycle time and allow for door opening following the dry phase sooner than other systems that do not include an air circulation system. The system improves moisture management both before and after the door is opened by the DOS system. The system may create a barrier that protects the cabinetry and user interface from moisture. This allows for DOS activation at a higher temperature and thus reduces the amount of time needed for the machine to cool down prior to DOS activation. This in turn reduces cycle time and also improves dry performance by increasing the evaporation rate of moisture on the dish load, especially on items that are normally hard to dry, such as plastics.

[0022] The system may also be active prior to the door opening, acting as a closed loop condensing dry system. The system may start drying dishes and increase total dry performance of the dishwasher, especially for consumers that open the door immediately after the cycle ends. When activated before door opening, the system can effectively dry, but also cool down the interior of the tub and the desired temperature for DOS activation may be achieved quicker, reducing cycle time. The system may also provide fresh air to the interior of the tub, which will help in drying for low energy and low temperature cycles.

[0023] In the examples herein, a U-shaped duct may be arranged within a dishwasher cabinet surrounding the door opening. Horizontal and vertical nozzles may effectively push the hot and moist air leaving the cabinet away from the cabinets and countertop to prevent damage to the surrounding furniture.

[0024] In one example, an air distribution duct may define nozzles at each of the top and sides of the opening for distributing air out of the duct towards the opening to force hot and moist air from within the cabinet outward and away from the cabinet. The duct forms a single piece U-shaped duct configured to receive air via a fan at the base of the dishwasher. In another example, the duct may be formed by the dishwasher frame and at least one foam seal on each of the sides of the dishwasher where the duct is formed at the sides between the frame and the foam seal. By placing the duct around the opening,

the duct does not impact the sound insulation of the dishwasher, which is typically arranged around the entire outside of the dishwashing cabinet. This also allows for similar insulation of the dishwasher to be achieved.

[0025] FIG. 1 illustrates an example view of a dishwasher 100 with a door assembly 110 being partially open and having a U-shaped duct 103 in accordance with one example embodiment. FIG. 2 illustrates an example perspective view of the duct 103 of FIG. 1. Referring to FIG. 1, the dishwasher 100 may be an automated appliance configured to clean kitchen equipment placed within the dishwasher 100. The kitchen equipment may include tableware such as dishes, glassware, cutlery and other utensils, and well as food preparation equipment such as pots and pans, slicers, presses, and peelers. To perform the cleaning, the kitchen equipment is placed on racks (not shown) inside a tub 104 of the dishwasher 100. A door assembly 110 is closed to form a watertight seal around the tub 104. Washing liquid and rinsing liquid is propelled from jets onto the kitchen equipment to clean dirt, grease, and other contaminants off the kitchen equipment. Though the examples described herein are generally related to in-home and personal use dishwashers, the same concepts may be applicable to commercial dishwashers as well.

[0026] The dishwasher 100 may include a frame 102 defining the exterior of the dishwasher 100. The frame 102 may be configured to interface with components exterior to the dishwasher 100 for installation, such as cabinets, countertops, floors, etc. The frame 102 may include a top, left side, right side, back, and bottom.

[0027] The tub 104 may define a hollow cavity or interior of the dishwasher for washing dishes. The tub 104 may define an open-face, or access opening with walls at the top, left side, right side, back and bottom. A chassis (not individually labeled) may be arranged between the frame 102 and the tub 104 to maintain the tub 104 within the frame. The chassis may support the tub 104 and allow for maintaining space between the frame 102 and the tub 104.

[0028] The door assembly 110 may be arranged at a front of the dishwasher 100. The door assembly 110 may be attached to the dishwasher at the bottom front edge of the frame 102 and may be hinged thereat to move between open and closed positions. In the closed position, the door assembly 110 may seal the tub 104 at the access opening. In the open position, the cavity may be accessible via the access opening. In another example, the door assembly 110 may operate as a drawer that can be slidably extended outward from the front of the dishwasher 100 to move into the open position, and slidably retracted back into the dishwasher 100 to the closed position to seal the tub 104.

[0029] The dishwasher 100 may be arranged near or within cabinetry such as kitchen cabinets and surfaces, including countertops. Certain moisture areas 130 may be arranged at or near the top of the dishwasher door assembly 110 and be susceptible of being exposed to

hot and humid air from the dishwasher upon door opening.

[0030] The dishwasher 100 may include a spray system for spraying liquid within the tub 104 during a cleaning cycle. In an example cycle, washing liquid including soap may first be sprayed onto the kitchen equipment, and then once washed, rinsing liquid without soap may then be sprayed onto the kitchen equipment. The spray system may include various jets for providing the liquid onto the surfaces of dishes during the automated washing and rinsing operations. The dishwasher 100 may also include a heating system or heating element for heating the tub 104 for drying during a drying phase of the cycle. In combination with the moisture provide by the spray system, the tub 104 may be configured to house hot and humid air therein during at least the wash and dry cycles. In some systems, current door opening temperatures are set at a predefined threshold, such as 45 degrees Celsius.

[0031] Referring to FIG. 1 and FIG. 2, in order to obviate this lengthy cool time, the dishwasher 100 may include a duct 103 configured to affect and direct the hot and moist air leaving the door opening. The duct 103 may form a U-shape around the door opening at the frame 102. The duct 103 may include a first side portion 140 and second side portion 142 configured to extend along the side of the dishwasher 100 and connected therebetween by a top portion 144. The duct 103 may be a single piece formed from blow molding or injection molding.

[0032] At least one nozzle 146 may be arranged along at least a portion of at least one of the portions of the duct 103. In the example shown in FIG.1, the at least one nozzle 146 includes three nozzles: a first nozzle 146a arranged at the first side portion 140, a second nozzle 146b arranged at the second side portion 142, and a third nozzle 146c arranged at the top portion 144. The nozzles 146 may be configured to release air therefrom. When the door assembly 110 is opened with hot and moist air starting to escape the dishwasher 100, the nozzles may release or transport cooler dry air towards the opening, helping to push the hot and moist air out of the opening but away from the surrounding furniture. Additionally or alternatively, the nozzles may include multiple nozzles on each side of shorter length, etc.

[0033] A fan 152 may be arranged at one end of the duct 103. The fan 152 may be arranged within the dishwasher, or alternatively, under a bottom panel or base of the dishwasher. The fan 152 may include a fan assembly as part of a vent assembly of the dishwasher. The fan 152 may also be a standalone fan powered by a fan motor and powered by the dishwasher's electrical system. The fan 152 may be an addition to the fan traditionally installed in a dishwasher. The fan may be a DC fan as well as an AC fan.

