W. R. WALKER.

MECHANICAL DISH WASHER.

APPLICATION FILED JAN. 12, 1914.

1,244,446.

Patented Oct. 23, 1917.

2 SHEETS—SHEET 1.

FIG. 1.

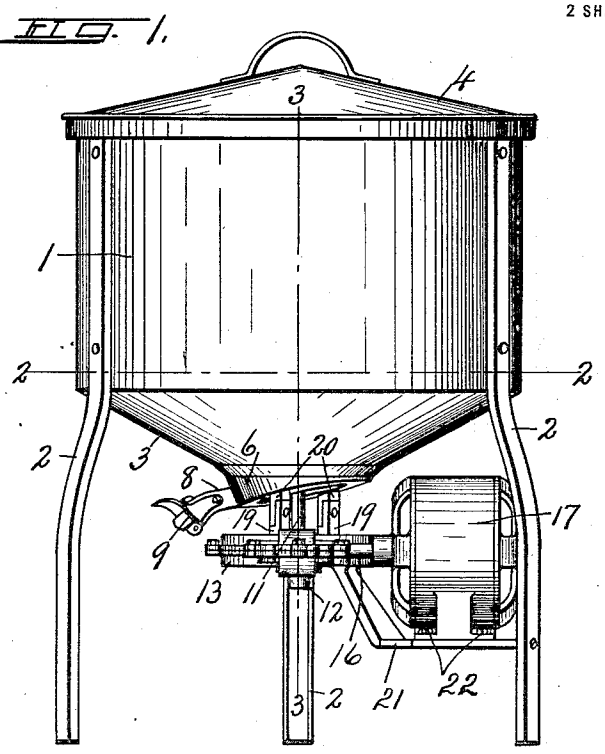
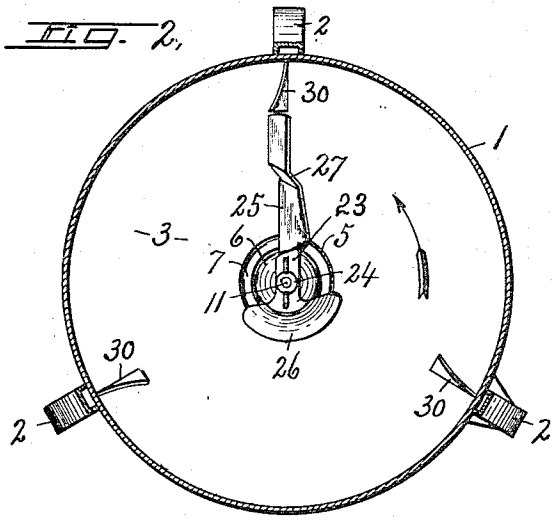


FIG. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

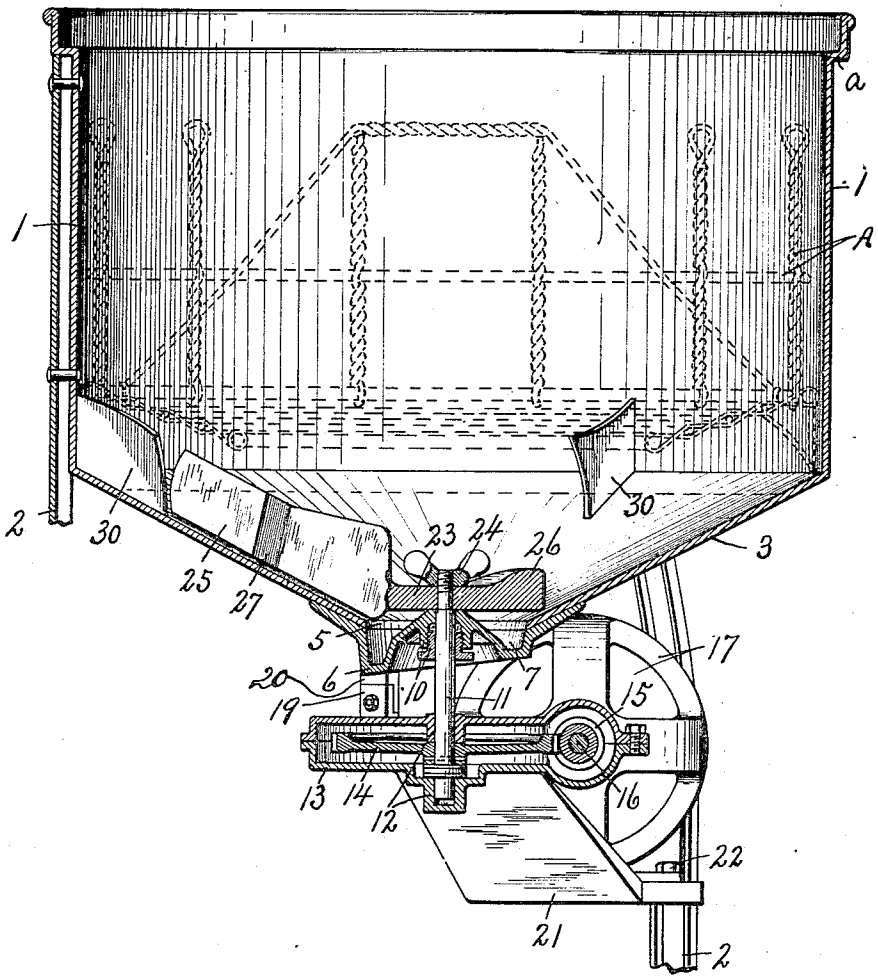
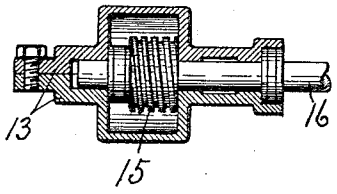


