United States Patent

[11] **3,570,506**

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[54] **WATER DISPERSING APPARATUS DISHWASHER**
4 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **134/183**
[51] **Int. Cl.** **B08b 3/04,** B08b 13/00
[50] **Field of Search** 134/176, 182, 183

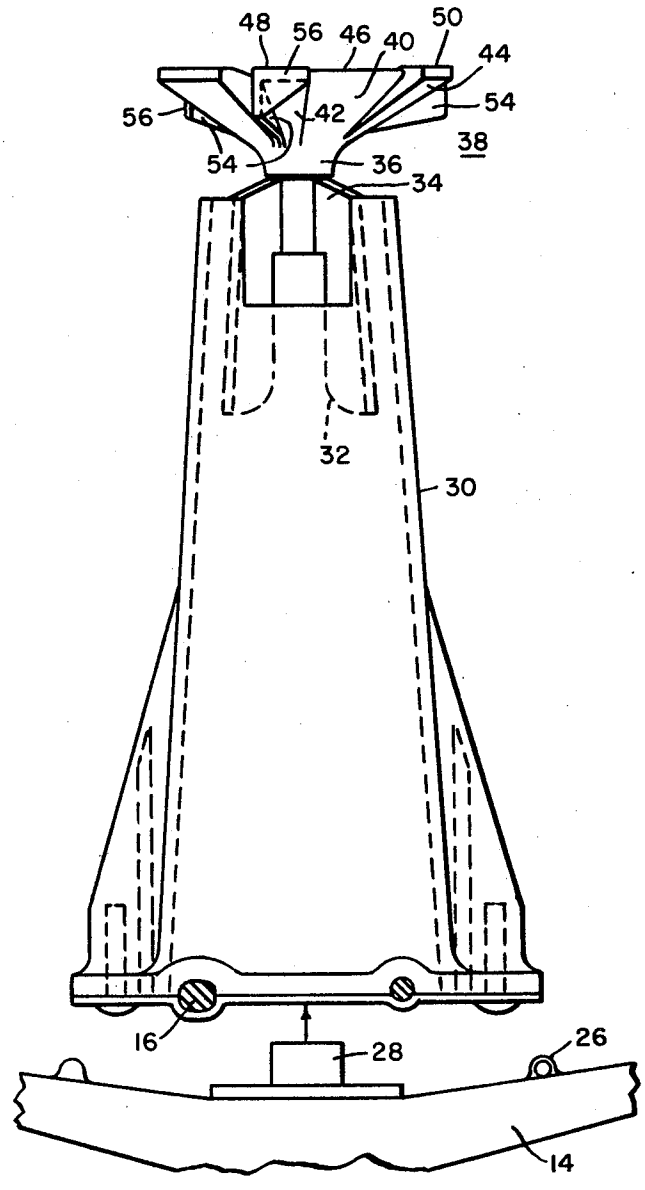
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ABSTRACT: Improved water dispersing apparatus for dispersing water about the area of the upper rack of a dishwasher, the apparatus including a rotatable member which is of inverted, generally conical shape, different segments of the lower surface of the member having different slopes to deflect the upwardly directed stream of water at different angles depending upon which of the surfaces the stream impinges upon, the member also including segments open from the periphery to the hub to permit part of the water to pass directly upwardly therethrough.



