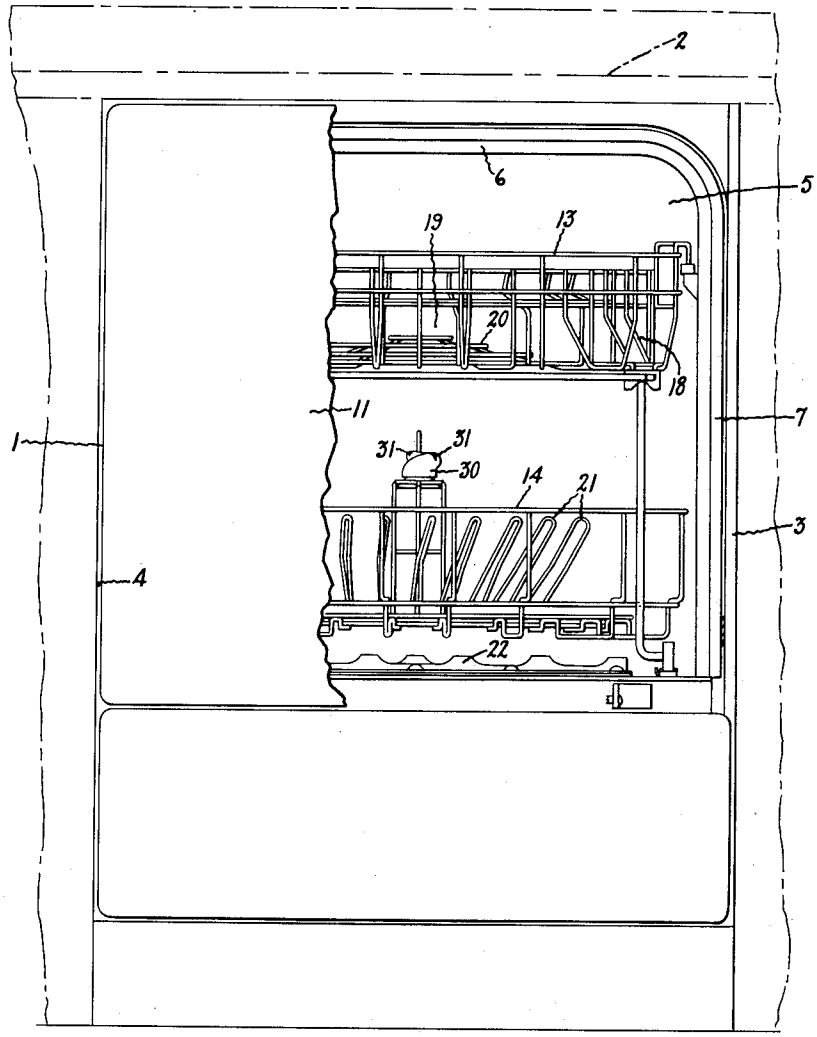
Jan. 5, 1954 H. C. SWAY 2,664,903

DISHWASHER

Filed Sept. 10, 1952

2 Sheets-Sheet 1

Fig. 1.



