A. M. DOW.

DISHWASHING MACHINE.

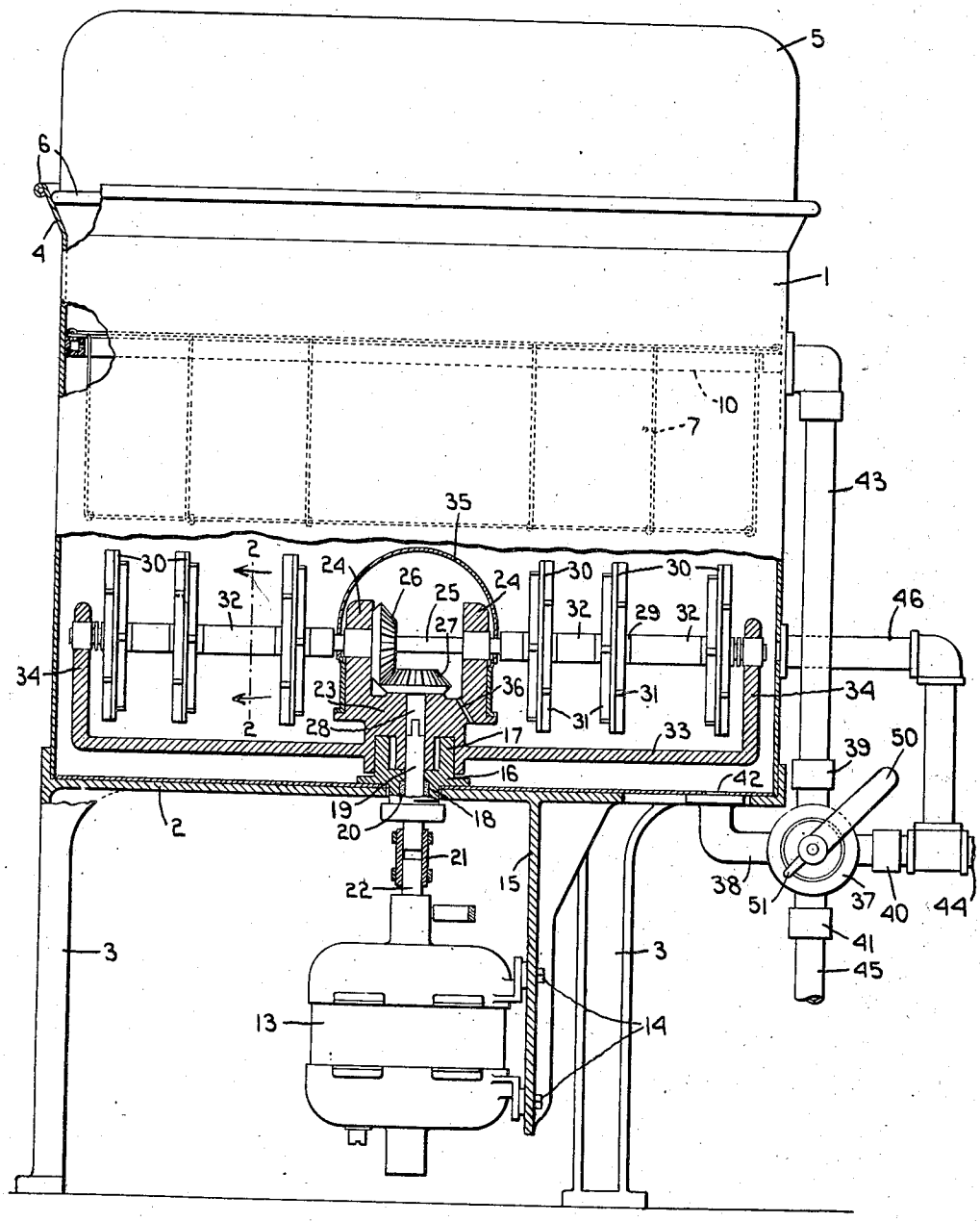
APPLICATION FILED NOV. 15, 1919.

1,420,418.

Patented June 20, 1922.

2 SHEETS—SHEET 1.

Fig.1.



