Oct. 24, 1933. A. J. SCHIMPKE 1,931,996

DISHWASHER

Filed Dec. 16, 1932 3 Sheets-Sheet 1

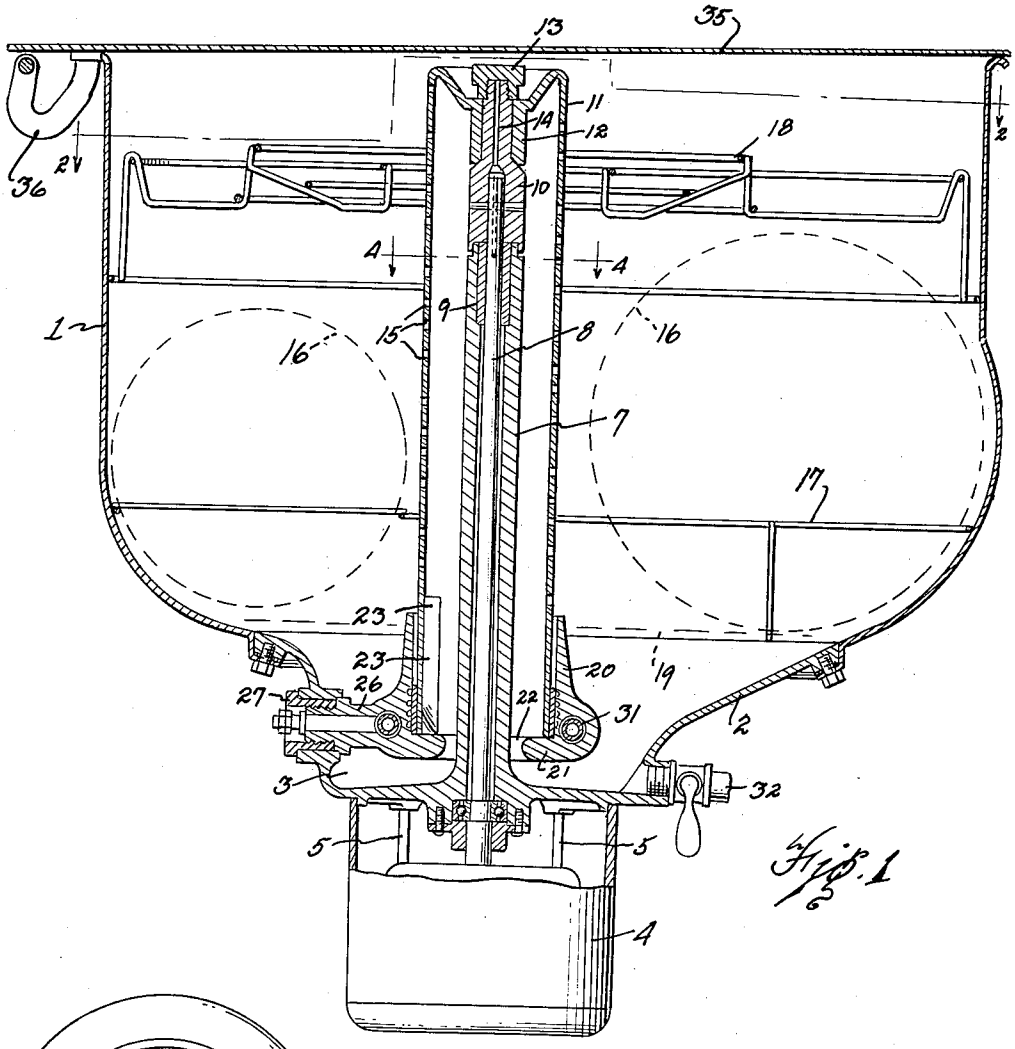


Fig. 1

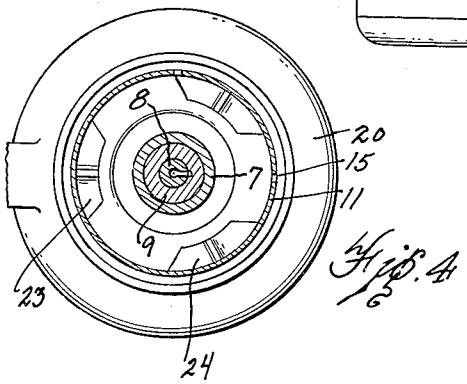


