R. W. STEED.

DISH WASHING MACHINE.

APPLICATION FILED JAN. 23, 1912.

1,090,420.

Patented Mar. 17, 1914.

2 SHEETS—SHEET 1.

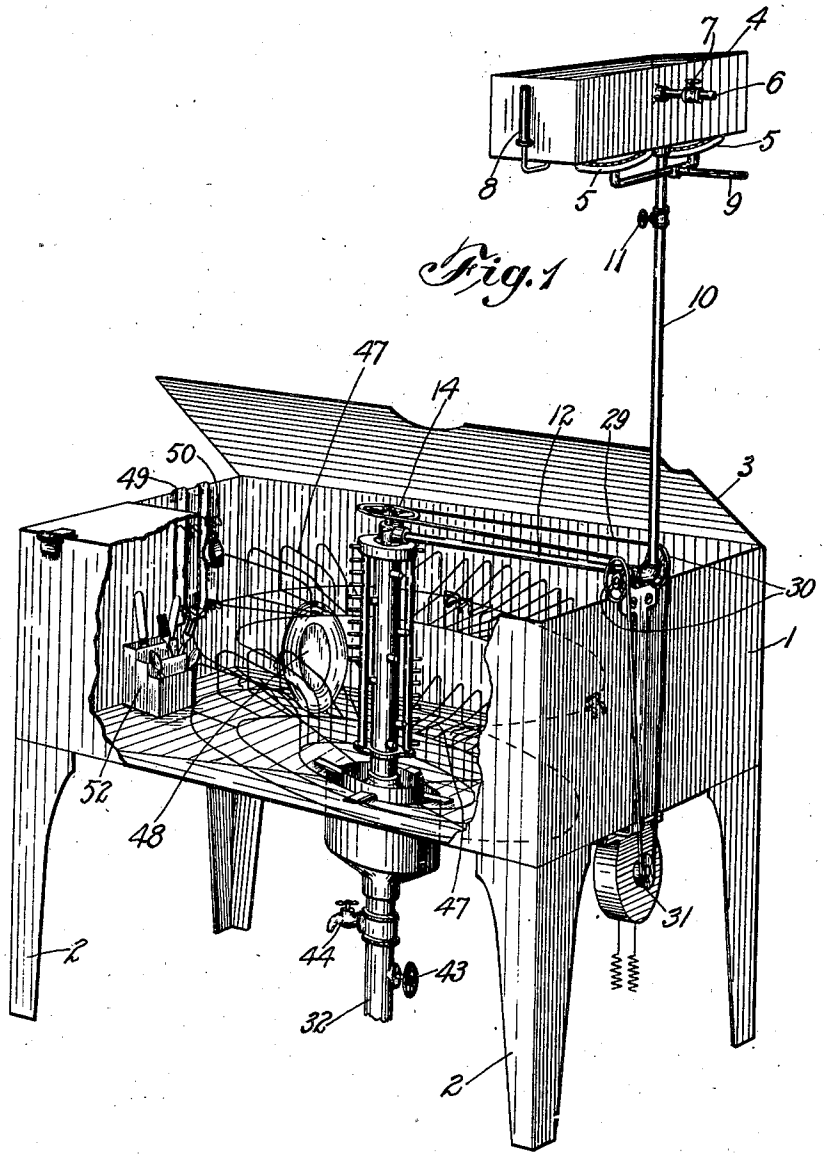


Fig. 1

Witnesses
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2 SHEETS—SHEET 2.