Inventor.
Alva M. Dow
by Heard Smith & Tennant.
Attys.

A. M. DOW.

DISHWASHING MACHINE.

APPLICATION FILED NOV. 15, 1919.

1,420,418.

Patented June 20, 1922.

2 SHEETS—SHEET 2.

Fig. 2.

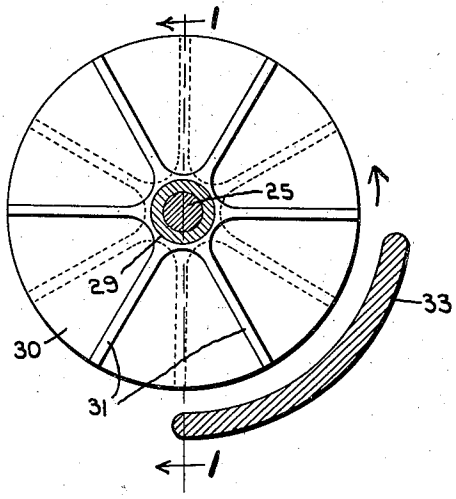


Fig. 3.

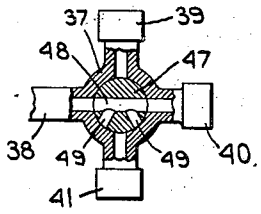
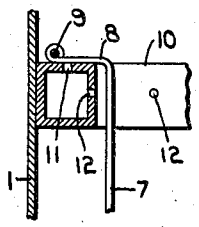


Fig. 4.



Inventor.
Alva M. Dow
by Heard Smith & Tennant.
Attys.

UNITED STATES PATENT OFFICE.

ALVA M. DOW, OF BRAINTREE, MASSACHUSETTS.

DISHWASHING MACHINE.

1,420,418. Specification of Letters Patent. Patented June 20, 1922.

Application filed November 15, 1919. Serial No. 338,144.

To all whom it may concern:

Be it known that I, ALVA M. DOW, a citizen of the United States, residing at Braintree, county of Norfolk, State of Massachusetts, have invented an Improvement in Dishwashing Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to a machine for washing dishes and while the machine is capable of being constructed in any size to wash any quantity of dishes it is particularly designed for household use.

The object of the invention is to provide a machine of this character which shall effectively and thoroughly wash and rinse all kinds of dishes.

The object of the invention is further to provide a machine which shall be of simple construction readily operable by a small amount of power, preferably obtained from an electric motor, which shall be durable and which shall occupy a minimum amount of space.

The object of the invention is further to provide a machine in which the dishes shall be cleansed solely by the action of the water or cleansing fluid and without the use of brushes or other mechanical devices upon the dishes.

The object of the invention is further to provide a machine in which all the working parts are readily removable from the tank to enable all parts of the machine to be cleansed.

The object of the invention is further to provide a machine of this character which may be connected to a water main and to a discharge conduit so that the water may be supplied thereto and discharged therefrom by simply operating a valve.

These and other objects of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

In the drawings—

Fig. 1 is a view partially in front elevation and partially in vertical cross section, taken on the line 1—1 of Fig. 2, of a preferred form of machine embodying the invention adapted for household use.

Fig. 2 is a view in transverse section taken on the line 2—2 of Fig. 1.

Fig. 3 is a detail partially in section showing the construction of the valve.

Fig. 4 is a detail partially in vertical cross section taken through the rinsing conduit.

The machine comprises a closed and preferably cylindrical metal tank of a proper size. The body 1 of the tank rests upon and is supported in a metal base 2 having a plurality of legs 3 by which it is mounted on the floor or other support. The body 1 is provided at its upper edge with an outwardly and upwardly flaring portion 4 and the cover 5 fits within and rests at its lower edge upon this flaring portion. The edges of both cover and body are preferably beaded at 6. The inner cylindrical surface of the cover 5 is of slightly larger diameter than that of the body 1 so that there is little chance of water passing the line of juncture while such as does drains back into the tank.

The dishes to be washed are supported in a skeleton frame 7 made of wire. The frame may be of any desired construction in order to support the different styles of dishes to be washed.