Fig. 4

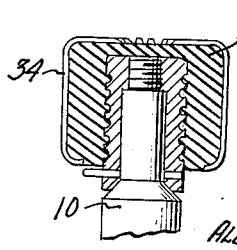


Fig. 6

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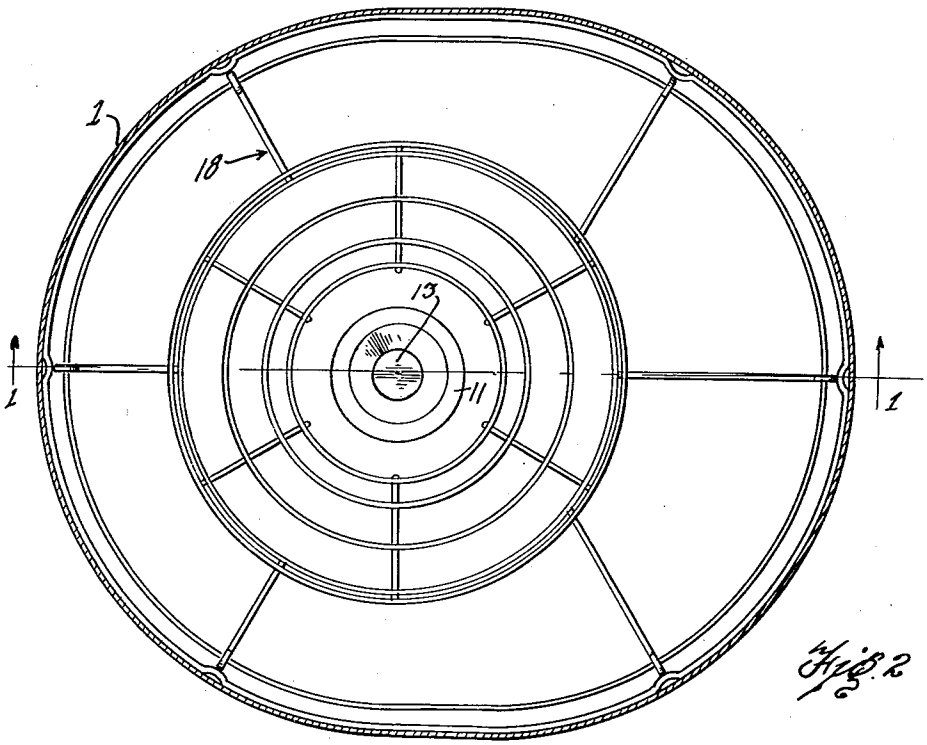


