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DISHWASHING MACHINE

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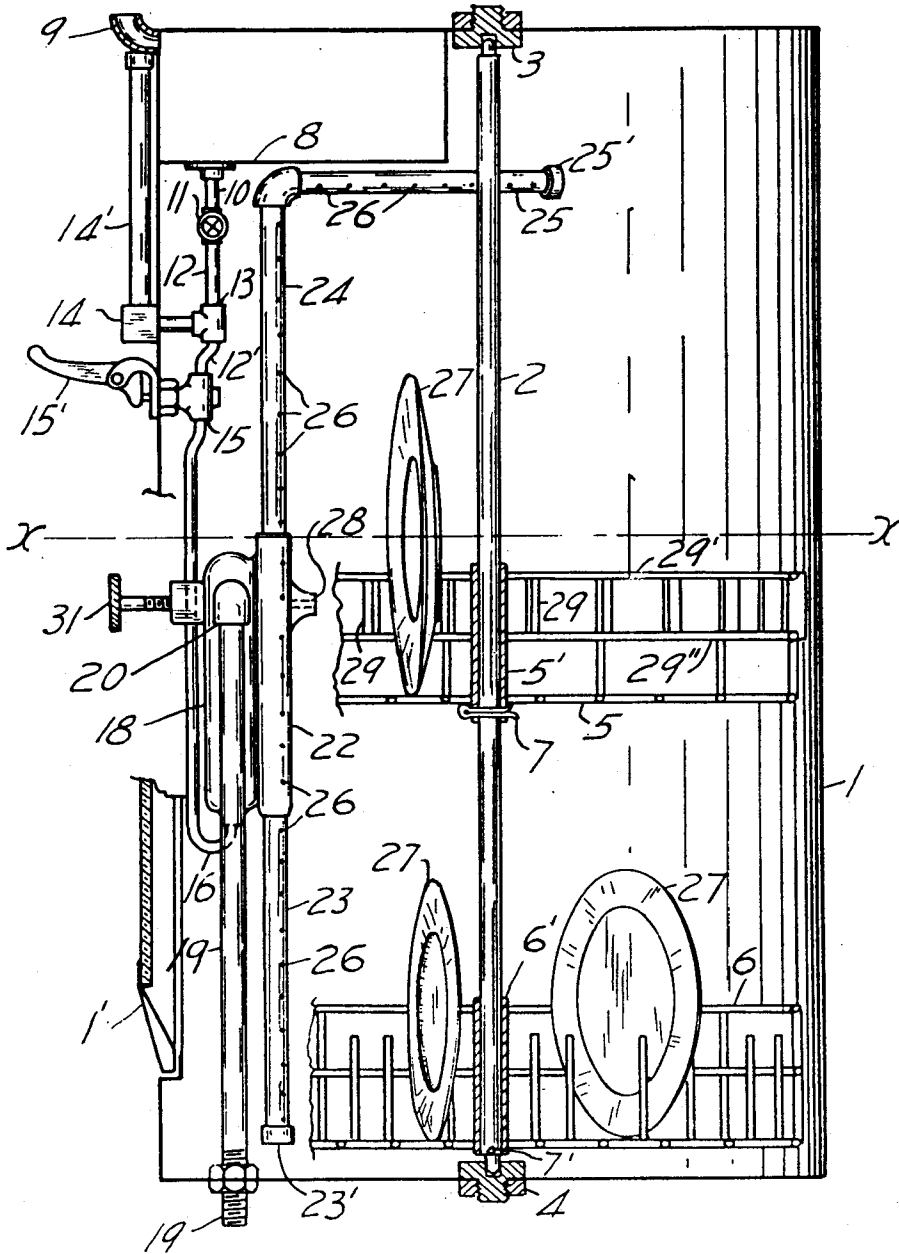


Fig. 7.

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# UNITED STATES PATENT OFFICE

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## DISHWASHING MACHINE

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6 Claims. (Cl. 141—9)

My invention relates to improvements in dish washing machines, and more particularly to that type of dish washing machine in which horizontally positioned baskets are rotated on a vertically revolvable shaft, all of which are inclosed in a metal housing, or cabinet having a swinging door in the front.

