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FRONT OPENING DISHWASHER

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FRONT OPENING DISHWASHER

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1 Claim. (Cl. 134-176)

This invention relates to dishwashing apparatus and more particularly to front-opening dishwashing machines of the type employing a rotating body for distributing washing water. It is an object of this invention to provide improved apparatus of this kind.

Domestic dishwashing machines of the front-opening type usually comprise a cabinet having a washing vat and an access opening to the vat formed in a front wall of the cabinet. Upper and lower racks for holding dishes in place and means for projecting and distributing washing water toward the dishes are ordinarily provided. On certain prior art dishwashers, where the water distributor is of the type that projects water upwardly from a level below the lower dish rack, improper distribution of washing water to the dishes on the upper rack and scattering of food particles thereto results so that auxiliary sprays were proposed to correct this situation.

In accordance with this invention, water is distributed to the upper and lower regions of the vat from distribution points on a rack-mounted distributor centrally located with respect to the dish storage regions. The distributor is, preferably, of the rotating variety and mounted for rotation on the lower dish rack in a central region thereof, for distributing washing water to the upper and lower regions of the vat from respective upper and lower discharge ports. Means are provided for conveying pressurized washing water from the outlet of a water circulating pump to the inlet of the distributor. This means includes a readily disconnectable coupling arrangement which permits the distributor to be disconnected from the pump outlet so that the rack on which the distributor is located can be moved out through the front of the dishwasher for loading and unloading dishes.

In another embodiment of the invention communication between the pump outlet and the distributor is established during a dishwashing operation by a movable nozzle member or tubular head that is retracted, when the pump is not operating, to permit the dish racks to be moved.

Accordingly, it is a further object of this invention to provide a readily disconnected fluid connector which directs the entire output of the pump to the water distributor inlet.

The foregoing and other objects are effected by the invention as will be apparent from the following description and claim taken in connection with the accompanying drawings, forming a part of this application, in which:

FIG. 1 is a vertical, sectional view of a dishwashing machine of the front opening type, as viewed from the side, having water conveying means for the water distributor constructed and arranged in accordance with the invention, and showing in phantom the racks and door in loading position; and

FIG. 2 is an enlarged sectional view of the fluid connector employed in the dishwasher shown in FIG. 1.

The invention is applied to a domestic dishwasher of the front opening type, which includes a box-like cabinet 10. A vat structure 11 defining a washing chamber is disposed within an upper portion of the cabinet 10 and has a bottom wall 12 which slopes downwardly and inwardly to define a sump 13 for washing water. The bottom wall 12 also partitions the vat 11 from an apparatus compartment 14 which houses a washing water

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return and pumping system in the lower portion of the cabinet 10.

A conventional access opening to the vat 11 is formed in a front wall of the cabinet 10 and is closed by a door 16 carried by the cabinet and hinged thereto. The door 16 is movable to an open horizontal position below the opening for gaining access to the vat 11, all of which is well understood.

Upper and lower, open-work, dish storage racks 17 and 18, respectively, are movable on wheels 19 into and out of the vat 11 through the access opening and are supported in operating position on horizontal tracks 20. The tracks 20 extend from front to back within the vat 11 and may be secured to the lateral walls thereof in any suitable manner. As in prior art structures, the arrangement provides for the top rack 17 to be removably supported on the wheeled lower rack 18 for movement therewith so that the user can roll the racks outwardly through the access opening, where they are supported by the open door 16 for convenient loading and unloading of dishes, all of which is well known.

The apparatus compartment 14 houses a pump 21 which is driven by an electric motor (not shown) and has its inlet connected to the sump 13, and its outlet connected to a conduit 23, all of which are suitably supported. The conduit 23 extends upwardly and enters the washing chamber through an opening in a wall of the vat 11 for delivering water thereto in a manner hereinafter described in detail.

A rotatable water distributor 24 of the type shown in FIG. 1 of the drawings is employed for receiving and directing the entire output of water forced from the pump 21 toward the dishes stored on the upper and lower racks 17 and 18. A portion of the energy from the water flowing through the distributor is utilized to rotate the distributor 24. The distributor 24 resembles a hollow-bullet-shaped shell having side walls formed about a vertical axis of rotation and a domed upper portion. An axial entrance passage to the distributor 24 is formed in its base for admitting water thereto. The distributor 24 is supported in a central region of the vat 11 by portions of the lower rack 18, hereinafter described, and is movable with the lower rack into and out of the vat.