Fig. 2

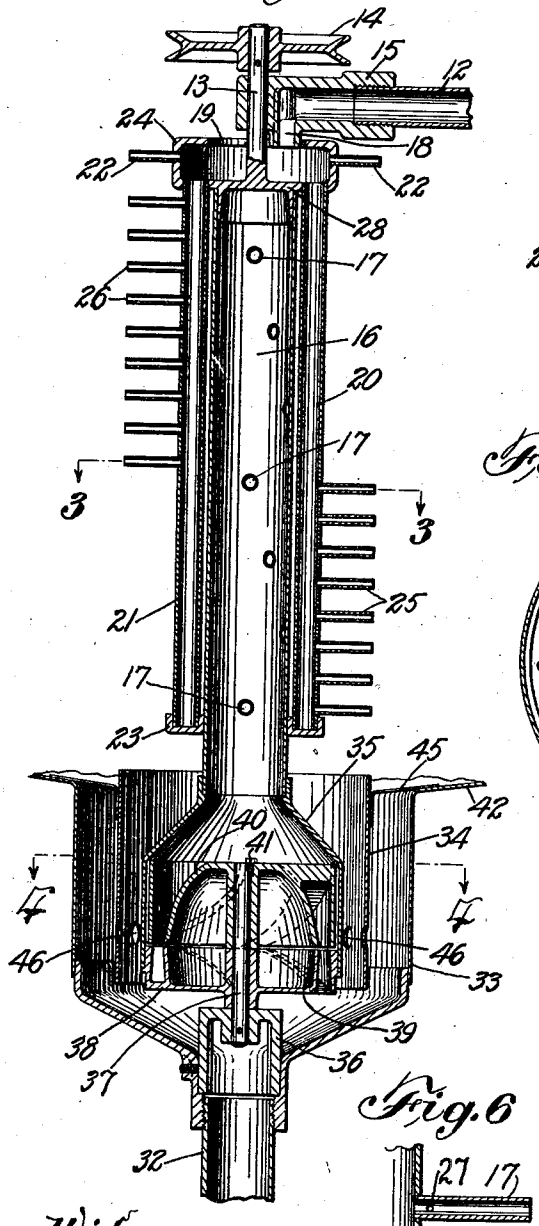


Fig. 3

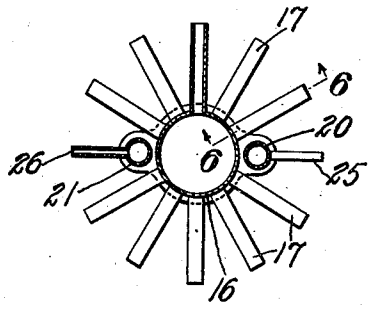


Fig. 4

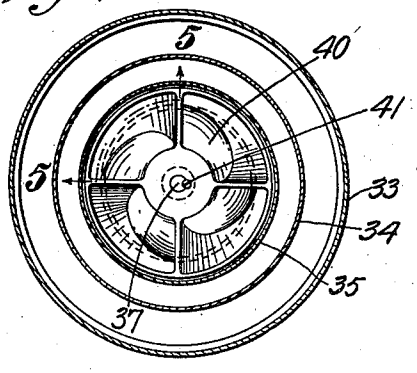


Fig. 5

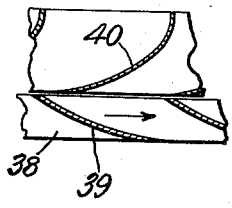
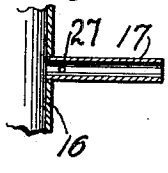


Fig. 6



Witnesses

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UNITED STATES PATENT OFFICE.

ROBERT W. STEED, OF MAPLEWOOD, NEW JERSEY.

DISH-WASHING MACHINE.

1,090,420. Specification of Letters Patent. Patented Mar. 17, 1914.

Application filed January 23, 1912. Serial No. 672,877.

To all whom it may concern:

Be it known that I, ROBERT W. STEED, a citizen of the United States, residing at 35 Durand road, Maplewood, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Dish-Washing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

My present invention relates to certain new and useful improvements in dish washing machines, the object thereof being to provide a machine particularly adapted for domestic use in homes and small kitchens, although it is equally well calculated to serve for efficient use on a larger scale.

The invention consists essentially in a centrifugal, turbine, or rotary pumping means whereby water is lifted vertically to a point where it can be projected laterally against the dishes and other articles requiring cleansing; and the invention also comprises numerous details and peculiarities in the construction, arrangement and combination of the various parts, substantially as will be hereinafter described and then pointed out in the claims.