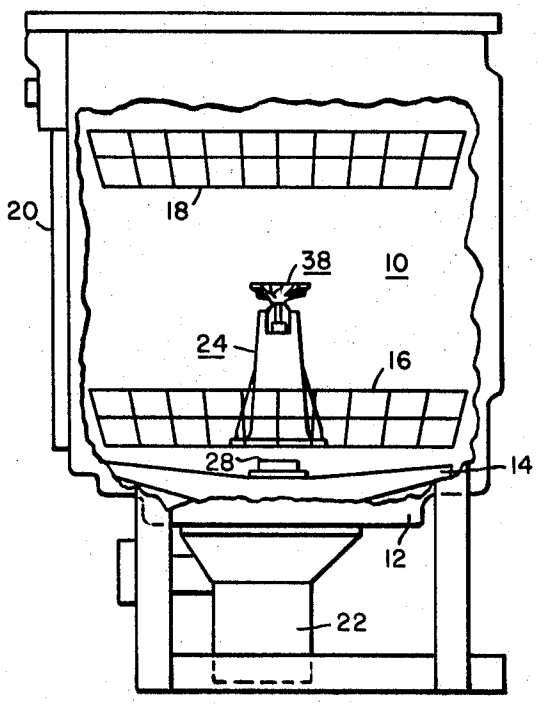


FIG. 1.

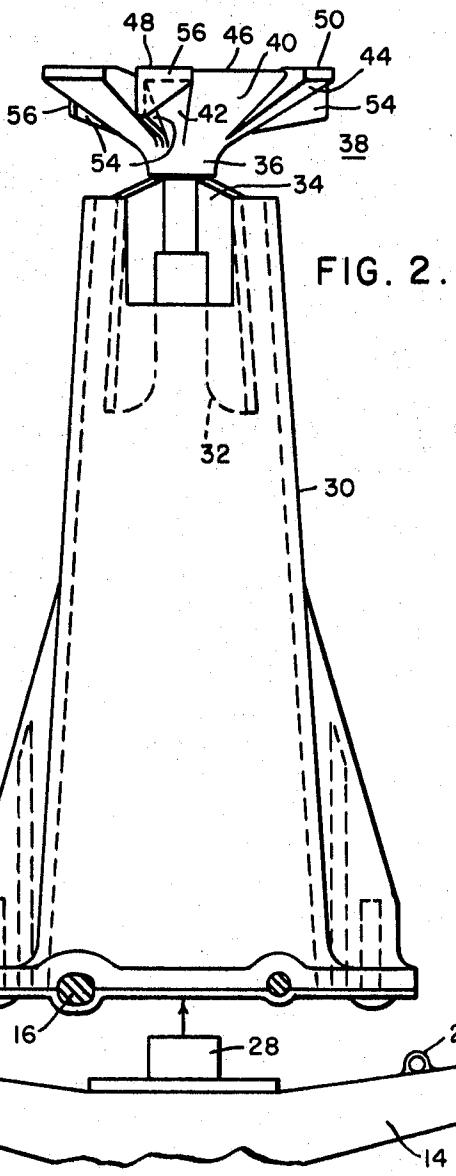


FIG. 2.

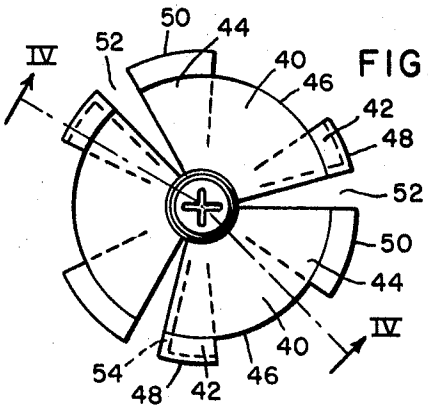


FIG. 3.

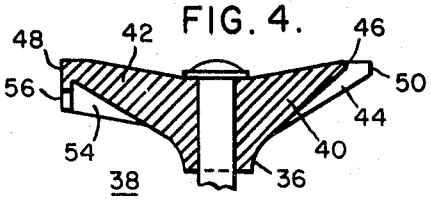


FIG. 4.

WITNESSES

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WATER DISPERSING APPARATUS DISHWASHER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention pertains to the art of water dispersal or distributing apparatus for a dishwasher.

