Oct. 27, 1953 L. A. JAMES ET AL 2,657,095

IMPELLER ASSEMBLY FOR DISHWASHERS

Filed June 8, 1950 2 Sheets-Sheet 1

Fig. 1.

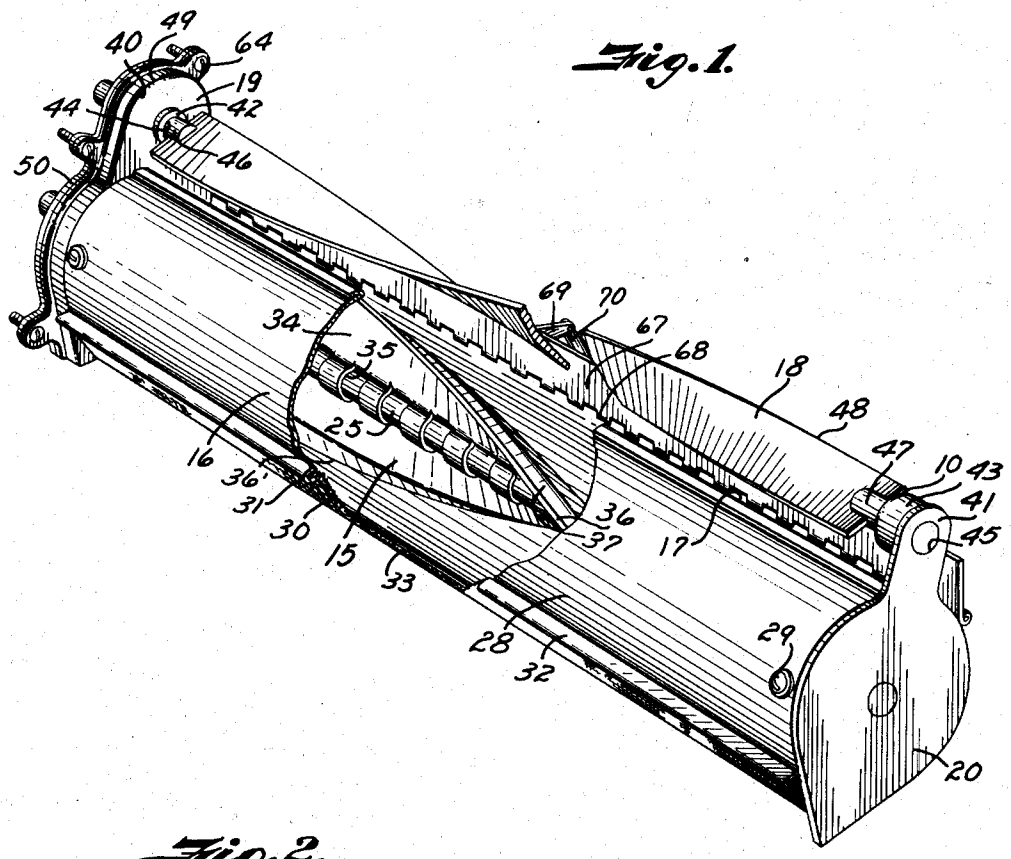

Fig. 2.

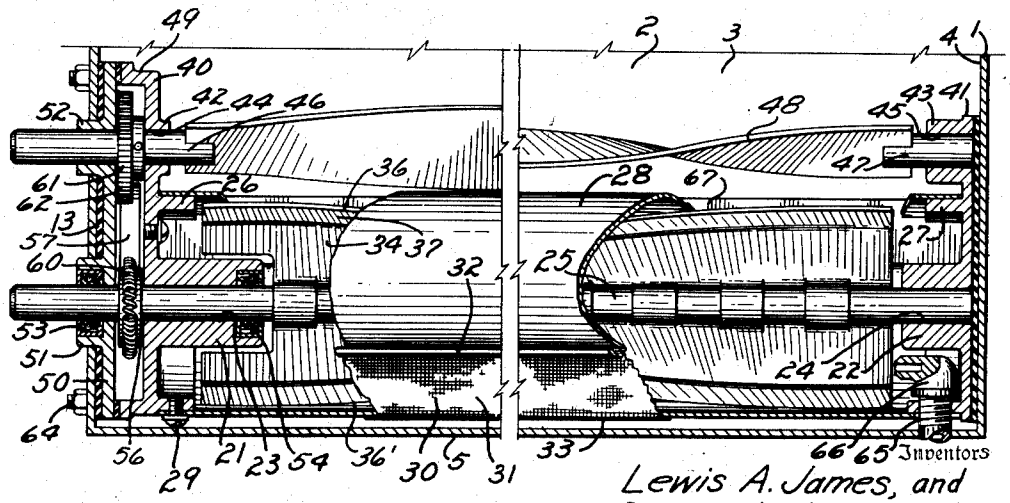

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Fig. 3.