In the annexed drawings illustrating my invention; Figure 1 is a perspective view of my improved dish washing machine, a portion of the tank being broken away to expose to view the internal mechanism. Fig. 2 is an enlarged vertical section of the operative mechanical parts of my improved dish washing machine, including more particularly the pumping mechanism. Fig. 3 is a sectional plan view on the line 3, 3 of Fig. 2. Fig. 4 is a sectional plan view on the line 4, 4 of Fig. 2 and indicates especially the appearance of the diffusing vanes and the blades of the water pump. Fig. 5 is an enlarged detail section of a broken away portion of certain of the diffusing vanes and the pump blades, for the purpose of showing their relative location as well as their shape; the section of Fig. 5 being on the line 5, 5 of Fig. 4. Fig. 6 is a sectional view on the line 6, 6 of Fig. 3.

Similar characters of reference designate corresponding parts throughout all the different figures of the drawing.

In carrying my invention into practical effect I provide a main tank 1 of suitable size and shape, preferably rectangular, for containing the dishes and other articles to be washed, as well as the main parts of the operative mechanism, which tank is to be considered as the main washing tank. It is supported in any convenient way, as for instance upon the legs 2, and is provided with a suitable cover 3. I also utilize an elevated water-heating tank 4, which is supported in any desirable manner, and has the function of heating a proper quantity of water which can be supplied to the washing mechanism in a way to be presently explained. This water tank 4 has a suitable water supply pipe 6 provided with a cock 7, a glass 8 to indicate the level of the water, and an outlet pipe 10 provided with a cock 11, which pipe 10, runs downwardly and connects with a pipe 12, see Figs. 1 and 2, which leads to the interior of the tank 1 and connects with other parts of the mechanism there. Further, the water tank 4 is provided with gas jets 5 located beneath it having a gas supply pipe 9, so that in this way the water can easily be heated. Thus a supply of hot water is provided for the washing tank, and this supply, which is led through the pipe 12 enters a stationary horizontal pipe casting 15 provided with a downwardly-projecting outlet nozzle 18 which delivers through a circular opening 19 into the upper revolving circular casting 24. Two vertical pipes 20 and 21 placed diametrically opposite to each other have their upper ends fixed securely into the upper revolving casting 24, and their lower ends fixedly held by a base plate 23. The upper hollow casting 24 is provided with horizontally-projecting outlet pipes 22; any suitable number of them. The pipe 20 is furnished in its lower half with a series of horizontal projecting pipes 25, while the opposite pipe 21 is provided in its upper half with a similar series of horizontal projecting pipes 26. Thus it will be seen that the pipes 25 and the pipes 26 project in opposite directions. While the lower ends of the vertical pipes 20 and 21 are closed and securely held by the horizontal casting 23, the upper ends of said pipes communicate with the interior of the hollow casting 24 and receive a hot water supply therefrom which passes downwardly through said vertical pipes 20 and 21 and finds outlet through the branches 25 and 26 into the tank 1.

Between the pipes 20 and 21 is a water discharge cylinder 16 of uniform diameter throughout, which passes downwardly through the lower casting 23 and is held

therein, and which is provided at its upper end with a circular disk or casting 28 securely seated therein and connected thereto, said disk 28 forming part of the bottom of the casting head 24. This circular casting 28 is provided with an upwardly projecting shaft 13 on which is a grooved pulley 14. A belt 29 passes around this pulley to the edge of the tank 1 where it runs around a couple of guide pulleys 30 and then downwardly to a small electric or other motor 31. Thus it will be seen that I provide means whereby the shaft 13 is driven, and consequently the cylinder 16 and the casting 24 and pipes 20 and 21 are jointly caused to revolve.