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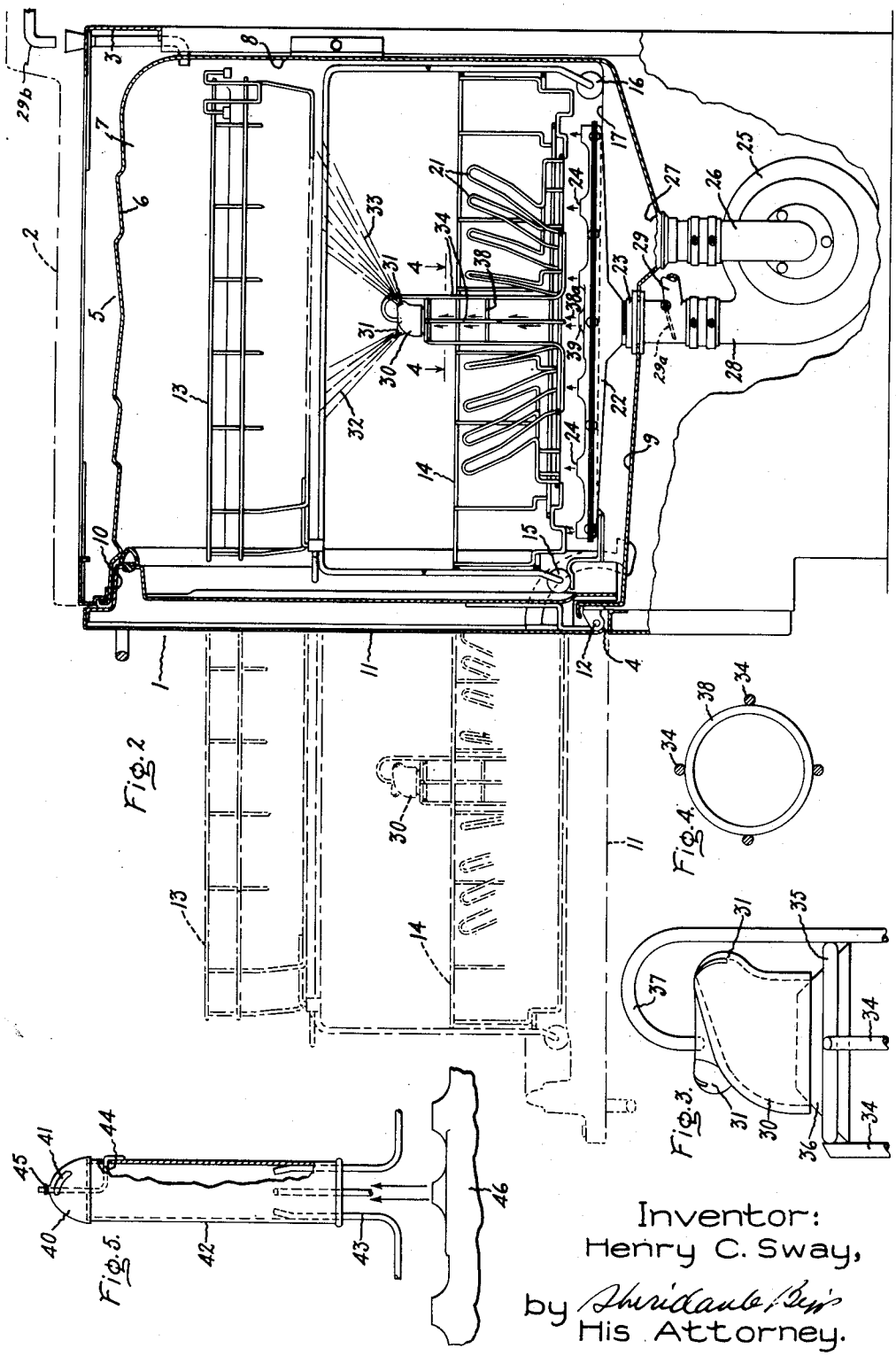


Fig. 2

Fig. 4.

Fig. 3.

Fig. 5.

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DISHWASHER

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Application September 10, 1952, Serial No. 308,753

2 Claims. (Cl. 134—176)

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This invention relates to dishwashers, more particularly to automatic dishwashers of the front opening type where a front door is provided for the tub, and wherein a plurality of vertically stacked openwork dish and utensil supporting racks are provided movable out of the tub through the front opening for loading and unloading; and it has for its object the provision of an improved cleanser water distribution system in the tub arranged so that the utensils and dishes in all of the racks are subjected to the proper cleansing action of the water.

In certain dishwashers of the front opening type now in use there is provided in the lower part of the tub a water distributor which projects cleansing water upwardly in the tub to the lower and upper racks for cleansing the utensils supported therein. The lower rack is arranged to support flat plates and the like in position to act as deflectors to deflect the water to the upper rack so that the utensils therein are subjected to the proper cleansing action. However, many times people place relatively deep dishes, such as soup bowls, cereal dishes and the like, in the lower rack where the flat plates should be placed. This causes undesired turbulence in the water and interference in its movement to the upper rack in proper paths, with several undesired results: the elements in the upper rack, which usually are relatively deep cups and glasses for which the rack is designed to hold, are improperly washed, and moreover, food soil particles washed from the dishes in the lower rack are thrown upwardly into the relatively deep cups and glasses in the upper rack where at times they remain since the water action to the upper rack is not sufficiently strong and properly directed to dislodge them.

In accordance with this invention, there is provided an auxiliary water distributor above the lower rack, or at least in the upper part thereof, for distributing water to the upper rack, in addition to the water which is forced upwardly through the lower rack to the upper rack from the primary water distribution means in the lower part of the tub. This auxiliary water distributor, which may be of the spray type and preferably although not necessarily so, of the reaction spray type, is supported by the lower rack. It has its water entrance opening positioned to receive water forced upwardly by the lower primary water distributing means, so that this water projected upwardly is intercepted by the reaction spray device and distributed by it in proper directions to the upper tray. Since the stream of water from

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the primary to the secondary water distributors is the only actual connection means, so to speak, between them, there is nothing present in the structure such as connecting pipes, etc. which can interfere with the movement of the racks into and out of the tub.

My invention will be better understood from the following description taken in connection with the accompanying drawings and its scope will be pointed out in the appended claims.