The frame is removably supported in the body of the tank. The dishes to be washed are first placed in the frame and then the frame is lifted and placed in the tank. Any suitable means may be provided for supporting the frame, but as shown the frame is provided with a laterally extending upper edge formed by bending the wires of the frame laterally at 8 to engage an annular wire 9. This edge rests upon a suitable shelf or projection from the interior of the body of the tank. This shelf in the preferred form is the upper face of an annular hollow rinsing conduit 10 secured to the interior of the body of the tank and provided with apertures 11 extending through its upper wall and apertures 12 extending through its inner wall.

The water or cleansing fluid such as a soapy solution is placed in the bottom of the body of the tank. The principle upon which the invention acts is that of projecting the water or cleansing fluid with considerable force and in finely divided parti-

cles against all portions of the dishes in all directions and at all angles and to continue this action of the water or cleansing fluid upon the dishes until all the dirt and foreign substance is removed therefrom.

This action is secured by a plurality of water distributors which in the preferred form of the invention take the form of radial blades projecting from the side faces of wheels. These water distributors are mounted in the bottom of the tank below the suspended dishes and partially submerged in the water or cleansing fluid in such a manner that they are capable both of rotation and of revolution. This combined rotation and revolution is preferably secured by mounting a plurality of the water distributors upon a horizontally extending shaft carried in a support, in turn rotating on a vertical axis. Thus, as the water distributors rotate about their own axis they at the same time revolve about the vertical axis of the support. In addition a deflecting apron carried by the support insures the deflection of the water projected by the distributors in an upward direction. This deflecting apron constantly maintains what may be termed a false water level because independently of the amount of water in the bottom of the tank its distribution is controlled by the upper edge of the deflecting apron. Thus as the distributors are revolved and rotated the water is picked up and projected thereby against the dishes in all directions and at all angles.

A simple and preferred construction for securing this result is illustrated. An electric motor 13 is secured to the base 2 as by being bolted at 14 to a flange 15 extending downwardly from the base. The axis of this motor is preferably alined with the center of the tank. A bearing block 16 having an upwardly projecting annular bearing 17 is mounted centrally in the bottom of the tank and projects at 18 through the bottom of the body of the tank and through the base 2 of the frame. This bearing block is soldered or otherwise secured in place to form a water tight joint. A shaft 19 is journalled vertically in the bearing block and passes through a stuffing box 20. This shaft 19 is connected by an insulating connection 21 with the driving shaft 22 of the motor 13.

The water distributors are carried upon a support fitting over the shaft 19 and mounted upon the bearing block 16. This support comprises a central hub 23 having an annular recess at its bottom so that it is adapted to fit over the bearing block 16 and the shaft 19 and to be supported upon the bearing block. This hub is extended upwardly to provide oppositely disposed projections 24 having alined bearings for a horizontally disposed shaft 25. This shaft adjacent to one of the projections 24 has mounted thereon a bevelled gear 26 in mesh with a bevelled gear 27 carried upon a stub shaft 28 mounted for vertical rotation in the hub 23 and provided with an interlocking connection with the shaft 19.

The shaft 25 extends substantially across the tank and has mounted thereon at each side a plurality of water distributors. These distributors are each shown as blades extending radially of and parallel with the shaft and in this case projecting laterally from wheels or disks. Each wheel in the preferred form illustrated comprises a hub 29, a disk 30 extending from the hub transversely of the shaft, and is provided with a plurality of radial laterally extending blades 31 arranged in staggered relation at opposite sides of the disk. These wheels are keyed or secured to the shaft 25 and are separated by spacers 32. They are so spaced that they will not all track as they are revolved, and this spacing is so arranged as to cause the water projected by the distributors against the dishes to be equalized throughout the tank.

A deflecting apron 33 is preferably formed upon the supporting hub 23 by being cast thereon and extends preferably in an arcuate curve in front of the lower portion of the upward path of the distributors, considering the front as where the blades are moving upwardly. At its outer ends this deflecting apron is carried upwardly to form vertical supports 34 in which the outer ends of the shaft 25 have their bearings. This deflecting apron preferably has its lower edge about in the vertical plane of the shaft 25 and its upper edge about in the plane of the bottom of the shaft 25.