Continuing my description of the discharge cylinder 16, which is really in fact a hollow shaft, I desire to point out that it is provided at intervals with outwardly-projecting pipes 17 similar to the pipes 25 and 26. These pipes are located at any suitable points and are more or less staggered, for example, or so situated that the water ejected through them from the interior of the cylinder 16 may be cast in all directions throughout the interior of the tank 1, see Fig. 1. The branch pipes 17 are provided each with a small perforation as at 27, to admit air to break the vacuum and thus permit the water to rise higher in pipe 16 and flow out of all the pipes 17, in the whole series to the top of pipe 16. Without the perforations 27 the head of the outflowing water at the ends of pipes 16 would be so great as to prevent the water rising more than a short distance in pipe 16. The lower end of the cylinder 16 is attached to a conical or bell-shaped casing 35, having also a cylindrical part, the lower end of which is securely fastened to a pump impeller 38, which is clearly shown in section in Fig. 2, and the blades of which, 39, are partially outlined in Fig. 5 so as to indicate their curvature. Inside of the cylindrical portion of the frame 35, just below its conical upper portion, is located a stationary series of diffusing vanes 40, which are shown in section in Fig. 2 and in partial outline in Fig. 5. This circular series of diffusing vanes is carried by a vertical shaft 37 to which the hub of the vanes is fastened by a set screw 41, see Fig. 2, or by some other equivalent device. This shaft 37 is secured to an angle piece or arch 36 in the lower end of a receptacle 33, which has a flange 42 at the upper end thereof, said receptacle 33 being located below the central portion of the main tank 1 and supported by means of its flange 42, which rests on the bottom of the interior of said tank. Attached to the lower end of the receptacle 33 is a waste or discharge pipe 32 by which the water is carried away from the machine, said pipe being provided, as shown in Fig. 1, with a hand valve 43 and also a faucet 44. Within the receptacle 33 and concentric therewith, being arranged so as to leave an annular space between it and the cylindrical wall of said receptacle 33, is a cylindrical barrel 34 provided with several fingers 45, which project over the flange 42 and rest thereon and serve to support the cylindrical barrel 34 in place. The upper end of cylinder 34 is open as well as the lower end, both ends being free, and cylinder 34 is provided opposite the diffusing vanes 40 with a series of orifices 46 through which the water can pass from the annular space between cylinders 33 and 34. The perforated barrel 34 serves to enable the water to pump more efficiently when the impeller 38 is rotated in consequence of the rotation of the casing 35 to which it is attached. The reason for this is, that the rapidly-rotating casing 35 causes a rapid swirling motion in the water around it, and in the absence of the barrel 34 the water would not flow down through the receptacle 33 to the suction of the pump, but its course would be interfered with by the revolving water around casing 35. It will be evident that, with the diffusing vanes 40 carried by the shaft 37, and thereby held in a stationary position, when the impeller 38 with its series of turbine blades rotates, the water in the receptacle 33 will be pumped up and discharged into the cylinder 16, and will be carried upward through said cylinder until it reaches the lateral outlet pipes 17, through which it will be passed and projected in a plurality of streams in different directions throughout the main tank 1, and thus brought into contact with the dishes and other articles that are placed therein to be washed and cleansed.

In order to support the dishes in the proper way I have found it convenient to provide a wire frame 47 which surrounds the rotating mechanism, and which is shaped with substantially radial spaces between the wires so that the plates and other articles, as for instance 48, may be located on edge in radial positions in two or more rows, one above the other, around the rotating water-projecting parts and thus the contact of the water will be against these radially-placed articles and will effectually cleanse them. The wire frame 47 may be constructed in any desired manner, and may hold the plates in two rows, as shown, or in any other way.

I do not wish to be restricted to a wire frame that will hold the articles in position, but I find this a very convenient way of disposing them. Furthermore, a rack like that shown at 49, having spring devices 50 thereon, may be used for holding cups, and a box rack 52 may be employed for knives, forks and spoons. I reserve, however, the right to widely vary the racks and other supports on which the dishes and other articles are to be placed for cleaning.