Fig. 2

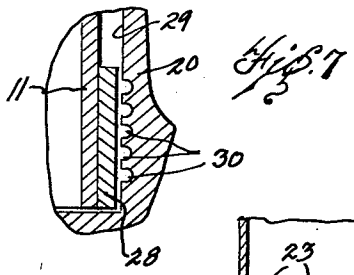


Fig. 7

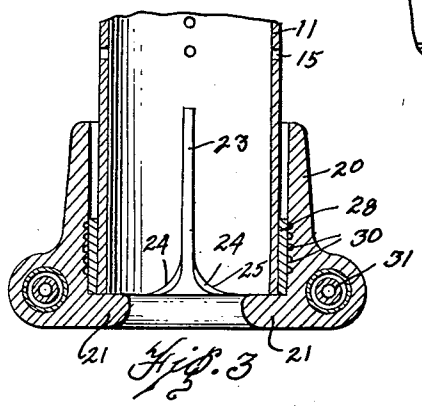


Fig. 3

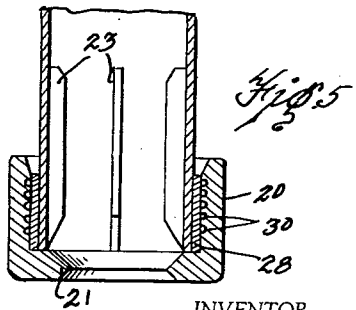


Fig. 5

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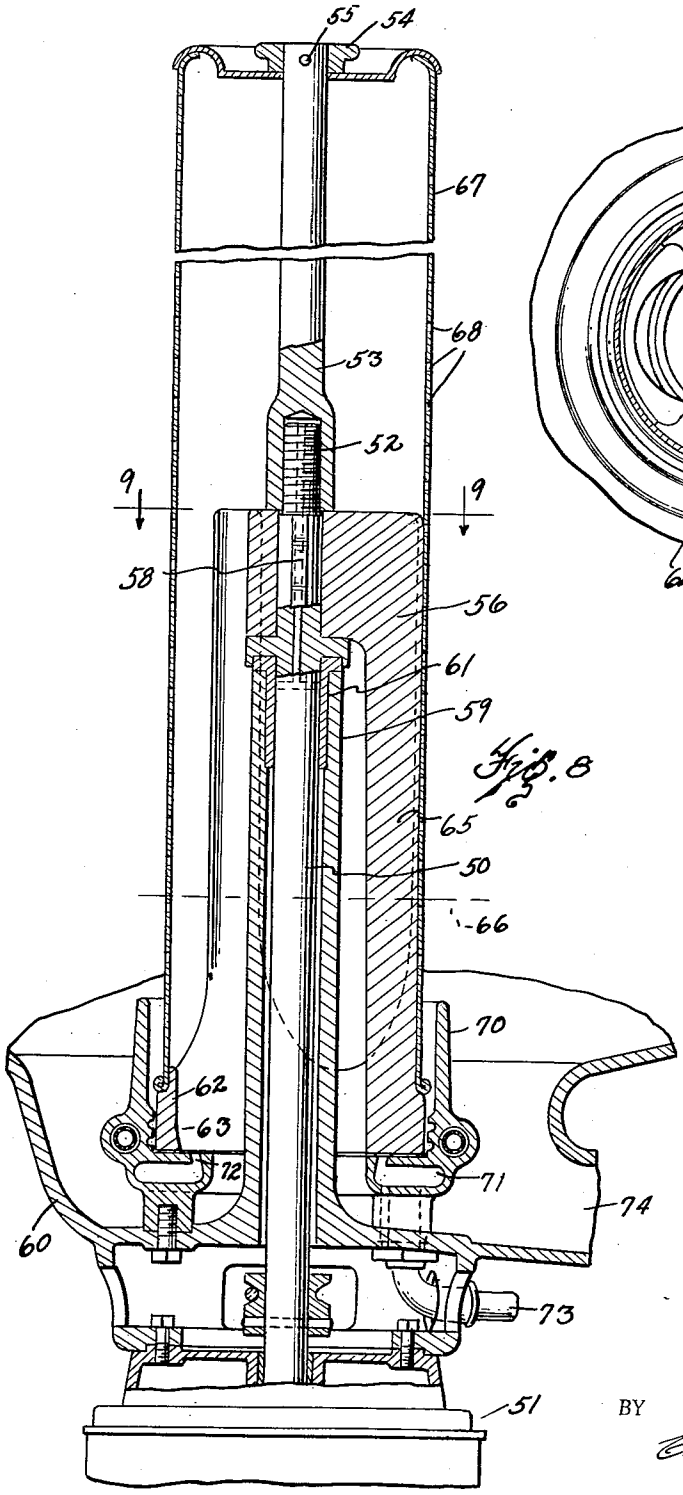