[0034] The fan 152 may operate to provide air to the duct 103 at one side of the duct 103. In the example shown in FIG. 2, the fan 152 is arranged at the second side portion 142 of the duct 103 and connected to the

second side portion 142 via a transition portion 154. The transition portion 154 may be angled, bent, and shaped to accommodate connecting the fan 152 to the second side portion 142. The transition portion may be necessary where the fan 152 is arranged in the base and connected to the dishwasher electrical system.

[0035] By providing air to the duct 103, the fan 152 creates an airflow therethrough. As air is forced into the duct 103, air subsequently leaves the duct 103 via the nozzles 146. The nozzles 146 create an airflow in the direction of the respective duct portion. The first nozzle 146a and second nozzle 146b may form first and second vertical air streams 160a, 160b, respectively. These vertical air streams 160a, 160b may create an airflow along kitchen cabinets typically arranged on either side of the dishwasher 100. The vertical air streams 160a, 160b, may thus force the hot and moist air from the cabinet straight outward, protecting the adjacent cabinets from undue exposure to the hot and moist air.

[0036] Similarly, the third nozzle 146c may form a third air stream 160c extending horizontally. This third air stream 160c may force the hot and moist air exiting the dishwasher cabinet from coming into contact with the countertop above the dishwasher.

[0037] The nozzles 146 may be open, and the fan 152 may be controlled in accordance with certain factors, such as the current cycle, state of the door assembly 110, etc. For example, the fan 152 may be activated upon certain predefined conditions and door states. If a wash cycle has recently completed, and a user opens the door, the fan 152 may be activated. Certain other factors may also be considered, such as temperature inside the tub 104, likelihood that the door assembly 110 will be opened, interaction with the user interface or handle, etc.

[0038] In one embodiment, and although not shown in the figures, the nozzles 146 may include a gate mechanism. The gate mechanism may selectively open and close the nozzle 146. The gate mechanism may be controlled based on the above referenced factors, including the dishwashing cycle and the door state. For example, the gate mechanism may be closed during the wash portion of the cycle, but opened when the door is opened and/or the wash cycle has ended.

[0039] While three separate nozzles 146 are shown, one along each of the U-shaped portions, more or fewer nozzles 146 may be arranged. In one example, the top portion 144 may include two nozzles, each spaced from one another.

[0040] The dishwasher 100 may include a controller to control the components herein such as motors, gears, sensors, water flow, sprayers, heating elements, fans, gate mechanisms, door assemblies, etc. Specifically, the controller may control the fan 152, motor for the fan, nozzles and any gate mechanism therefor. The controller may include the machine controller and any additional controllers provided for controlling any of the components of the dishwasher 100. Many known types of controllers can be used for the controller. It is contemplated that the

controller is a microprocessor-based controller that implements control software and sends/receives one or more electrical signals to/from each of the various working components to implement the control software.

[0041] The controller may also include or be coupled to a memory configured to include instructions and databases to carry out the systems and processes disclosed herein. The controller may also be part of the general dishwasher control system that controls wash cycles and other systems. The controller may receive data and commands from the system components and may also have an antenna for wireless communication with the devices within the dishwasher 100, as well as device remote from the dishwasher 100. In one example, the controller may receive commands from the user interface on the dishwasher 100. Additionally or alternatively, the controller may receive commands from a mobile application on device remote from the dishwasher 100.

[0042] FIG. 3 illustrates an example perspective view of the dishwasher 100 with the door assembly being partially open and having a U-shaped distribution duct 203 created by the dishwasher frame 102 in accordance with one example embodiment. FIG. 4 illustrates an example perspective view of the duct 203 of FIG. 3.

[0043] In this example, plastic plates and foam seals may be arranged about the frame 102 near the door opening. These parts create a duct 203 around the frame 102 and air may be pushed through the cavity created by the parts and the frame 102. The duct 203 may be formed by the first side portion 140 and the second side portion 142 extending vertically along the sides of the dishwasher and connected therebetween by the top portion 144. In this example, the side portions 140, 142 may be foam seals extending along the internal wall of the frame 102 to create the side ducts. The top portion 144 may be a plastic cover for the horizontal section of the front of the frame 102. While the sides are described as being formed with foam seals, the sides may also be formed with plastic covers similar to the top portion 144.

[0044] Similar to the configuration in FIGs. 1 and 2, the first nozzle 146a may be arranged at the first side portion 140, the second nozzle 146b arranged at the second side portion 142, and the third nozzle 146c arranged at the top portion 144. The nozzles 146 may be configured to release air therefrom. When the door assembly 110 is opened with hot and moist air starting to escape the dishwasher 100, the nozzles may release or transport cooler dry air towards the opening, helping to push the hot and moist air out of the opening but away from the surrounding furniture. Similarly, the third nozzle 146c may form a third air stream 160c extending horizontally. This third air stream 160c may force the hot and moist air exiting the dishwasher cabinet from coming into contact with the countertop above the dishwasher.

[0045] The fan 152 may operate to provide air to the duct 103 at one side of the duct 103 via the transition portion 154. The transition portion 154 may provide fresh air into the cross section of the front frame 102, e.g., the

duct 203 created by the foam. By providing air to the duct 203, the fan 152 creates an airflow therethrough. As air is forced into the duct 203 formed between the foam, plastic and frame 102, and air subsequently leaves the duct 103 via the nozzles 146. The nozzles 146 create an airflow in the direction of the respective duct portion. The first nozzle 146a and second nozzle 146b may form first and second vertical air streams 160a, 160b, respectively. These vertical air streams 160a, 160b may create an airflow along kitchen cabinets typically arranged on either side of the dishwasher 100. The vertical air streams 160a, 160b, may thus force the hot and moist air from the cabinet straight outward, protecting the adjacent cabinets from undue exposure to the hot and moist air.

[0046] FIG. 5 illustrates an example perspective view of a dishwasher with the door assembly being partially open and having a U-shaped duct 303 similar to FIG. 1 with a tub vent 310 feature in accordance with one example embodiment. FIG. 6 illustrates an example perspective view of the duct 303 of FIG. 5. The duct 103 may form a U-shape around the door opening at the frame 102. The duct 103 may include the first side portion 140 and second side portion 142 configured to extend along the side of the dishwasher 100 and connected therewith by the top portion 144. The duct 103 may be a single piece formed from blow molding or injection molding.