The operation of my improved dish washing machine is as follows:—After a supply of water has been heated in the water-heating tank 4, the valve 11 will be opened and the water allowed to pass down into the hollow casting 24 and the vertical pipes 20 and 21, emerging thence to fill the receptacle 33 at the bottom of tank 1. As soon as the requisite quantity of water has been supplied from the tank 4 to the tank 1 the valve 11 will be closed. The motor 31 will then be started and this will actuate the pump, and the discharge pipe 16; therefore, as soon as the water fills the pipe 16 it will be thrown out of the branches 17 in a whirling spray which will dash through the different parts of the tank 1 and will impinge briskly upon the dishes which have been placed in the supports, and will then fall back into the receptacle 33 at the base of the tank 1, and be repumped as often as desired. While the operation of washing is proceeding the tank 4 can again be filled with water through the supply pipe 6, and the supply heated and made ready to be used as rinsing water after the dishes are washed. While the motor 31 continues to revolve, the water will be acted on by the impeller 38 and caused to be driven upwardly through the diffusing vanes 40 and lifted through the hollow cylinder 16 until it reaches the various projecting staggered horizontal outlet pipes 17 through which the water will be projected in a plurality of streams which will strike against the dishes and effectually perform a washing operation thereof. This will be continued until the water in receptacle 33 has been pumped by the centrifugal pumping mechanism and delivered upon the articles to be washed. Of course the water will fall back again and be repumped, usually a number of times, and this operation will be continued until the dishes are properly cleaned. The motor 31 will then be stopped and by either using the valve 43 or the faucet 44, the greasy water and other contents of the tank and the receptacle 33 can be withdrawn, after which the valve or faucet will again be closed. Then the motor 31 will be again started and the vertical pipes 20 and 21 set in revolution (as well as the connected parts), and the clean hot rinsing water coming from tank 4 down through pipes 20 and 21 will be thrown out through pipes 25 and 26, and a supply of clean hot water directed against the dishes which will enable them to be rinsed off. It will be found that by these operations the tableware will be effectually cleaned and rinsed and then dried, and everything will take place easily and conveniently with a small number of manual operations and with very little attention on the part of the user.

Many changes in the precise construction and arrangement of the various parts may be made without exceeding the scope of the invention.

I do not in this case claim the specific form of centrifugal pumping means shown, as that has been made the subject-matter of an application for patent filed by me on the 22nd day of November, 1913, Serial No. 802,516, as a division of this case.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a dish washing machine, the combination of a tank, means for supporting the articles to be washed, rotatable spray pipes in the tank, means for supplying water thereto, a pipe for spraying water into the tank and connected to and rotatable with the said rotatable spraying pipes, and means for pumping water from the tank into said last-named pipe.

2. In a dish washing machine, the combination of a tank, a hot water supply, means for introducing it into the tank consisting of vertical pipes having lateral outlets, said pipes being mounted for revolution, a centrifugal pumping mechanism having a discharge cylinder properly secured in connection with the aforesaid pipes, and combined and arranged in connection with a pumping means, whereby the water may be raised vertically to a point where it can be projected laterally over the dishes.

3. In a dish washing machine, the combination of a tank, means therein for supporting the dishes and other articles to be washed, a pumping mechanism in the base of the tank, a vertical cylinder connected with the pumping means and having lateral outlets throughout its vertical length, a water supply mechanism connected with said cylinder for the delivery of the water to the tank, said mechanism including vertical pipes having lateral outlets, a common head to which the pipes are connected, a supply pipe delivering into the common head, and a heating tank.

4. In a dish washing machine, the combination of a tank in which the dishes are supported, a rotatable vertically disposed pipe carrying a series of lateral outlets arranged at different levels, and means for supplying said pipe with water from outside the tank.

5. In a dish washing machine, the combination of a tank in which the dishes are supported, a vertically disposed pipe carrying a series of lateral outlets, means for controlling the supply of water from outside the tank to the said pipe, a rotary pump communicating with the tank, a pipe to which the pump delivers arranged to discharge laterally against the dishes in the tank, and means for revolving the pump and also the said vertically disposed supply pipe.

6. In a dish washing machine, the combi-

nation of means for delivering water to dishes to be cleansed, comprising a rotary member having two sets of water delivery conduits, one communicating with a water supply external to the tank, and a pump taking water from the tank and delivering to the other set of delivery water conduits.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT W. STEED.

Witnesses:
JEANNETTE STORK,
L. S. PERRINE.