The general object of my device is to provide an improved dish washing machine which is also adapted to serve as a cupboard displaying the dishes in repose, after cleansing.

Other objects of my particular improvements are, to provide means to inject a predetermined quantity of detergent into the water to be applied, to provide means to regulate and to permit observation of the amount of detergent used, to provide means to automatically inject in proper sequence the rinse water, to provide an impelling jet, which serves the dual purpose of revolving the dish holding baskets, and spraying the dishes; to provide additional cleansing streams substantially in an opposing direction to that of the impelling jet or motor revolving the baskets, to provide an improved removable strainer to arrest the refuse from the drain water, and other objects as may appear in this specification, and be pointed out in the claims.

Referring to the drawings, Figure 1 is a front view of my improved dish washing machine including a metal glass paneled swinging door.

Figure 2 is a top view of my dish washing machine.

Figure 3 is a sectional side view showing the arrangement of the interior parts of my machine, and the upper and lower baskets, and also showing a suggested means of driving the baskets by a motor.

Figure 4 is a sectional view taken just at the top of the machine.

Figure 5 is a sectional view of the injector part of the device that injects the washing solution into the fluid pipe.

Figure 6 is a section on line AA of Figure 5.

Figure 7 is an enlarged sectional view showing the arrangements of the inner parts of my machine.

Similar numerals refer to similar parts throughout the several views.

Referring in detail to the drawings, 1 indicates a metal housing or cabinet, 8 a main detergent storage or supply tank and 1' represents a glass paneled swinging door in the front of the machine, all of which constitutes the frame work of the machine. A catch 35 is used for opening and latching the door 1' which swings on hinges 36.

A pivotal bearing 4 is secured to the bottom wall of the cabinet 1 and a similar bearing 3 is secured to the upper walls and in vertical alignment with the bearing 4. A vertically placed shaft 2 is centrally mounted in the bearings 3 and 4, and wire baskets 5 and 6 are secured on the shaft 2 in vertically spaced relation by means of the cotter pins 7 and 7' passing through the center hubs of the baskets 5' and 6'.

The upper wire basket 5 has spaced vanes or paddles 29 carried by its two outer and upper peripheral wires 29' and 29''.

A fluid supply pipe 19 extends upwardly through the bottom wall of the cabinet 1 and connects to a fitting L 20 which is secured by a threaded connection to the upper end of an injector casting 18, that houses a chamber for mixing the detergent and hot water which are supplied to the chamber.

Within the horizontal part of the L 20 is secured the upper horizontal end of the curved pipe 20', the vertical part thereof extending to approximately the bottom of a chamber 18'. The storage chamber 18' has suitably tight connection 17 at its lower extremity. A horizontally positioned needle valve 30 of usual form with a handle 31 is arranged to regulate the orifice of an impelling nozzle opening 28 in the injector casting 18 which has a passageway 21 leading from the storage chamber 18' into a spray chamber 22. The spray chamber 22 is provided with screw connections at its upper and lower ends for insertion of spray pipes 24 and 23, respectively.

The spray pipe 23 extends into downwardly close proximity to the bottom wall of the cabinet 1 and is closed tight by means of a cap 23'. The top spray pipe 24 extends to the L 24' into which is screwed a horizontal spray pipe 25 above the upper basket. The spray pipe 25 is closed by means of a cap 25'. Spaced spray holes or jets 26 are drilled in pipes 23 and 24, and the spray chamber 22 of the injector casting 18, all facing towards the baskets 5 and 6 and tangent to a circle having a diameter smaller than the outside diameter of the baskets and in a direction opposed to the direction of the revolving baskets. Additional spray holes drilled in the horizontal pipe 25 are designed to direct sprays diagonally downward in varying directions, some of which may be in part, opposed to that of the revolving baskets.