[0047] Referring to FIGs. 5, 6 and 7, similar to the configuration in FIGs. 1 and 2, the first nozzle 146a may be arranged at the first side portion 140, the second nozzle 146b arranged at the second side portion 142, and the third nozzle 146c arranged at the top portion 144. The nozzles 146 may be configured to release air therefrom. When the door assembly 110 is opened with hot and moist air starting to escape the dishwasher 100, the nozzles may release or transport cooler dry air towards the opening, helping to push the hot and moist air out of the opening but away from the surrounding furniture. Similarly, the third nozzle 146c may form a third air stream 160c extending horizontally. This third air stream 160c may force the hot and moist air exiting the dishwasher cabinet from coming into contact with the countertop above the dishwasher.

[0048] As best illustrated in the example of FIG. 7A, the fan 152 may operate to provide air to the duct 103 at one side of the duct 103 via the transition portion 154. The transition portion 154 may provide fresh air into the cross section of the front frame 102, e.g., the duct 203 created by the foam. By providing air to the duct 203, the fan 152 creates a duct airflow 316 therethrough. As air is forced into the duct 203 formed between the foam, plastic and frame 102, and air subsequently leaves the duct 103 via the nozzles 146. The nozzles 146 create an airflow in the direction of the respective duct portion. The first nozzle 146a and second nozzle 146b may form first and second vertical air streams 160a, 160b, respectively. These vertical air streams 160a, 160b may create an airflow along kitchen cabinets typically arranged on either

side of the dishwasher 100. The vertical air streams 160a, 160b, may thus force the hot and moist air from the cabinet straight outward, protecting the adjacent cabinets from undue exposure to the hot and moist air.

[0049] The duct 303 may include a tub vent 310 arranged at the transition portion 154. The fan 152 may provide air both to the duct 303, as well as the tub vent 310. As best illustrated in the example of FIG. 7B, the tub vent 310 may vent the air into the cavity of the dishwasher 100 via a tub airstream 314. This air may aid in cooling the air within the cabinet and drying dishes after a wash cycle is complete. The tub vent 310 may aid in drying dishes during low energy cycles that use lower temperatures. In this use-case, the dishes may not be dried as quickly due to a decrease in heat used for drying. The tub vent 310 may thus allow additional air flow into the tub to aid in drying and allow for low energy criteria to be met.

[0050] The fan 152 may provide air to one of the transition portion 154 and the tub vent, and A flap portion 312 may be arranged at the tub vent and configured to direct air into one of the second side portion 142 or the tub vent 310. The flap portion 312 may be controlled by the controller and may be instructed to close access to the tub vent 310 when a normal dry cycle is implemented. In this case, the hot and moist air may effectively dry the dishes, but possibly cause harm to the surrounding furniture. Thus, air flow through the nozzles 146 may be appreciated to protect the furniture during high temperature cycles. On the other hand, if a low energy, low heat dry cycle is implemented, air flow generated by the fan 152 may be put to better use by helping to dry the dishes. Because the air is not as warm and humidity levels are lower, the air escaping the dishwasher around the frame 102 may be less harmful to the surrounding furniture.

[0051] While exemplary embodiments are described above, it is not intended that these embodiments describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention. Additionally, the features of various implementing embodiments may be combined to form further embodiments of the invention.

[0052] For purposes of description herein the terms "upper," "lower," "right," "left," "rear," "front," "vertical," "horizontal," and derivatives thereof shall relate to the device as oriented in FIG. 1. However, it is to be understood that the device may assume various alternative orientations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following claims. Hence, specific dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting, unless the claims expressly state otherwise.

[0053] The descriptions of the various embodiments

have been presented for purposes of illustration, but are not intended to be exhaustive or limited to the embodiments disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art without departing from the scope and spirit of the described embodiments.

[0054] The flowcharts and block diagrams in the figures illustrate the architecture, functionality, and operation of possible implementations of systems, methods and computer program products according to various embodiments of the present disclosure. In this regard, each block in the flowchart or block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s). It should also be noted that, in some alternative implementations, the functions noted in the block may occur out of the order noted in the figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be noted that each block of the block diagrams and/or flowchart illustration, and combinations of blocks in the block diagrams and/or flowchart illustration, can be implemented by special purpose hardware-based systems that perform the specified functions or acts, or combinations of special purpose hardware and computer instructions.

Claims

1. A dishwasher system for cleaning dishes, comprising:

a dishwasher cabinet defining an opening and a tub (104) configured to house dishes therein and run a dishwasher cycle;
a door assembly (110) configured to selectively open and close the opening; and
an air distribution duct (103) arranged around the opening of a dishwasher (100), the duct defining nozzles (146) at each of the top and sides of the opening for distributing air out of the duct (103) towards the opening to force hot and moist air from within the cabinet outward and away from the cabinet.

2. The system of claim 1, wherein the duct (103) forms a single piece U-shaped duct configured to receive fresh air via a fan at the base of the dishwasher (100).
3. The system of claim 1, further comprising a dishwasher frame (102) defining the cabinet and at least one foam seal on each of the sides of the dishwasher (100), wherein the duct (103) is at least partially formed at the sides between the frame (102) and the foam seal.

4. The system of claim 3, further comprising a plastic plate arranged at the top of the dishwasher cabinet, wherein the duct (103) is at least partially formed at the top of the dishwasher (100) between the frame (102) and the plastic plate.

5. The system of claim 4, further comprising a tub vent (310) fluidly connected to the air distribution duct (103, 303) at the base of the dishwasher (100), the tub vent (310) configured to selectively vent fresh air into the dishwasher cabinet to aid in drying dishes.

6. The system of claim 5, further comprising a flap (312) arranged between the air distribution duct and the tub vent (310) to selectively close one of the ducts allowing fresh air into the other duct, and a controller in communication with the flap (312) and programmed to control the position of the flap (312) based on at least one of a cycle status and door position.

7. The system of claim 6, wherein the flap (312) is configured to selectively block airflow to one of the tub vent (310) and the air distribution duct (103, 303), wherein selectively blocking the tub vent (310) allows the air distribution duct (103, 303) to force the hot and moist air from within the cabinet outward and away from the cabinet and wherein selectively blocking the air distribution duct (103, 303) allows for air to vent into the dishwasher cabinet to aid in drying dishes.

8. A dishwasher system for cleaning dishes, comprising:

a dishwasher cabinet defining an opening and a tub (104) configured to house dishes therein and run a dishwasher cycle;
a door assembly (110) configured to selectively open and close the opening; and
a U-shaped duct (103) arranged around the opening of a dishwasher (100), the duct (103) defining nozzles (146) at each of the top and sides of the opening for distributing air out of the duct (103) towards the opening to force hot and moist air from within the cabinet outward and away from the cabinet.