2. Description of the Prior Art

U.S. Pat. No. 3,368,573 discloses a water distributor arrangement for a dishwasher which functions generally satisfactory for its intended purpose. However, it does have certain disadvantages which the water distributor of the present invention is intended to obviate. The distributor of the patent takes the form of a rotatable wheel which has a hub, spokes, an outer ring, and an open part in the hub. Part of the water which is directed against the underside of the wheel is deflected out to the greatest extent by an inclined lower surface on the outer ring of the wheel. Another part is deflected to cover an intermediate area inwardly therefrom by deflecting off the bottom of the hub and then against an upper inclined surface of the ring. Another part covers the radially inner part of the tub by passage through the open segment in the hub. While generally satisfactory coverage is obtained with a water distributor of that character, better coverage and action is obtained with the distributor of my invention.

SUMMARY OF THE INVENTION

In accordance with my invention the water distributor is an inverted, generally conically-shaped member provided with water deflecting lower surfaces which slope upwardly and outwardly from the hub to the peripheral rim portion of the member, with the lower surface of the hub being formed of and divided into at least two sets of generally pie-shaped segments. The individual segments of one of the sets have a steeper slope than the slope of the other of the sets, with the degree of deflection of the water striking the individual segments being controlled by the slope of the segment. Further, the distributor includes at least one open segment extending inwardly to the hub from the outer periphery of the member for permitting water to pass directly upwardly therethrough.

DRAWING DESCRIPTION

FIG. 1 is a fragmentary, partly broken side view, of dishwasher apparatus embodying the invention;

FIG. 2 is a fragmentary elevational view of the dispersal apparatus and underlying rotating arm;

FIG. 3 is a top view of the distributor member; and

FIG. 4 is a sectional view of the member corresponding to one taken along the line IV–IV of FIG. 3.

The dishwasher illustrated has the conventional generally-rectangular, box-shape encompassing the washing chamber 10 which has a sump 12 formed in its bottom wall, a rotatable spray arm 14 immediately above the sump, a lower dish rack 16, and an upper dish rack 18. The dishwasher shown is of the front-loading type in which a front door 20 is dropped and both the bottom rack 16 and top rack 18 are adapted to be pulled horizontally forward out of the washing chamber on suitable track means so that the articles to be washed may be loaded on the racks.

A pump and motor assembly 22 are provided below the bottom wall for delivering water under pressure into the interior of the rotatable spray arm 14. As is conventional, the water issuing under pressure from the top surface of the spray arm 14 through tangentially-directed outlets will cause the spray arm to rotate and the water issuing from this arm is flung upwardly and outwardly through the lower rack 16 and to a lesser extent about the upper portion of the washing chamber 10.

The dispersal apparatus according to this invention for supplementing the distribution of water about the upper portion of the water washing chamber 10 may conveniently be mounted upon the movable lower rack 16 for movement therewith since the supplementary dispersal assembly in lightweight, relatively small, and does not need to be directly connected to a source of water from the lower spray arm 14.

As shown in FIG. 2, the rotatable lower spray arm 14 is provided with the reaction and spray outlets 26 on the upper surface of the arm, and is provided with an upwardly directed, central, jet outlet 28 through which a portion of the water delivered to the spray arm 14 is delivered upwardly in the form of a substantially solid stream. The lower rack 16 is located immediately above the spray arm and supports an upright, hollow tube 30 having its axis aligned vertically with the vertical axis of the jet outlet 28. The upper end of the tube is provided with a spider arrangement 32 for supporting a central core 34 to which the dispersal member is secured by means of a screw (not shown) which passes freely down through a bore in the shank or hub 36 of the wheel. The stream of water from the jet outlet 28 is directed up through the hollow tube to the dispersal member.