As shown, a fluid detergent supply tank 8 is built in the top wall of cabinet 1 and a metal filling spout 9 is attached to the top of the same. The tank 8 has an outlet pipe 10 extending to

the bottom of the injector casting 18 at the threaded connection 17, in which is incorporated a valve 11, a T 13, and a spring operated valve 15.

5 The horizontal outlet of the T 13 is connected by a pipe nipple to a fitting 14 securely fastened to the outside of front wall of the cabinet 1. A detergent measuring tank in the form of a gauge glass 14' is securely connected to the fitting 14 extending vertically to a point above the top of the detergent tank 8.

15 A cavity 32 is constructed in the bottom wall of the cabinet 1, and a porous removable strainer 33 having hollow handle 34 is seated in the cavity 32, which has a fitting 35 fastened to its lower wall for the connection of a discharge pipe. The hollow handle 34 functions as an overflow drain if undissolved refuse clogs the strainer 33.

20 The operation of my device is as follows:—

The valve 15 leading to the injector casting 18 being closed, a supply of liquid detergent is poured into the storage tank 8, until the level of the detergent is registered in the glass gauge 14' which serves as a measuring tank, the needle valve 11 in pipe 10 having been opened sufficiently to allow the detergent to flow by gravity from the storage tank into the measuring gauge through the passage connecting the fitting 13 with the said gauge. The valve 11 is closed sufficiently so that the effective cross sectional area of the outlet pipe 10 leading from the detergent tank 8 to the fitting 13 is substantially less than the by-pass connecting the fittings 13 and 14, and is less than the cross sectional area of the pipe 12' below the fitting 13. When the gauge 14' has been filled by gravity from the supply tank the spring valve 15 is then opened by means of the handle 15' and a regulatable quantity of detergent flows to the storage chamber 18' of the injector casting, a small quantity of such detergent coming direct from the supply tank 8, while the major portion comes from the gauge glass, owing to the setting of the needle valve 11 which renders the effective area of the pipe 10 leading from the storage tank less than the area of the passage leading from the gauge. When the spring valve 15 is released, it closes, allowing the gauge glass 14' to be automatically replenished by gravity from the main storage tank 8. The capacity of the storage tank is many times that of the gauge glass, so that the gauge may be filled several times from the storage tank. Obviously by use of the visible measuring gauge 14' the quantity of detergent supplied to the injector casting may be regulated so as to just fill the storage chamber 18' with detergent.

60 The cabinet door 1' being opened, soiled dishes 27, glasses, and similar articles are placed in the wire baskets 5 and 6, and the door is then securely closed.

70 Washing is accomplished by turning hot water under pressure into supply pipe 19 through fitting 20, and into injector reservoir 18' through opening 21 into spray reservoir 22 and spray pipes 23, 24, and 25 and discharging through their spray holes 26 onto the dishes. Some of the water at the same time enters the pipe 20' in the injector chamber 18', displacing the previously stored liquid detergent slowly out of the chamber 18' through opening 21' and mixing it with the hot water flowing through this opening 21'.

75 The impelling jet from opening 28 strikes the

vanes 29 on the basket 5 to revolve it together with basket 6,—they both being fastened to the vertical shaft 2,—and thence on the dishes to cleanse the same.

80 The spraying fluid from the opening 28, and the openings 26 thoroughly washes the dishes in the revolving baskets.

85 The valve 30 is adapted to regulate the impelling jet, by reducing or enlarging the size of the nozzle opening 28.

90 Rinsing is accomplished by the hot water stream subsequent to forcing out the detergent from storage chamber 18'. In the meantime, more detergent is automatically supplied to the measuring tank 14' by gravity flow from the storage tank 8, through pipe 10, and needle valve 11, through pipe 12, the fitting 13, the pipe 12' and the fitting 14, and is now ready for the next operation of washing the dishes.

95 A strainer 33 is provided for arresting undissolved refuse in the cavity 32 whence it drains off by the pipe 35.

100 As an alternative method of driving (see Fig. 3), there may be substituted in place of the driving jet a motor 36 suitably geared to provide the requisite speed,—particularly in an opposite direction to that of the spraying jets so as to create a very effective washing operation.