9. The system of claim 8, further comprising a fan (152) arranged at one side of the duct (103) at the base of the dishwasher to provide fresh air to the duct (103).
10. The system of claim 8, further comprising a dishwasher frame (102) defining the cabinet and at least one foam seal on each of the sides of the dishwasher (100), wherein the duct (103) is at least partially formed at the sides between the frame (102) and the foam seal.

11. The system of claim 10, further comprising a plastic plate arranged at the top of the dishwasher cabinet, wherein the duct (103) is at least partially formed at the top of the dishwasher between the frame (102) and the plastic plate. 5
12. The system of claim 11, further comprising a tub vent (310) fluidly connected to the air distribution duct (103, 303) at the base of the dishwasher (100), the tub vent (310) configured to selectively vent fresh air into the dishwasher cabinet to aid in drying dishes. 10
13. The system of claim 12, further comprising flap (312) arranged between the air distribution duct (103, 303) and the tub vent (310) to selectively close one of the ducts allowing fresh air into the other duct, and a controller in communication with the flap (312) and programmed to control the position of the flap (312) based on at least one of a cycle status and door position. 15 20
14. The system of claim 13, wherein the flap (312) is configured to selectively block airflow to one of the tub vent (310) and the air distribution duct (103, 303), wherein selectively blocking the tub vent (310) allows the air distribution duct (103, 303) to force the hot and moist air from within the cabinet outward and away from the cabinet and wherein selectively blocking the air distribution duct (103, 303) allows for air to vent into the dishwasher cabinet to aid in drying dishes. 25 30

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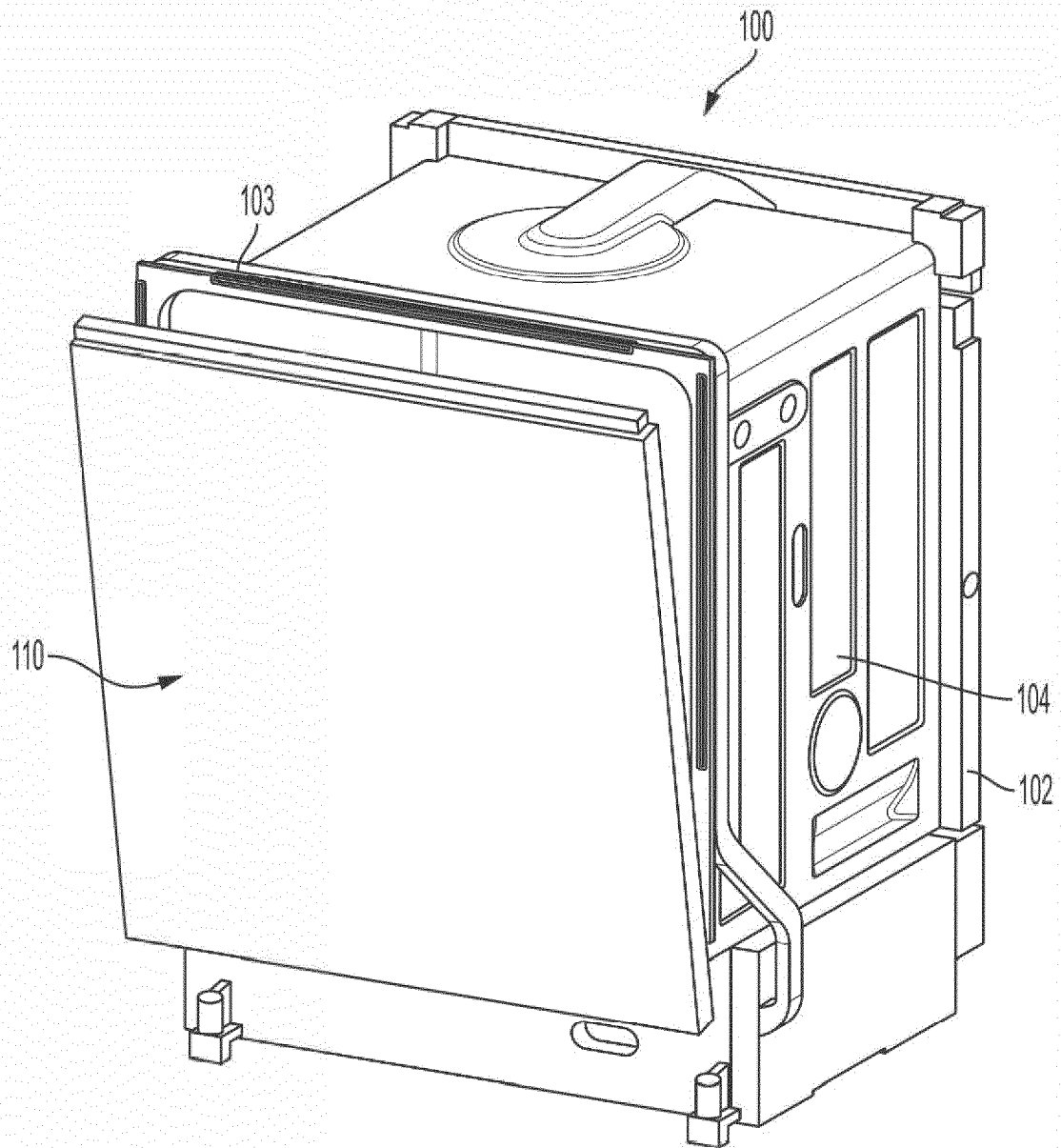