In the drawing, Fig. 1 is a fragmentary front elevation of dishwashing apparatus embodying this invention, parts being broken away and shown in section so as to illustrate certain details of construction;

Fig. 2 is a side elevation of the dishwashing apparatus of Fig. 1, shown mainly in section, and also having parts broken away so as to illustrate certain details of construction;

Fig. 3 is an elevation view of the secondary reaction spray device utilized in the washing machine shown in Figs. 1 and 2 and drawn to a larger scale than are Figs. 1 and 2;

Fig. 4 is a sectional view taken through the line 4—4 of Fig. 2 and looking in the direction of the arrows, and drawn to a larger scale than is Fig. 2; and

Fig. 5 is an elevation view illustrating a portion of the primary water distributor means and also a secondary water distribution means of modified form arranged in accordance with this invention.

Referring to the drawings, this invention has been shown in one form as applied to a front opening dishwasher of the under-the-counter type. As shown, the dishwasher 1 is mounted under a horizontal table-like work surface, such as a counter 2, which is the top wall or surface of a suitable cabinet. The washer 1 is provided with an enclosing cabinet structure 3 of rectangular box-like form. The cabinet is provided with a front opening 4. Mounted within the cabinet is a tub 5 also of generally box-like form having a top wall 6, side walls 7, a rear wall 8, and a bottom wall 9. The tub has a front opening 10 which is closed by a front door 11 hinged at its lower end to the tub by hinges 12 so that it may be swung downwardly from its vertical closed position shown in solid lines in Fig. 2 to its substantially horizontal open position shown in dot-dash lines of that figure.

Mounted within the tub are a pair of openwork racks 13 and 14 stacked one over the other as shown. The upper rack 13 is carried by the lower rack 14 and the lower rack is provided with sup-

porting rollers 15 and 16 at the front and rear respectively which are arranged to roll on the door 11 when it is in its open position and on rails 17 formed in the tub so that the racks may be run out of the tub to open position shown in dot-dash lines in Fig. 2 for loading and unloading, and when loaded with dishes and utensils to be cleansed, moved back into the tub for the washing operation.

The racks may be of any suitable openwork construction for supporting dishes, glasses and the like, and may have any suitable construction mounting them for movement out of the tub and for return movement back into it. Preferably and as shown, a rack slide structure will be used such as described and claimed in the copending application of C. R. Sebens, Serial No. 317,798, filed October 30, 1952, and assigned to the General Electric Company, the assignee of the instant application. It is pointed out, however, that the upper rack 13 is formed by wires suitably joined together to form compartments 18 for supporting shallow bowls and the like, and a central compartment 19 which has a generally conical-shaped bottom wall 20 upon which glasses, cups, and like relatively deep articles are supported in an inverted position for washing; this rack may be formed in general like the upper rack 10 disclosed in the U. S. Patent to F. A. Walker, No. 2,035,625, dated March 31, 1936. The lower rack is provided with a plurality of generally upright wire brackets 21 spaced circumferentially at substantially uniform intervals. These brackets are inclined to the vertical and are arranged to support between them flat dishes as plates and the like in position to be washed and to act as deflectors to deflect water upwardly to the upper rack. The bracket arrangement may be like that of the lower rack structure 11 of the above-mentioned Walker patent.

Positioned below the lower rack 14 in the lower portion of the tub is a primary water distributor 22 for forcing streams of water upwardly through the two racks 13 and 14. This distributor is in the form of an elongated reaction spray device consisting of a pipe extending transversely across the tub, as shown. It is mounted to revolve at its center and at the center of the tub on a water inlet pipe 23 in any suitable manner. At its upper side the pipe is provided with a series of oblique ports 24 arranged in such manner that when water is ejected from them, the water will cause it to rotate by its reaction on the pipe. The water issuing from the revolving pipe issues from the multiple jets 24 and is hurled upwardly and outwardly through the tub to cleanse the utensils supported in the two racks 13 and 14.

Water is forced under pressure through the reaction spray device by a suitable pump 25 having its inlet 26 connected with a sump 27 formed in the bottom of the tub and its outlet 28 discharging into the pipe 23 feeding into the reaction spray device. Thus, the pump 25 when operated recirculates the water in the tub. The tub may be emptied through a drain pipe 29 by closing drain valve 29a to the position shown in Fig. 2. It will be understood that when the apparatus is washing, etc. valve 29a will be moved to a position to close the entrance to the discharge pipe 29. Water is introduced to the tub initially through a water inlet pipe system 29b which may be like that disclosed in the U. S. patent to G. H. Wotring, No. 2,654,386, dated October 6, 1953.