The cleansing fluid which is preferably a solution of soap and water is supplied to or admitted to the body of the tank and fills the tank about to the level of the bottom of the shaft 25 so that the water distributors are partially immersed therein. The dome shaped cover 35 is fitted over the hub 23 and covers the gears 26 and 27. This cover is not intended to be water tight but it prevents dirt and foreign substances from being thrown into the gears. Any water leaking or passing in the space beneath the cover drains out through an opening 36 provided for that purpose.

When a frame containing the dishes has been placed in the tank and the cover 5 put into position and the cleansing fluid supplied and the electric motor put into operation the gear 27 is rotated and consequently rotates the gear 26 and the shaft 25 with the distributors connected thereto. The motor is driven at a fairly high speed and consequently the distributors are rotated at a high speed. Owing to the fact that there is but one gear 26 on the shaft 25 and this is at one side of the center, and owing to the

fact that the distributors are immersed in the water, the action is such as to produce a slow and steady revolution of the shaft and distributors about the vertical axis of the tank. The water is consequently picked up by the distributors and deflected by the apron 33 and thrown upwardly in a spray of fine particles against the dishes. As the support slowly revolves the water is thus projected in all directions and at all angles against the dishes thoroughly washing and cleansing them. The number of the distributors and the speed of the rotation may be arranged and governed as found necessary by the size of the machine and the character of the dishes to be cleansed.

The machine in its preferred form is intended to be set up permanently and connected to a suitable hot water main and provided with a suitable discharge conduit so that the water may be readily supplied to and discharged from the tank. A simple and efficient means for securing this result is illustrated. An annular valve casing 37 is provided preferably having extending radially therefrom four branch pipes, 38, 39, 40, and 41. The branch pipe 38 forms a conduit to the tank at an inlet and outlet opening 42 formed in the bottom of the tank near the edge. The branch pipe 39 is connected to a pipe 43 and therewith forms a conduit opening into the rinsing conduit 10. The branch pipe 40 is connected to a discharge conduit 44. The branch pipe 41 is connected to a water main 45 preferably running to a supply of hot water. An overflow from the tank is preferably provided and is shown as a pipe 46 connected to the wall of the tank and to the discharge conduit 44. The valve provided in the valve casing 37 is of a peculiar type and is shown in detail in Fig. 3. This valve 47 is provided with one straightaway passage 48 and two radial passages 49 having an angle of less than ninety degrees with each other and symmetrically disposed with respect to the straightaway passage. A suitable handle 50 having a suitable indicator 51 is provided for operating the valve. While this valve may be arranged to make any desired connection it is preferably arranged to operate as follows.

When the machine is ready for use and the dishes to be washed are in place, the valve is turned so that the passages 49 connect the branch pipes 41 and 40. This places the water main 45 in connection with the discharge conduit 44. Thus any cold water is discharged. As soon as the water is running at full high temperature the valve is turned to bring the passages 49 into communication with the branch pipes 41 and 38. This places the water main 45 in communication with the tank and hot water is now admitted until it begins to run out of the over-flow. The valve is then turned to a neutral position; the machine is then operated until the dishes are thoroughly cleansed. The valve is then turned to bring the passageway 48 into communication with the branch pipes 40 and 38 all as shown in Fig. 3. This connects the opening 42 of the tank directly with the discharge conduit whereupon the dirty water or cleansing fluid is discharged. The valve is then turned to bring the straightaway passage 48 into communication with the pipe 43, this connects the water main 45 with the rinsing conduit 10. The hot water then squirts out through the openings 11 and 12 and pours down over the dishes thoroughly rinsing them. The valve is then turned to permit the discharge of the water through the discharge conduit. The cover 5 is removed and the dishes taken out.

When it is desired to clean the tank and the water distributors all that is necessary to do is to reach into the tank and lift out the support 23 bodily. This leaves the tank entirely unobstructed except for the small bearing plug 16 at the bottom and enables it to be entirely cleansed. The support and distributors are also readily cleansed when outside of the tank.