FIG. 1

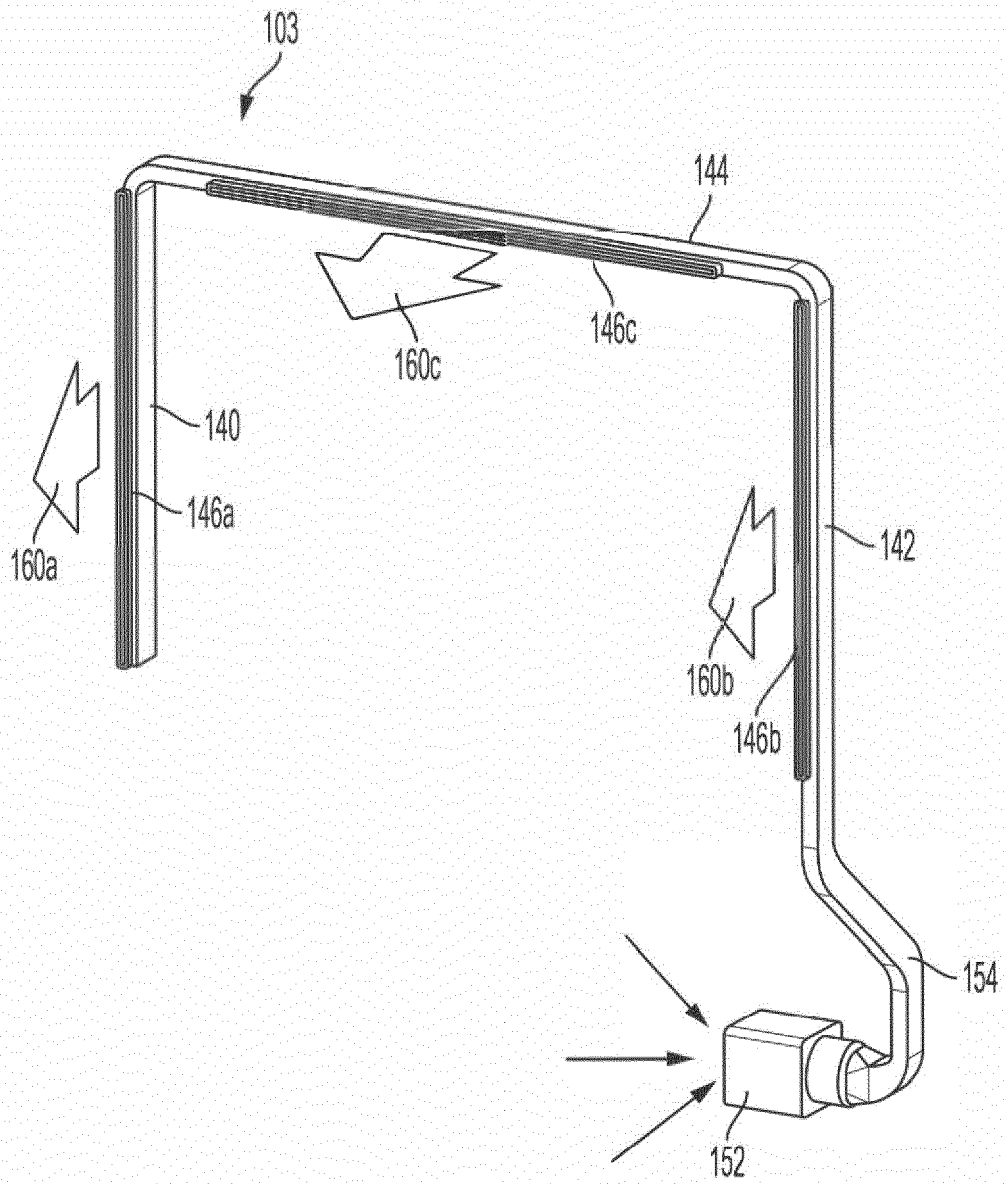
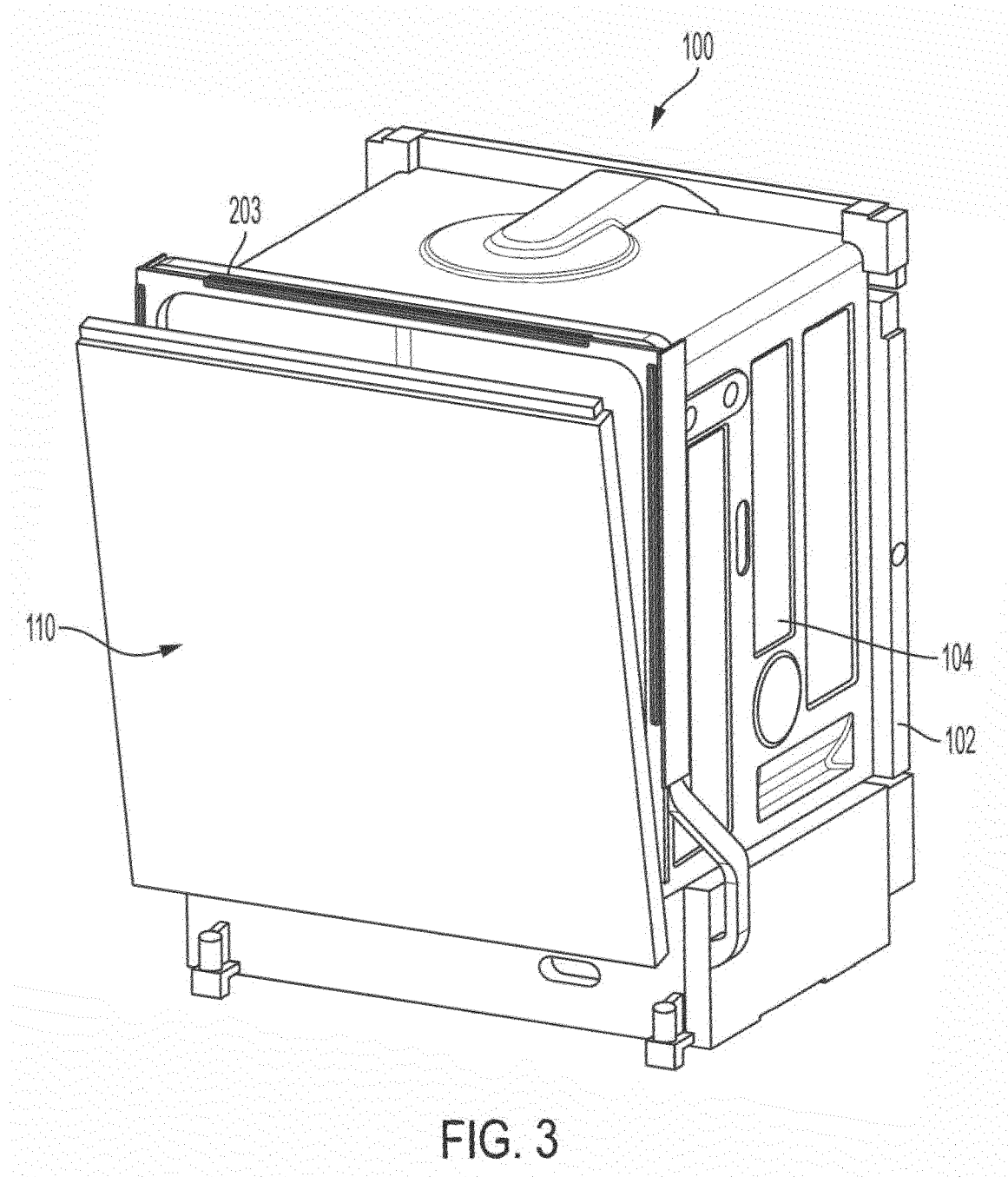