Several discharge passages 26, formed in the walls of the distributor 24 can be of the well known oblique type which utilize principles employed in many lawn sprinklers for distributing water from a body which rotates in response to the reaction forces of the discharged water streams. A detailed description of another type of water distributor useable with this invention and employing radial discharge passages may be found in the copending application of Anthony B. Marmo and Vinal D. Thurston, Serial No. 680,461, filed August 27, 1957, now Patent No. 2,943,633, and assigned to the assignee of the present invention.

A circular opening is formed in a central region of the lower dish rack 18.

Included in the lower rack 18 are several rod-like members which form a protective cage 28 about the distributor 24 and also support a downwardly extending stationary pin 29 which is journaled in a bearing recess formed in the top of distributor 24. The pin 29, supported by the cage 28, provides a thrust-resisting, upper pivot for the distributor 24 during its operation.

In accordance with this invention, the full volume and force of washing water circulated by the pump 21 is caused to impinge upon dishes stored in both the upper and lower racks 17 and 18 from the single distributor 24. In order to wash the dishes effectively, water must be delivered to the distributor 24 under pressure so that the

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water will issue from the distributor nozzles 26 with considerable velocity. This requires that a relatively fluid-tight water conveying system be provided between the pump outlet conduit 23 and the distributor 24. Moreover, this water conveying system must be readily disconnectable in order to permit the racks 17 and 18 and the distributor 24, which is mounted on the latter rack, to be easily moved through the front of the dishwasher casing for loading and unloading dishes.

This invention provides unique and novel means for conveying washing water from the pump outlet conduit 23 to the distributor 24, which means includes a readily disconnectable coupling arrangement for permitting the racks 17 and 18 to be moved out of and returned to the vat 11 without requiring that the user of the appliance take any special steps to disconnect and reconnect the water conveying means. To illustrate the invention, a water conveying system constructed in accordance therewith, and applicable to the general arrangement of dishwasher components previously described, is shown in the drawings and will now be described in detail.

The conduit 23 from the pump 21 includes outlet structure or an outlet portion which is formed about a generally vertical axis and enters the vat 11 to communicate therewith through a centrally located opening in the bottom wall 12 of the vat 11, in fixed, sealing relationship therewith. A tubular nozzle or head 38, which may be of smaller diameter than the conduit 23, is telescopically arranged within the outlet portion of the conduit for vertical sliding movement with respect thereto. The upper end of the head 38 is furnished with an inwardly extending flange 39 and an outwardly extending flange 41, whereby the latter said flange 41 serves as a stop to limit the downward, gravitational movement of the head 38 into the conduit 23 when water is not flowing from the pump 21. However, when water is delivered to the conduit 23 from the pump 21, as illustrated in FIG. 1, the moving water contacts the restriction defined by the inwardly extending flange 39 and forces the head 38 upwardly to an upper position. The upward movement of the head 38 establishes a fluid connection between the conduit 23 and the inlet to the distributor 24. A coupling member 42 encompassing the lower end of the distributor 24 has a downwardly facing, convergent inlet end which is positioned coaxially with the head 38 and adapted to receive the head 38 in a central portion thereof for admitting a jet of liquid from the nozzle. By this arrangement the head 38 moves to a

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lowermost or retracted position when the dishwashing machine is not operating so that the fluid connection between the conduit 23 and the inlet to the distributor 24 is disestablished, and the racks 17 and 18 can be pulled out of the vat 11 without interference.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

Dishwashing apparatus comprising a vat having a front opening therein, a door for closing said front opening movable to an open position, upper and lower dish storage racks in said vat movable out of and returnable into the vat through said front opening, a liquid distributor disposed in a central region of the vat for spraying liquid to the upper and lower racks, said distributor having an entrance passage in its lower end for admitting liquid and discharge passages for directing streams of liquid toward the upper and lower racks, a liquid pump remotely positioned with respect to said distributor, an upwardly extending conduit having an inlet connected to the outlet of said pump and an outlet interiorly of said vat facing the distributor entrance passage, and means for conveying the entire liquid output of said pump from the conduit outlet to the distributor entrance passage, said means including a coupling member carried by one of said racks for rotatably supporting said distributor and for conducting liquid from a lower end of said coupling member to the distributor entrance passage, said distributor being movable with said one of said racks into and out of said vat, and a tubular head for said conduit, said head being movable relative to said conduit and having a restriction therein which causes upward movement of said head into registering engagement with said coupling member when said racks are in operating position and liquid flows upwardly through said head, said head being movable to a lower position when liquid is not passing therethrough.

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