Fig. 8

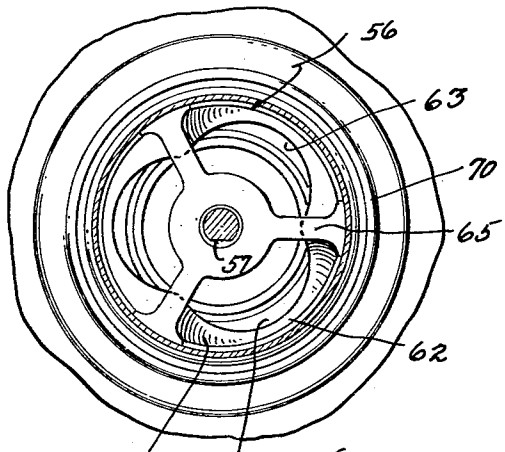


Fig. 9

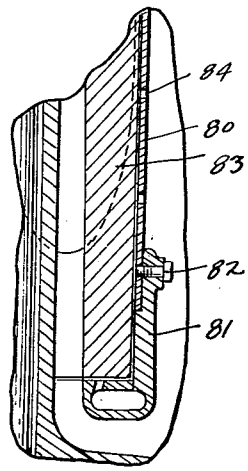


Fig. 10

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UNITED STATES PATENT OFFICE

1,931,996

DISHWASHER

Albert J. Schimpke, Detroit, Mich.

Application December 16, 1932
Serial No. 647,610

13 Claims. (Cl. 141—9)

This invention relates to dish washers and is a continuation of my application, Serial No. 465,994, filed July 7, 1930, to all common subject matter and the principal feature of the invention resides in the provision of a device of this character in which the water is elevated by centrifugal force through a rotatable member from a well in the tub and discharged through apertures in the wall of the rotatable member.

Another object of the invention resides in the provision of a dish washer in which the temperature of the water for washing dishes may be controlled as desired.

Another object of the invention resides in the provision of a dish washer in which a rotatable tubular member has its lower end positioned below the water in the tub and which is provided with a member surrounding the lower end of the tubular member preventing water in the well of the tub from coming in contact with the outer surface of the tubular member thereby preventing eddy currents or disturbance of the water prior to its entering the interior of the tubular member.

Another object of the invention resides in the provision of a device of this character which is provided with a rotating element for causing the water to rise by centrifugal force in a tubular member the walls of the same being provided with jet openings whereby the water is caused to strike against the surface of the dishes, the rotating element being reversible for permitting the jets of water to strike against both faces of the dishes.

These objects and the several novel features of the invention are hereinafter more fully described and claimed and the preferred form of construction by which these objects are attained is shown in the accompanying drawings in which—

Fig. 1 is a vertical sectional view taken substantially on line 1—1 of Fig. 2.

Fig. 2 is a plan sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged fragmentary section of the rotor and its shroud.

Fig. 4 is a detail horizontal sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a view similar to Fig. 3 showing a modified form of my invention.

Fig. 6 is a detail fragmentary section illustrating a scraping or cleaning attachment to be substituted for the rotor.

Fig. 7 is an enlarged fragmentary section of the lower end of the rotor and shroud.

Fig. 8 is a vertical sectional view of a modified form of construction.

Fig. 9 is a sectional view taken on line 9—9 of Fig. 8.

Fig. 10 is a detail sectional view showing another modified form of construction.