The rotatable dispersal member 38 according to the invention has a generally flattened, conical shape and is mounted in inverted position (i.e., with the narrower or apex part of the cone downwardly, and the base part of the cone upwardly) on the core 34 carried by the tube 30. The lower surface of the member is separated into sets of generally pie-shaped individual segments which extend from the hub 36 out to the peripheral rim portion of the member. Each segment designated 40 has a steeper slope than the segments 42 and 44 which bound it on either side. Since the different segments merge into the hub 36 along the same circumferential line around the hub, the steeper slope results in the rim portions 46 formed by the segments 40 being inset from the rim portions 48 and 50 of the other segments. Thus the arcuate-shaped notches are formed in the rim of the member as best seen from above (FIG. 3). The member also includes the pie-shaped open segments 52 which extend from the rim area all the way in to the hub.

In the illustrated member 38, and as best seen in FIG. 3, the wheel is divided into three general sections of 120° each, each section including, in succession in a clockwise direction, segments 44, 40, 42 and open segment 52. The segments 44 and 42 have the same slope on their lower surfaces, but it will be appreciated that these slopes may differ from each other as well as from the slope of segment 40.

To promote the rotation of the member 38, a triangular-shaped vane 54, which occupies a plane parallel to the axis of rotation of the member, is provided on the lower surface of each segment 42 at the edge adjacent the open segment 52. Preferably, the pocket formed between the surface 42 and vane 54 is closed at its radially outer end by another triangular-shaped gusset 56 extending generally tangentially which further promotes the rotation of the distributor. The water directed upwardly against the member includes swirl components (generated by the pump) which lie at angles to the axis of the wheel, these swirl components driving the member as an impulse type wheel by striking the vanes and, to a lesser extent, the other surfaces parallel to the axis of rotation of the wheel.

The patterns of water obtained in operation include an inner pattern derived from the open segments 52, an intermediate pattern from the segments 40, an outer pattern from the segments 44, and an umbrella-shaped pattern directed on to the lower rack from the segments 42 and parts 54 and 56. The inner pattern obtained from each of the open segments is generally triangular in horizontal section, occupies a radial plane relative to the vertical axis of the member, and sweeps around the vertical axis of the member. Both the intermediate and outer patterns are generally conical, with both having interrupted portions or gaps which correspond to the segments which create the other pattern. Both of these patterns also move around the vertical axis as the member 38 rotates.

I claim:

1. In dishwasher apparatus having an enclosed washing chamber and upper and lower open racks in the chamber for supporting articles to be washed, and having means for directing a part of the washing water against the lower rack and for directing another part of the washing water upwardly to rotate

water dispersing means located generally centrally and below said upper rack and against which said stream of water is directed, the improvement in which the water dispersing means comprises:

an inverted, generally conically-shaped member having a central hub about which said member is rotatable and having water deflecting lower surfaces sloping upwardly and outwardly from said hub to the peripheral rim portion of said member;

said lower surfaces being formed of and divided into at least two sets of generally pie-shaped segments, the individual segments of one of said sets having a steeper slope than the other of said sets and therefore terminating at the upper face of said member in a rim portion spaced radially inwardly from the rim portion formed at the upper face by the individual segments of the other of said sets;

and at least one open segment extending inwardly to the hub from the outer periphery of said member for permitting water to pass directly upwardly therethrough.

2. In dishwashing apparatus according to claim 1 including a vane projecting away from the face of one of said segments of said other set of said segments.

3. In dishwashing apparatus according to claim 1 said individual segments of said one set are bounded on opposite sides by segments of said other set to form a section of said member, and each said section is separated from an adjacent section by one of said open segments.

4. A water dispersal member for dispersing water directed against its underside about the upper portion of the dishwasher, said water dispersal member comprising an inverted, generally conically-shaped member having a central hub about which said member is rotatable by the force of water directed against said member, said member including water deflecting lower surfaces sloping upwardly and outwardly from said hub to the upper rim portion of said member, said lower surface being formed of and divided into discrete, generally pie-shaped segments, some of said segments having a steeper slope than others of said segments and having rim portions spaced inwardly from the rim portions of the others and said segments, and a number of open segments extending inwardly to the hub from the rim portion of said member for permitting water to pass directly upwardly therethrough.