Fig. 4.



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MECHANICAL DISH-WASHER.

1,244,446. Specification of Letters Patent. Patented Oct. 23, 1917.

Application filed January 12, 1914. Serial No. 811,720.

To all whom it may concern:

Be it known that I, WILLARD R. WALKER, a citizen of the United States of America, and resident of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Mechanical Dish-Washers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in mechanical dish washers, similar in some respects to that set forth in my pending applications No. 749,133 filed February 18, 1913, and No. 776,678 filed June 30, 1913, and also in my Patent No. 1,070,562, August 19, 1913, except that the agitator for the washing fluid is rotatable and power-driven.

The main object is to provide a low priced power-driven machine which is capable of expeditiously and thoroughly washing and cleansing a considerable quantity of dishes and other kitchen or culinary utensils within a relatively small space and with the expenditure of a minimum power, and at the same time leaving the dishes or other utensils free from immersion in the water to drip and dry after the washing operation is completed.

In other words, I have sought to provide simple means for impelling, projecting and distributing a relatively small body of water or other cleansing fluid from a plane below the dish support upwardly between and across the dishes and other utensils, which may be carried in or by the support around a common axis in a plane above the water level when the machine is at rest, so as to allow the water or other washing fluid which may accumulate upon the dishes to drip or drain back into the bottom of the receptacle free therefrom.

I have discovered that by using a peculiar structure of blades adapted to be rotated in correlation to one or more baffle-plates of peculiar form, the water may be agitated, projected and evenly distributed upwardly across and between all sides and portions of the plates or dishes under a rotary, whirling motion which may be produced by the expenditure of a comparatively small amount of power, and one of the specific objects of my present invention is to produce such a structure as will produce these results.

Other objects and uses relating to specific parts of the device will be brought out in the following description.

In the drawings—

Figure 1 is a side elevation of a dish washing machine embodying the various features of my invention.

Fig. 2 is a horizontal, sectional view of the same machine taken on line 2—2, Fig. 1.

Fig. 3 is an enlarged, vertical sectional view taken on line 3—3, Fig. 1.

Fig. 4 is an enlarged detail sectional view of a portion of the gear case, showing the driving worm and adjacent portion of the armature shaft for the motor.

In the preferred form of my invention shown in Figs. 1 to 4 inclusive, a circular vat or receptacle —1— is supported at the desired height from the floor by suitable legs or standards —2—, and is provided with a conical or hopper shaped bottom —3— and a lid or cover —4—, all of which parts are preferably formed of galvanized iron or other sheet metal which will withstand ordinary use without corrosion, the conical bottom —3— being provided with a central opening —5— in its apex covered by a pendant reinforcing cap —6— of cast metal or equivalent material brazed, soldered, riveted or otherwise secured thereto to form a water-tight joint.