Referring to the drawings, the body 1 of the tub is preferably made of sheet metal and the same is suitably connected to the casting 2 the same forming a well 3 for the water. A reversible electric motor 4 is secured to the base of the casting 2 by means of the rods or bolts 5. A vertically extending post 7 is formed integral with the casting 2 and the drive shaft 8 from the motor 4 extends therethrough. A bearing 9 is positioned in the upper end of the post 7 and encircles the shaft 8. An extension 10 is pinned to the upper end of the shaft 8 and a hollow tubular member 11 is formed with the boss 12 fitting over the upper end of the extension 10 and is preferably keyed thereto for rotation therewith. A cap 13 is threaded on the upper end of the extension 10 and closes the upper end of the oil hole 14 the same providing for lubrication between the shaft 8 and the bearing 9. The tubular member 11 is formed with a plurality of openings 15 which act as jets for directing the water against the dishes shown by dotted lines 16 in Fig. 1. A wire rack 17 is positioned in the tub 1 adjacent the base thereof for supporting plates or the like while a rack 18 is positioned adjacent the upper end of the tub for supporting glasses, cups and the like. It will be noted that the plates are preferably positioned in radial alignment with the vertical axis of the tubular member 11 so that as the tubular member rotates, as will be hereinafter described, water from the jets 15 will strike against one surface of the plates with a sweeping motion and with considerable force to remove the dirt therefrom.

Upon reversing the direction of rotation of the member 11 by reversing the electric motor 4 the other surface of the plates will be cleaned in a similar manner. It will be noted that the apertures 15 are not symmetrically arranged but are in staggered relation so that practically the entire surface of the dishes in the tub will be struck by water from one or more of the jets. The lower end of the tubular member 11 extends into the well 3 and is positioned below the normal water level in the tub which is shown by dotted lines 19 in Fig. 1. A shroud 20 encircles the lower end of the tubular member 11 and the lower end of the same is formed with the inwardly extending flange or lip 21 having an opening 22 therein of larger diameter than the shaft 7 providing a passageway for water from the well 3 into the

interior of the member 11. A plurality of blades 23 are secured to or formed integral with the inner surface of the tubular member 11 and the lower ends of the same are formed with the outwardly curved portion 24 the faces 25 of these portions being preferably inwardly inclined. The shroud 20 is formed with the extension 26 the same being secured to the casting 2 by means of the threaded member 27. The bushing or bearing 28 is pressed or otherwise secured on the lower end of the tubular member 11 and centers the same relative to the inner face 29 of the shroud 20.

It will be seen by referring to Fig. 7 that the outer surface of the bearing 28 is spaced from the inner surface 29 of the shroud 20 and the surface 29 of the shroud is formed with a plurality of annular grooves 30 the same acting as a water seal to prevent discharge of water from between the shroud and the tubular member 11. Rotation of the tubular member 11 and the bearing 28 will impart rotation to the water between the outer surface of the bearing 28 and the inner surface 29 of the shroud 20 and the centrifugal force will really pack this water in the grooves 30 and prevent water from being discharged into the tub in the space between the shroud and the tubular member 11. It will be understood that the blades 23 do not act as scoops to lift the water in the tubular member 11 but merely tend to impart rotation to the water as the member 11 is rotated. It will be understood that the member 11 is rotated relatively fast and since the flange 21 on the shroud 20 prevents movement of the water downwardly then the same must, of necessity, rise due to the centrifugal force exerted by rotation of the water and be discharged through the jets 13 and tangentially to the outer periphery of the member 11. It will be seen that the shroud 20 prevents the water in the well 3 from coming in contact with the outer surface of the tubular member 11 so that rotation of the tube will not create any disturbance of the water in the well.

I have found by experimentation that when a rotating member such as the tubular member 11 had its lower end inserted in a body of liquid that rotation of the tubular member would at first cause the liquid to be discharged through the openings 15 but after operation for a short period of time one or more vortices would be created externally of the tubular member and when the apex of the same reach a certain distance air would be admitted to the interior of the tubular member thereby breaking the action of the centrifugal force on the water and rendering the device inoperative. Undoubtedly this could be overcome by placing the lower end of the tubular member a considerable distance below the liquid level but this is highly impractical in a device of this character where it is not only desirable to reduce the depth of the device but to use only a minimum amount of water necessary to perform the function of washing the dishes.