105 The invention is not restricted to the particular design and shape shown, and the basket wires may be adapted to hold any particular kind of specially sized or shaped dishes, silverware, pots, pans, cups, glasses, etc. A motor may be used to revolve the baskets as shown in Figure 3 instead of the water jet from the nozzle 28.

110 The invention is simple in construction, the detergent acts as a lubricant for the vertical shaft bearings, is inexpensive, strong, and easily installed in restaurants, homes or apartment houses, and can be built in the wall exactly the same as any dish closet or cupboard.

115 What I claim and desire to secure by Letters Patent is:—

1. A dish washing machine including a cabinet provided with a door, a vertical shaft mounted within the cabinet, a plurality of vertically spaced revoluble dish receptacles mounted on the shaft, means for rotating said dish receptacles, means within the cabinet for discharging fluid upon the dish receptacles, including a perforated vertical pipe having a perforated horizontal arm, both supplying fluid in a direction opposed to the direction of rotation of said receptacles, and measuring means connected with the fluid discharging means for supplying thereto a predetermined amount of detergent.

2. A dish washing machine comprising a cabinet, a vertical shaft mounted within the cabinet, a revoluble basket mounted on said shaft and constituting a dish receptacle, dishes within the receptacle, a plurality of peripheral fins mounted on said basket, fluid supply means within the cabinet, including a jet means for discharging fluid upon said peripheral fins and tending to rotate the basket in one direction, and means including a vertical pipe having a horizontal arm, both having perforations therein discharging fluid against the surfaces of the dishes in a direction to oppose the rotating action of said jet.

3. A dish washing machine comprising a cabinet, a vertical shaft within the cabinet, a plurality of horizontally revoluble basket dish receptacles mounted on said vertical shaft, means for propelling said baskets in one direction and a fluid supply system, including vertical and

horizontal spray pipes each having perforations so located as to direct the resulting fluid forced through the perforations in an opposite direction to that in which the baskets are revolved by means of said propelling device.

4. In a dish washing machine, a dish receptacle, means for discharging fluid upon the dish receptacle, and means for successively supplying to said discharging means a cleaning fluid having a predetermined quantity of detergent and then supplying clear water to the dishes, said supply means including a mixing chamber, a clear water pipe communicating with the mixing chamber, a detergent pipe leading to the mixing chamber, a detergent measuring gauge having a transparent wall through which the detergent is visible communicating with said detergent pipe, for supplying a predetermined quantity of detergent to the mixing chamber, manually controlled valve means interposed between the measuring gauge and mixing chamber for cutting off the detergent as soon as the visible supply of detergent in the measuring gauge is exhausted, and means for automatically replenishing the supply of detergent in the measuring gauge as soon as the said manually controlled valve means is closed.

5. A dish washing machine including a cabinet, a dish receptacle within the cabinet, a spray system within the cabinet for discharging fluid upon said dish receptacle, and means for successively supplying to said spray system a cleaning fluid having a predetermined quantity of detergent, and then supplying clear water, said means in-

cluding a chamber communicating with said spray system and initially filled with detergent, a detergent supply pipe leading to said chamber, valve means normally closing off said detergent pipe from a source of detergent, and means for supplying clear water under pressure to said chamber, for mixing with said detergent, and discharging the mixture from the chamber to said spray system, said water supply means continuing to supply clear water for rinsing after the detergent fluid has been discharged.

6. In a device of the character described, a detergent mixing chamber having a water supply conduit leading thereto and a controlled detergent supply means, comprising a detergent reservoir located above the mixing chamber and having a pipe leading thereto, a detergent measuring transparent gauge of substantially less capacity than the tank, a connecting passage leading from the gauge to said pipe, a normally closed manually operable valve in said pipe below its juncture with said passage, said pipe above the juncture with said passage being of considerably less effective cross section of area than the area of said passage, whereby when the normally closed valve is opened the greater quantity of detergent is supplied to said mixing chamber from said measuring gauge than direct from the reservoir, while when the valve is closed the gauge will be replenished by gravity from said reservoir through said restricted pipe and connecting passage.

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