In order to insure the proper distribution of water to the upper rack 13 regardless of the fact that the lower rack may be improperly loaded, there is provided a supplementary spray device 30. This device 30 also is a reaction spray device; as shown, it is in the form of a diffusing nozzle with two obliquely positioned orifices 31 arranged so that the reaction of the water on the nozzle, due to the orifices deflecting the water issuing from them, causes the device to rotate. The orifices are positioned so that two fan-shaped streams of water 32 and 33 rotate immediately beneath the upper rack 13, thereby providing additional washing action for the utensils in the upper rack.

The supplementary reaction spray device 30 is mounted to rotate on the lower rack 14, in the vertical center of the tub. For this purpose, the lower rack has four upright wires 34, preferably extending upwardly from the wires forming the bottom of the rack, as shown. At their upper ends these wires support a ring 35 (Fig. 3) which supports a conical base 36 upon which the device 30 is rotatably mounted. The device 30 is held on this base by a wire 37 which is a continuation of one of the wires 34, as shown. Wires 34 are interconnected and reinforced by an annular ring 38 (Figs. 2 and 4). The conical base is hollow and constitutes a water inlet to the reaction spray device.

Water is fed to the base 36 and hence, to the spray device 30 in the form of a substantially solid free jet 38a from the primary water distributor 22. For this purpose, the distributor 22 is provided with an orifice 39 in the center of its top wall facing upwardly and formed to issue or eject the jet as a high velocity substantially solid stream of water directly upwardly through the space bounded by the wires 34 and 38 to the spray device 30.

In the operation of the washing machine, therefore, the water which is pumped by the pump 25 through the feed pipe 23, not only issues from the primary reaction spray device 22 to hurl water upwardly and outwardly through the racks, but it also issues from the secondary reaction spray device 30 as a supplementary supply of water to the upper rack in order to insure a proper cleansing of the untensils supported therein.

Thus, in effect, there is provided a liquid connection between the two spray devices which, of course, disappears immediately when the pump 25 stops. In other words, once the washing operation has been completed and the pump 25 stopped, there is nothing whatsoever to prevent the free movement of the racks from the tub for loading and unloading operations.

It should also be noted that the reaction spray device 30 will operate efficiently even though there should be considerable lateral misalignment between the jet 38a and the axis of rotation of the spray device, since the jet will strike the conical base—even in the case of wide misalignment—and be guided by the base up into the spray head 30.

In Fig. 5 there is illustrated a modified form of supplementary reaction spray device. As there shown, this device includes a reaction spray member 40 in general similar to the reaction spray member 30, it being provided with oblique discharge ports 41 which when the water issues from them effects a rotary motion of the spray device. The spray device in this case, however, is mounted upon a water guiding tube 42 elongated in the vertical center line of the vat and supported by wires 43, corresponding to the wires 34 of the form of the invention shown in Figs. 1 and 2. These wires at their upper ends are

tapered inwardly somewhat as shown so as to facilitate the insertion of the tube **42** upon them and which function by their inherent resiliency to spring outwardly to support the tube and the spray device. The spray device **40** is rotatably mounted on the upper end of the tube and is secured thereto by means of a supporting member **44** anchored to the tube and extending upwardly through the central rotary axis of the spray device to protrude from it; on the upper end this support **44** is provided with a collar **45** to hold the spray device in place. Here a primary spray device **46** is provided which may be identically the same as the primary spray device **22** of the first form of the invention disclosed, and which, like the first form, issues an upwardly directed supply jet **47**. The tube **42** has a diameter sufficiently large to intercept the jet **47** even in case there is a relatively wide lateral misalignment between the jet and the axis of rotation of the spray device **40**, thereby insuring proper operation of the spray device **40**.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Dishwashing apparatus comprising a tub having a front opening therein, upper and lower openwork racks in said tub movable out of and returnable into said tub through said front opening, a reaction spray device revolvable on said lower rack to spray liquid to said upper rack, said spray device having an entrance opening facing downwardly in said tub, and nozzle means

in said tub below said lower rack for projecting a supply of water in the form of a jet upwardly into said entrance opening.

2. Dishwashing apparatus comprising a tub having a front opening therein, upper and lower openwork racks in said tub movable out of and returnable into said tub through said front opening, a primary relatively elongated reaction spray device revolvably mounted in the lower part of said tub below said lower rack having oblique discharge ports for effecting the rotation of said device to distribute water upwardly and outwardly in said tub, and also having a top opening discharge port in the axis of rotation of the spray device to project a jet of water upwardly in said axis, and a secondary reaction spray device revolvable on the upper part of said lower rack in said axis of rotation having an inlet opening to receive said jet of water, and having oblique discharge ports to effect the rotation of said secondary device and the distribution of water through said upper rack.

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