This plate —6— is provided with an inclined bottom disposed in a plane at an angle to the axis of the vat and forms the lower side of an annular channel —7— which gradually increases in vertical depth from the higher to the lower portion of the inclined bottom, to permit the washing fluid to be entirely drawn off through an outlet pipe —8— by the opening of a valve —9— on the outer end of the drainage or outlet pipe. The central portion of this plate —6— is elevated some distance above its inclined bottom and is conical in form and provided with a gland —10— in which is journaled a vertical shaft —11— having its lower end journaled in additional bearings —12— in a gear case —13— and provided with a worm gear —14— tight thereon, and adapted to be driven by a worm —15— on the end of a motor shaft —16— of an electric motor —17— as shown more clearly in Figs. 1 and 2.

The gear case —13— is provided with upwardly projecting lugs —19— bolted or otherwise secured to pendant lugs —20—

on the under side of the plate —6— for partially supporting the gear case from the under side of the vat, said gear case being additionally supported by a shelf bracket —21— having one end integrally or otherwise rigidly united to the gear case and its other end disposed in a horizontal position and bolted or otherwise secured to one of the legs or standards —2—, thereby constituting a suitable supporting shelf upon which the motor —17— is fixedly mounted and secured in place by bolts —22—.

The upper end of the upright shaft —11— extends some distance above the gland —10— into the interior of the vat and is reduced in diameter and threaded for receiving and supporting a revolving hub or plate —23—, the latter being removably held in place by set screw —24— engaging the upper threaded end of the shaft.

This hub or plate is provided with a laterally and upwardly projecting impeller blade —25— counterbalanced by an opposite weight —26— which is preferably integral with the hub. The impeller blade —25— may also be integral with or otherwise rigidly secured to the hub —23— at one side of its axis and is disposed in an inclined plane substantially parallel with that of the conical bottom —3— of the tank, so as to travel in close proximity thereto with just sufficient clearance to prevent friction therewith, said blade being disposed edgewise vertically with its front face in a plane at an acute angle to a vertical plane, or rather inclined upwardly and rearwardly in relation to its direction of rotation so as to impel the washing fluid, as water, upwardly and forwardly.

The intermediate or central portion of the blade is offset at —27— in the direction of rotation and at an angle to the tangent of a circle passing therethrough, for the purpose of impelling part of the water upwardly, forwardly and inwardly toward the center or axis of rotation, leaving the outer end beyond the offset portion slightly in advance of, but parallel with, the inner end of the blade.

In other words, the outer active portion of the impeller blade constitutes a wing or fin having its front face inclined upwardly and rearwardly relatively to the direction of rotation for impelling and distributing the washing fluid forwardly and upwardly under a whirling motion throughout the space within the vat, to cause the washing fluid to impinge with considerable force against the dishes or other utensils which may be arranged within said vat.

The radial length of the impeller blade —25— is somewhat less than that of the inclined conical bottom of the vat around which it is movable, so as to permit the use of one or more, in this instance three, relatively fixed deflector blades or baffle plates —30— projecting inwardly and upwardly from the sides and conical bottom of the vat respectively, and rigidly secured thereto by brazing, soldering, or equivalent fastening means, said baffle plates being spaced uniform distances apart and rising from the bottom to substantially the same height as the impeller blades, the inner, upper corners of the baffle plates being deflected or curved forwardly in the direction of rotation of the impeller blade so as to coact with said impeller blade in impelling the washing fluid upwardly, forwardly and inwardly as the impeller blade is rotated under a suitable speed.

The conical bottom of the vat is shallow as compared with the height of its cylindrical portion, so as to leave ample space above the plane of rotation of the impeller blade and also above the fixed blades —30— for the reception of a comparatively large dish-tray A, shown by dotted lines in Fig. 3 and forming the subject-matter of my pending application No. 776,678 previously referred to, except that the outer edge of the bottom of the tray is provided with pendant legs or feet adapted to rest upon the corresponding edges of the conical bottom of the vat between the fixed blades, thereby supporting the inclined bottom of the tray in an inclined plane sufficiently above the plane of revolution of the upper edge of the impeller blade to prevent friction therewith and at the same time leaving ample space in the conical portion of the vat for the reception and retention of a relatively small quantity of water, the normal level of which is some distance below the bottom of the dish-tray A to allow the dishes and other utensils to drain back into the water containing portion of the vat free from the dishes when the machine is at rest, the normal level of the washing fluid being indicated by dotted lines in Fig. 3.