The hot rinsing water not only removes all traces of the cleansing water leaving the dishes thoroughly cleansed but, if of a reasonably high temperature, so heats the dishes that they become dry when removed from the tank, rendering wiping unnecessary.

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

1. A dish washing machine comprising a closed tank, means for supporting the dishes in the upper part of the tank, a support mounted for rotation on a vertical axis in the bottom of the tank, a plurality of water distributors mounted for rotation on horizontal axes on the support, means carried by the support for deflecting the water thrown by the distributors, and means for simultaneously rotating the support and the distributors whereby the distributors will both rotate and revolve picking up water supplied to the bottom of the tank and throwing it in multitudinous directions and angles against the dishes.

2. A dish washing machine comprising a closed tank, means for supporting the dishes in the upper part of the tank above the water, a plurality of water distributors, and means for simultaneously rotating and revolving the said distributors with the axes of rotation and revolution in relative angular disposition to project the water in multitudinous directions and angles against the dishes.

3. A dish washing machine comprising a closed tank, means for supporting the dishes

in the upper part of the tank above the water, a support mounted in the bottom of the tank for rotation on a vertical axis, a horizontal shaft carried by the said support, a plurality of water distributing blades mounted on said shaft, and means for simultaneously rotating said shaft and revolving it about the vertical axis of the support to cause the blades to project the water in multitudinous directions and angles against the dishes.

4. A dish washing machine having the construction defined in claim 3 together with a deflecting apron carried by the support and extending in front of the lower portion of the upward path of said blades.

5. A dish washing machine comprising a closed tank, means for supporting the dishes in the upper part of the tank above the water, a stuffing box in the bottom of the tank, a driving shaft projecting through the stuffing box, a support mounted for rotation on a vertical axis in the bottom of the tank, a horizontal shaft carried by said support, a plurality of water distributors secured to said shaft, a driving member for the horizontal shaft mounted on the support, and means for separably connecting the said driving shaft and driving member whereby the support with the shaft and water distributors may be bodily removed from the tank.

6. A dish washing machine comprising a tank, means for supporting the dishes in the tank, rinsing means acting to direct water on the dishes, a valve casing, a water main connected to the valve casing, a discharge conduit connected to the valve casing, a plurality of conduits from the valve casing to the tank, and a valve member in the casing movable to connect either the main with the tank through one conduit to supply the washing water or the main with the tank through another conduit to supply rinsing water or the discharge conduit with the tank through one of the conduits to discharge the water.

7. A dish washing machine comprising a tank, means for supporting the dishes in the tank, rinsing means acting to direct water on the dishes, a valve casing, a water main connected to the valve casing, a discharge conduit connected to the valve casing, a plurality of conduits from the valve casing to the tank, and a valve member in the casing movable to connect either the main with the discharge conduit or the main with the tank through one conduit to supply the washing water or the main with the tank through another conduit to supply rinsing water or the discharge conduit with the tank through one of the conduits to discharge the water.

8. A water distributing element for a dish washing machine comprising a central supporting hub, a vertical shaft mounted in said hub, a horizontal shaft mounted in said hub, a driving connection between said shafts, a plurality of water distributors secured to said horizontal shaft, and an arcuate deflecting apron carried by the hub and extending in close proximity to said distributors throughout substantially the lower quadrant of their upward movement.

9. A water distributing element constructed as defined in claim 8 in which the said apron at its ends is provided with upwardly extending portions forming bearings for the outer ends of the horizontal shaft.

10. A dish washing machine comprising a closed tank, means for supporting the dishes in the upper part of the tank above the water, a support mounted for horizontal rotation in the bottom of the tank, a horizontal shaft carried by the support, a plurality of water distributors secured to said shaft, a vertical driving shaft mounted in the support, a gear on the driving shaft, and a gear on the horizontal shaft in mesh therewith whereby when the driving shaft is driven the horizontal shaft is rapidly rotated and slowly revolved about the vertical axis of the driving shaft.

11. A dish washing machine comprising the construction defined in claim 10 together with a deflecting apron carried by the support and extending in front of the lower upwardly moving portions of the distributors.

In testimony whereof, I have signed my name to this specification.

ALVA M. DOW.