It will be noted, therefore, that by enclosing the lower end of the tubular member 11 by the shroud 20 no eddy currents or vortices are created in the well 3 externally of the shroud 20 allowing the device to operate at its maximum degree of efficiency at all times. If desired a heating element 31 may be inserted in the shroud 20 for heating the water in the well 3 or for drying or sterilizing the dishes by removing all, or practically all, of the water from the well through the discharge pipe 32.

It will be understood, of course, that the heating element may be dispensed with as shown in Fig. 5 and it will be noted that in this figure I have also shown a modified form of blade construction and a modified form of flange 21 on the shroud 20.

Referring to Fig. 6 I have illustrated a scrubbing attachment 33 which may be made of relatively hard rubber or other suitable material the same having a roughened outer periphery 34 for cleaning utensils in which the food has become hardened and cannot be loosened by the jets of water. I have preferably provided a cover 35 having an offset hinge 36 for permitting insertion of the dishes and racks in the tub and removal of the same from the tub. Referring now to Figs. 8 and 9 I have shown a modified form of rotor construction. In this form of the device the shaft 50, operated by rotation of the electric motor 51, has a threaded upper end 52 for threaded engagement with the lower end of the rod 53, the upper end of the same having the washer or nut 54 secured thereto by the pin 55. A member 56 is apertured to receive the shaft 50 and one wall thereof is flattened at 57 to engage the flattened portion 58 of the shaft 50 the same acting as a key for rotating the member 56 with the shaft. A post 59 is formed integral with the casting 60 which corresponds to the casting 2 heretofore described and a bearing 61 is interposed between the shaft 50 and the post 59. The lower end of the member 56 is formed with the ring like portion 62 having the pockets 63 formed therein.

The walls 64 of these pockets are slightly concave in form and the same curve upwardly from the center line of the pockets toward the blades 65 which are preferably of uniform width from the top down to the dotted line 66 shown in Fig. 8. The purpose of these blades and pockets is to carry the water with the rotor or tubular member 67 so that centrifugal force will move the water from the well in the tub to discharge through the openings 68 in the tubular member 67. The walls 64 do not act as scoops to lift the water but merely provide an upwardly curved path for guiding the water upwardly during its initial movement. A shroud 70 encircles the lower end of the tubular member 67 and is similar in design to the shroud 20 heretofore described. An annular chamber 71 is formed in the shroud and the same is formed with the annular opening 72 opening to the interior of the tubular member 67. A water inlet pipe 73 is connected to the chamber 71 for admitting fresh water to the well in the casting 60 the dirty water being drained off through the discharge opening 74. It will be seen that the device will be flushed with clear water by opening the pipe 73 and putting the motor 51 in operation to rotate the member 56 and the tubular member 67. By referring now to Fig. 10, I have shown another modification in which the tubular member 80 is stationary and is secured to the shroud 81 by means of the screws 82. In this form of construction the member 83 is similar in design to the member 56 heretofore described and through rotation thereof water from the well in the tub is caused to rise in the tube 80 and be discharged through the jet openings 84.

It will be understood that since the wall of the tubular member 80 is relatively thin that the jets 84 will not direct water radially from the jets but

will direct the same substantially tangentially with a sweeping action in a manner similar to that given by operation of the device as shown in Figs. 1 and 8.

From the foregoing description it becomes evident that I have provided a dish washer in which the water is lifted by centrifugal force from a well in the tub and directed against the dishes in a sweeping tangential action, further that the device will operate in a relatively shallow depth of liquid and will operate economically and at its maximum degree of efficiency at all times.

Having thus fully described my invention, its utility and mode of operation, what I claim and desire to secure by Letters Patent of the United States is—

1. In a washing machine, the combination of a tubular shaft housing, a reversibly driven shaft disposed in said housing, a tubular rotor of uniform diameter from end to end mounted on the upper end of said shaft and having spaced vertical rows of jet openings, the jet openings of adjacent rows being out of horizontal alignment, said rotor being provided at its lower end with vertically disposed blades, said blades having upwardly converging portions at their lower ends, a shroud for the lower end of said rotor projecting above the normal water level and having an annular lip projecting below the lower end of the rotor, said shroud and rotor having coacting annular bearings, said bearings having a loose fit and the shroud bearing having a plurality of annular grooves therein.