It will be observed upon reference to Figs. 2 and 3 that the outer end of the impeller blade travels in close proximity to the inner ends of the fixed blades —30— with just sufficient clearance to avoid friction, the object of which is to forcibly impel the body of water to be carried forwardly and centrifugally by the blade against the deflector blades —30— where the impact is sufficiently forcible to cause portions thereof to rebound upwardly and rearwardly, and other portions striking the forwardly deflected inner corner to be carried forwardly and upwardly, while the impeller blade itself continually tends to throw the washing fluid upwardly and forwardly under a whirling motion, so as to distribute it more evenly throughout the entire collection of dishes and other utensils which are supported within the tray with sufficient space between

them to allow the passage of water through such space and across all sides of the dishes.

Referring again to Figs. 1, 2 and 3, particularly Fig. 3, it will be observed that the inner end of the impeller blade is somewhat wider or of greater vertical depth than its outer end, the object of which is to impel practically the entire volume of washing fluid upwardly and laterally under a more or less centrifugal whirling action and at the same time permitting the offsets —27— and fixed blades —30— to break up the whirling motion of the water and to divert it or distribute it more evenly to and across the dishes which may be supported in the tray.

The operation of my invention will now be readily understood with reference to the foregoing description and the accompanying drawings, and while I have shown two specific forms of means for impelling, projecting and distributing the washing fluid upwardly under a whirling motion, it is evident that the details of this construction may be somewhat varied without departing from the spirit of this invention.

What I claim is:

1. In a mechanical dish washer, the combination with a vat having a gland centrally in its bottom and a vertical shaft extending through the gland, of a hub secured to the shaft above the gland, an impeller blade projecting from one side of the hub, a counterbalancing weight for the impeller on the opposite side of the hub, and means for rotating said shaft.

2. In a dish-washing machine, the combination with a vat having a conical bottom and an annular channel in the apex of said bottom, a vertical shaft journaled centrally in said apex, and an impeller secured to said shaft and extended across the channel and having a portion thereof at the outer side of the channel deflected in the direction of rotation of the water impelled thereby, and upstanding baffle plates secured to the conical bottom beyond the path of movement of the impeller and having portions of their inner ends deflected in the direction of rotation of the impeller.

3. In a mechanical dish washer, the combination with a vat having a gland centrally in its bottom and a vertical shaft extending through the gland, of an impeller secured to the shaft above the gland and having its blade arranged edgewise relatively to the bottom of the vat, the outer end of said blade being disposed in a plane substantially parallel with, but at one side of that of its inner end, and means for rotating the shaft.

4. In a mechanical dish washer, the combination with a vat having a gland centrally in its bottom and a vertical shaft extending through the gland, of an impeller blade secured to the shaft above the gland and of considerably less radial length than the interior radius of the vat, said blade being inclined transversely from the lower edge upwardly in a direction opposite to that of its rotation, a series of stationary blades projecting from the sides of the vat toward the shaft a distance slightly less than the radial distance between the outer ends of the impeller and sides of the vat, and means for rotating said shaft.

5. A dish washing machine comprising a vat, a vertical shaft journaled centrally in the bottom of the vat, driving means for the shaft, an impeller secured to the shaft and inclining upwardly and radially from its axis of rotation, said impeller having its outer end offset to one side of the plane of its inner end, and relatively stationary blades within the vat wholly at the outside of the circle through which the outer edge of the impeller travels, the inner ends of the stationary blades being deflected in the direction of rotation of the impeller.

6. A dish washing machine comprising a vat having a conical bottom, a vertical shaft journaled centrally in said bottom, an impeller secured to the shaft within the conical portion of the vat and having portions thereof inclined forwardly relatively to its direction of rotation, and stationary blades within the vat wholly outside of the path of movement of the impeller and having their inner ends deflected in the direction of rotation of said impeller, and means for rotating the shaft.

In witness whereof I have hereunto set my hand this 6th day of January, 1914.

WILLARD R. WALKER.

Witnesses:
H. E. CHASE,
EVA E. GREENLEAF.