FIG. 2



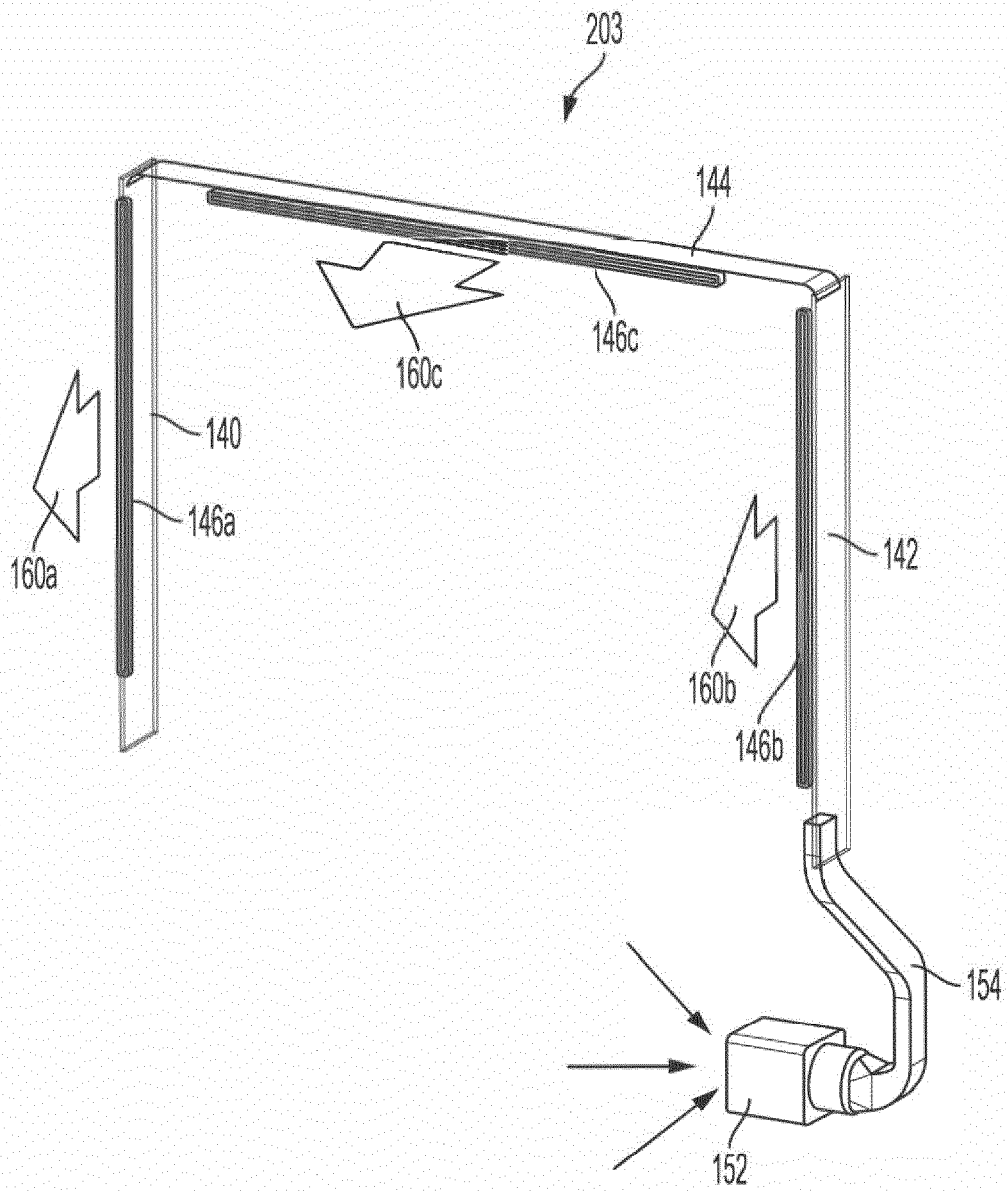


FIG. 4

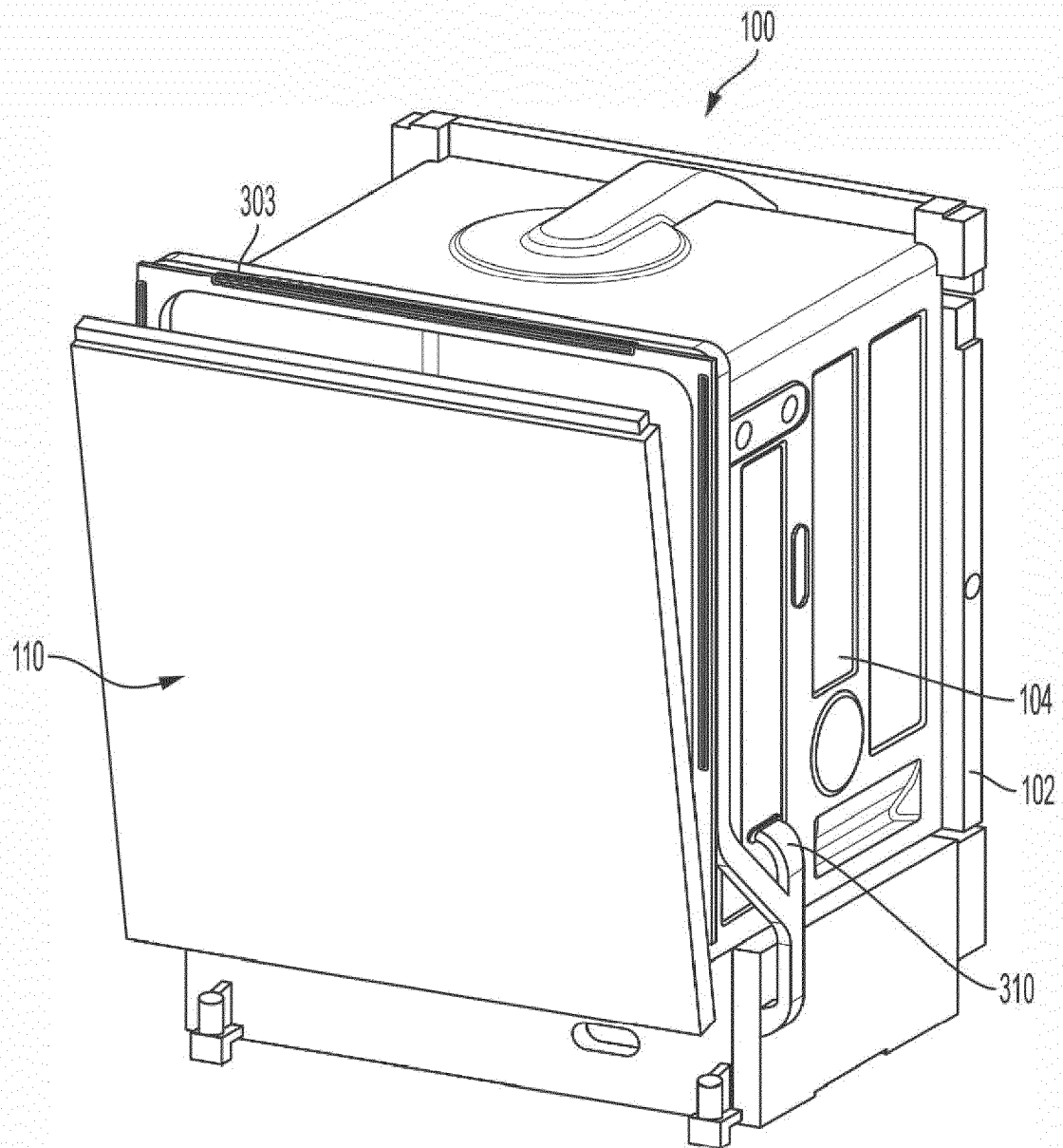


FIG. 5

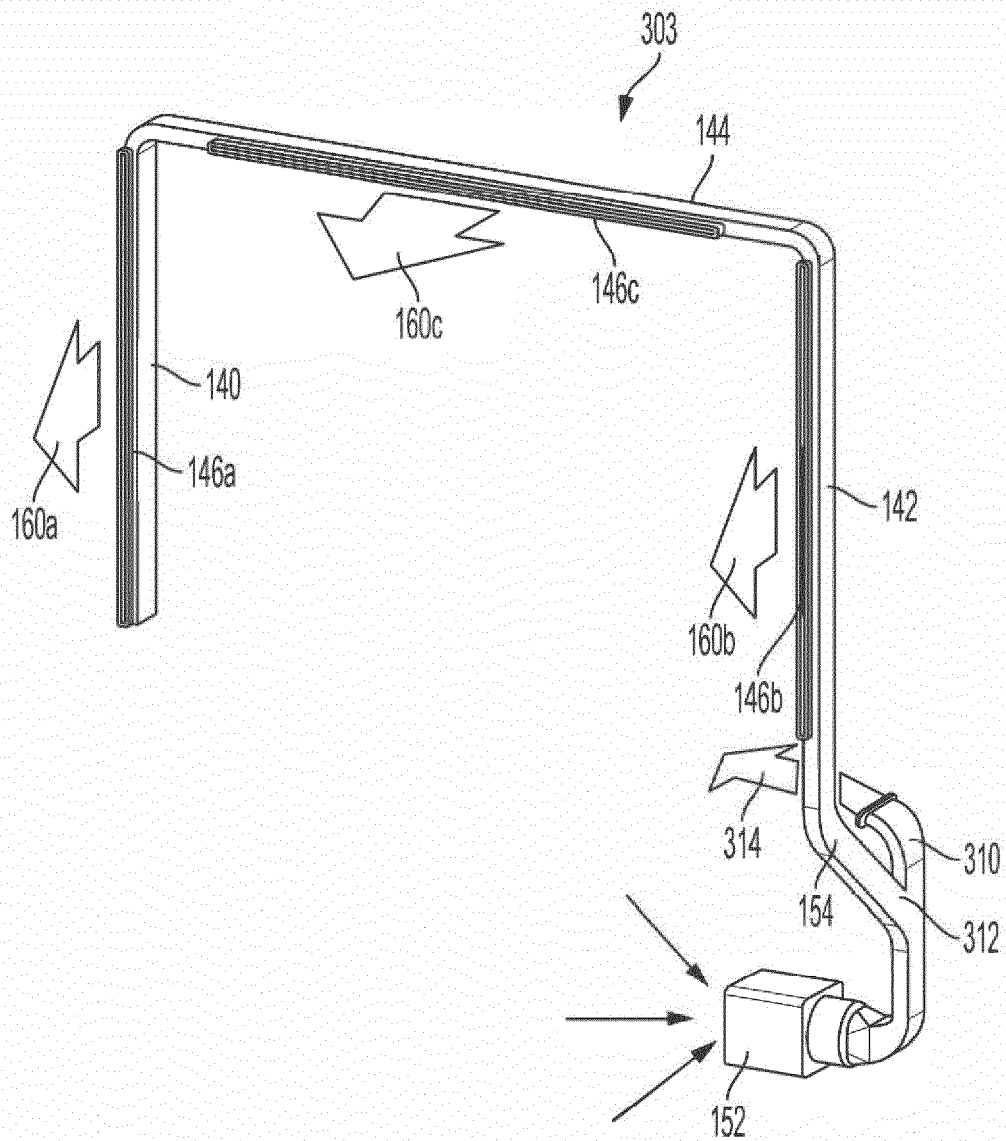


FIG. 6

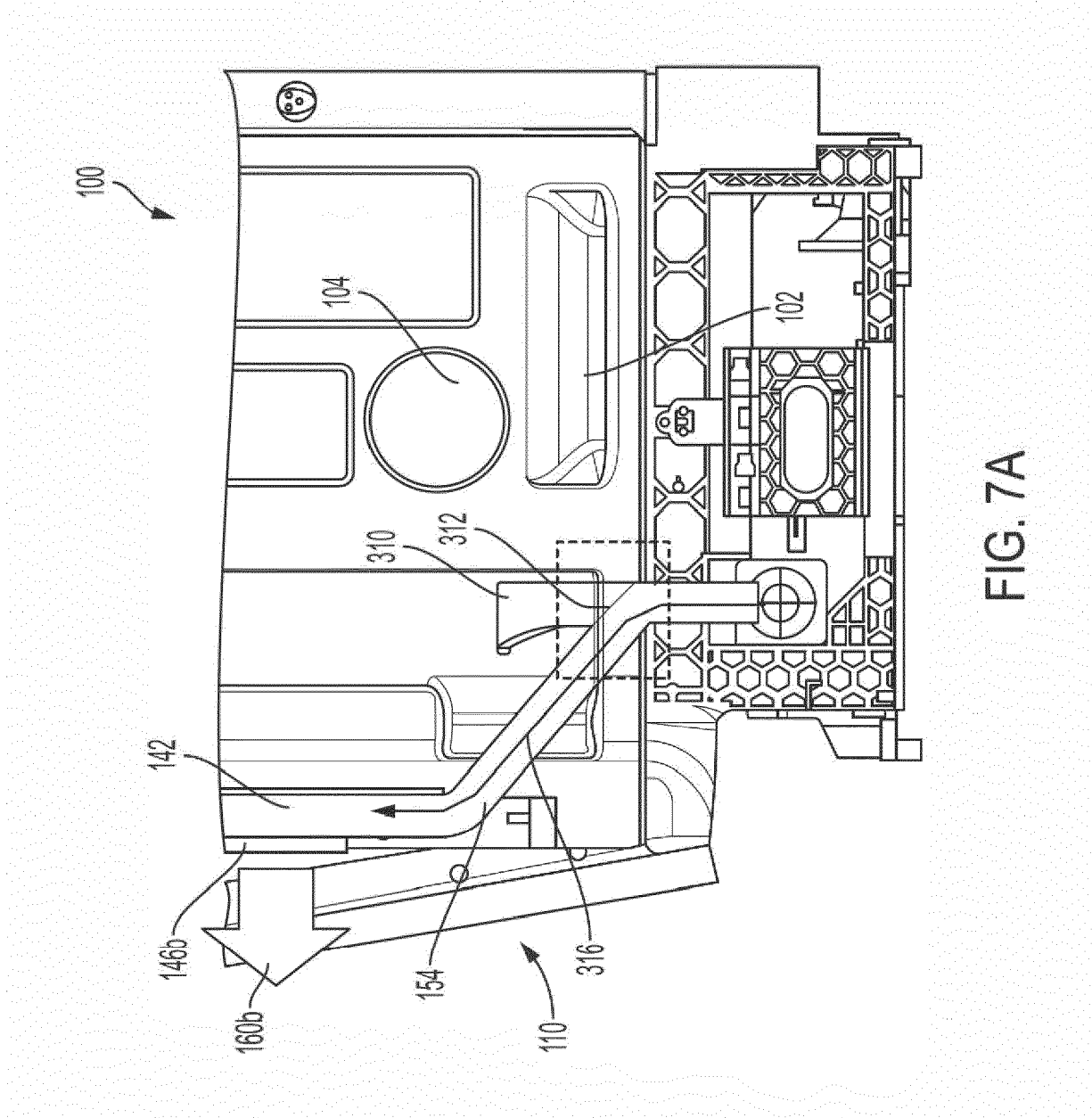