2. In a washing machine, the combination of a tubular shaft housing, a reversibly driven shaft disposed in said housing, means for driving said shaft, a tubular rotor of uniform diameter from end to end mounted on the upper end of said shaft and having spaced vertical rows of jet openings, the jet openings of adjacent rows being out of horizontal alignment, said rotor being provided at its lower end with vertically disposed blades, said blades having upwardly converging portions at their lower ends, and a shroud for the lower end of said rotor.

3. In a washing machine, the combination of a reversibly driven tubular rotor disposed therein of uniform diameter from end to end having a plurality of jet openings, means for reversibly driving said rotor, vertically disposed blades in said rotor, said blades having upwardly converging inwardly inclined portions at their lower ends, and a shroud for the lower end of said rotor having an annular lip projecting below the lower end of the rotor, said shroud and rotor having coacting radial bearings.

4. In a washing machine, the combination of a tubular rotor having a plurality of jet openings, a shroud embracing the lower end of said rotor, and an electric heating element housed within said shroud.

5. In a washing machine, the combination of a tubular rotor of uniform diameter from end to end having a plurality of jet openings, vertically disposed blades in the lower end of said rotor, a shroud for the lower end of said rotor having an annular lip projecting below the rotor, and a reversible driving means for said rotor.

6. In a washing machine, the combination of a tubular rotor of uniform diameter from end to end having a plurality of jet openings, a stationary shroud for the lower end of said rotor having an annular lip projecting below the rotor, and driving means for said rotor.

7. In a washing machine, the combination of a tubular rotor having a plurality of jet openings, blades disposed vertically in the lower end of said rotor, and a shroud for the lower end of said rotor having an annular lip projecting below the rotor.

8. In a washing machine, the combination of a tubular rotor therein having a plurality of jet openings, and a stationary shroud embracing the lower end of said rotor, said shroud and rotor having coacting radial water lubricated bearings.

9. In a machine of the character described, a tub for liquid, a vertially positioned hollow rotatable member therein, the open lower end of the same extending below the normal liquid level in the tub, and means for preventing the liquid in the tub from contacting the outer surface of the rotatable member.

10. In a machine of the character described, a tub for liquid, a vertically positioned hollow rotatable member therein, the open lower end of the same extending below the normal liquid level in the tub, a blade secured to the inner wall of the rotatable member adjacent the lower end thereof for causing rotation of the liquid in the hollow member, and means for preventing liquid in the tub from contacting the outer surface of the rotatable member.

11. In a machine of the character described, a tub for liquid, a vertically positioned hollow rotatable member therein, the open lower end of the same extending below the normal liquid level in the tub, the wall of the hollow member extending above the liquid level having a plurality of openings therein, means associated with the hollow member whereby rotation thereof will cause the liquid to be discharged through the said openings by centrifugal force, and means for preventing the liquid in the tub from contacting the outer surface of the rotatable member.

12. In a machine of the character described, a tub for liquid, a vertically positioned rotatable member having blades thereon for imparting rotation to the liquid, the lower end of the rotatable member extending below the normal liquid level in the tub, and means for preventing the liquid in the tub from contacting the outer surface of the rotatable member.

13. In a machine of the character described, a tub for liquid, a vertically positioned stationary hollow member therein, a rotatable member in the stationary member having blades thereon for imparting rotation to the liquid, the lower end of the rotatable member extending below the normal liquid level in the tub, and means surrounding the lower end of the rotatable member and extending above the normal liquid level in the tub for preventing the liquid in the tub from contacting the outer surface of the rotatable member.

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