FIG. 7A

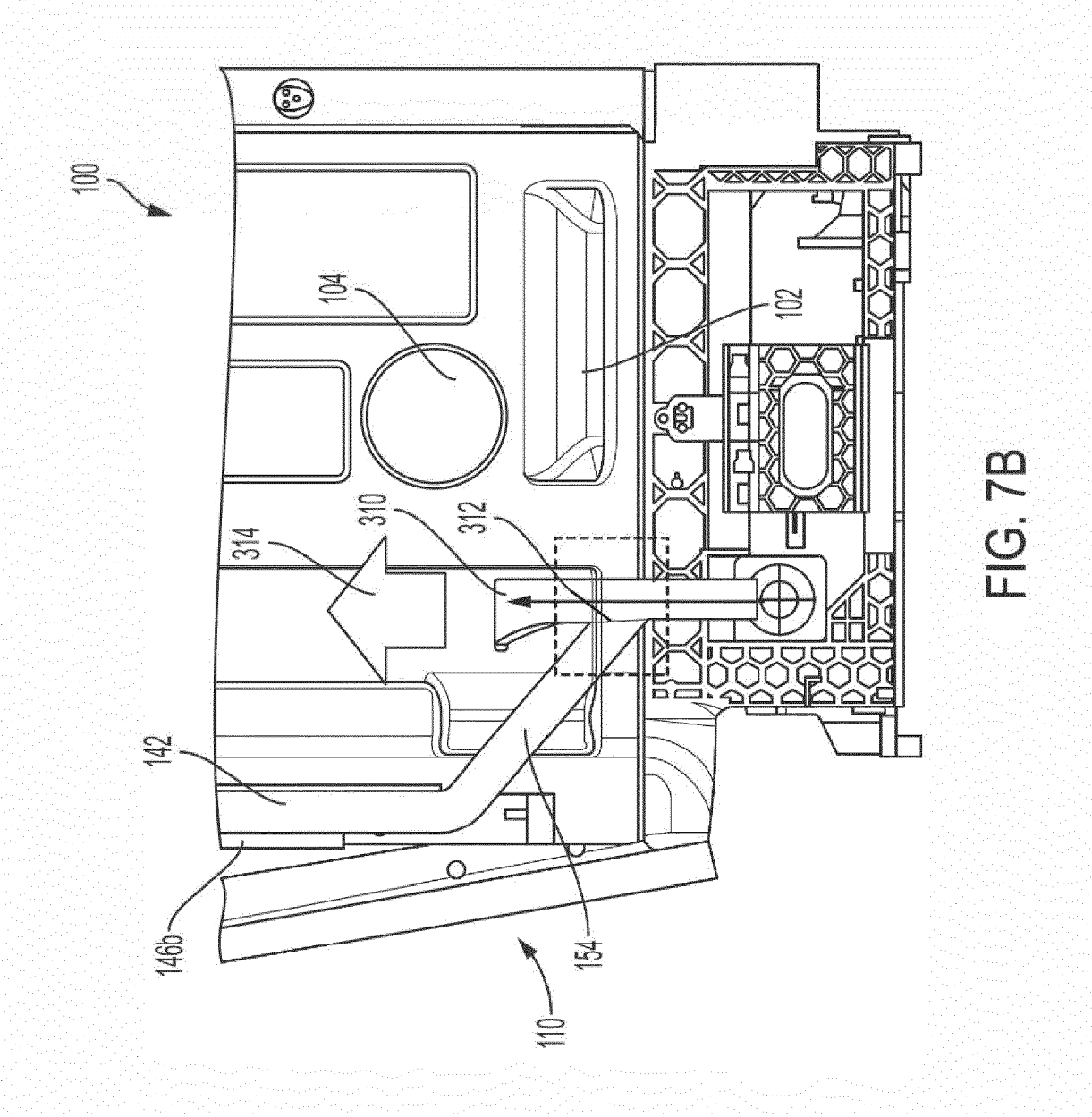


FIG. 7B



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Application Number

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	* paragraphs [0029] - [0066], [0098] - [0108]; figures *		A47L15/48
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Munich		7 December 2022	Prosig, Christina
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