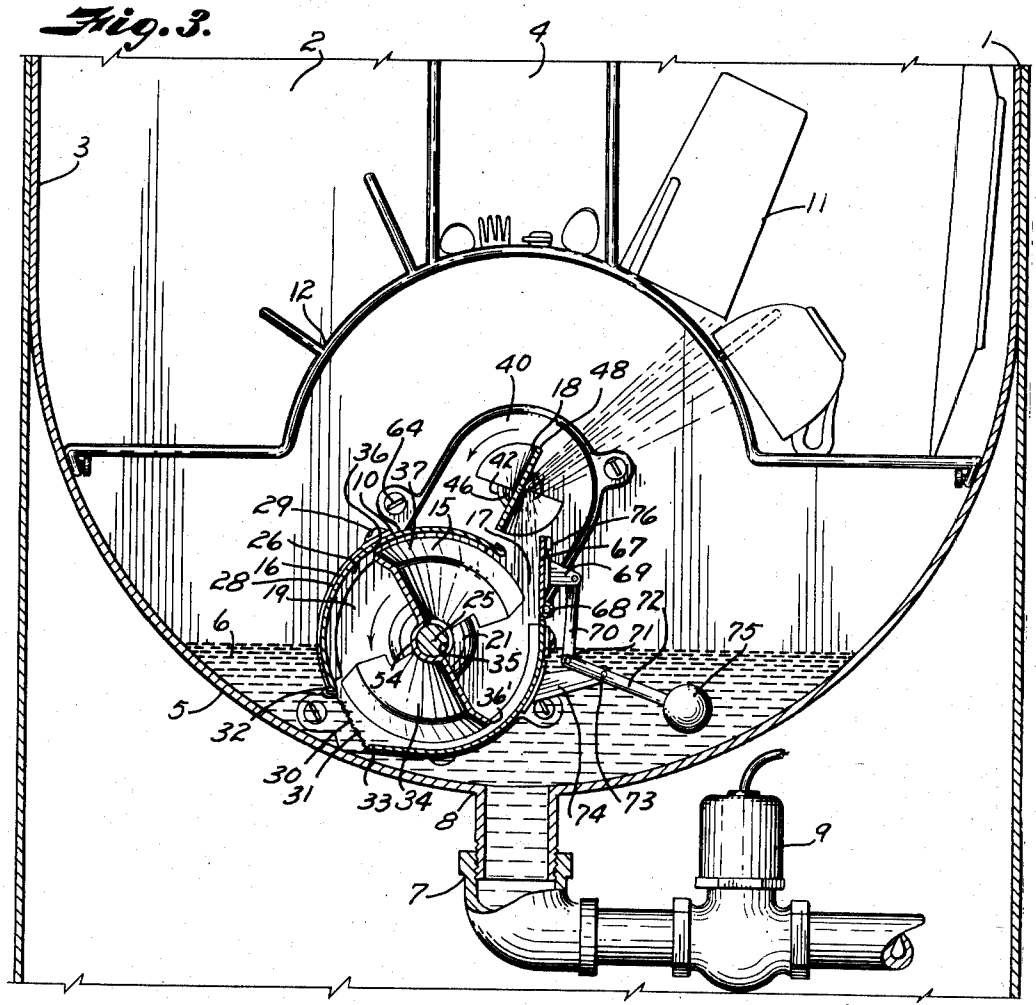


Fig. 4.

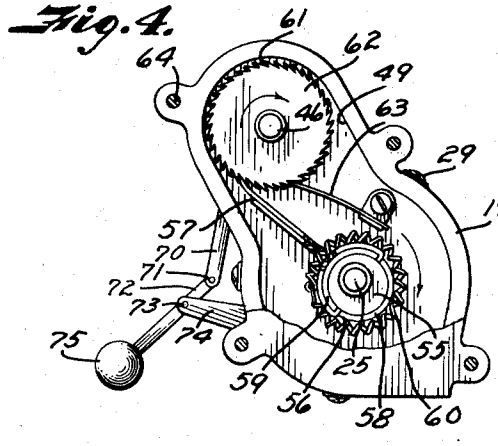
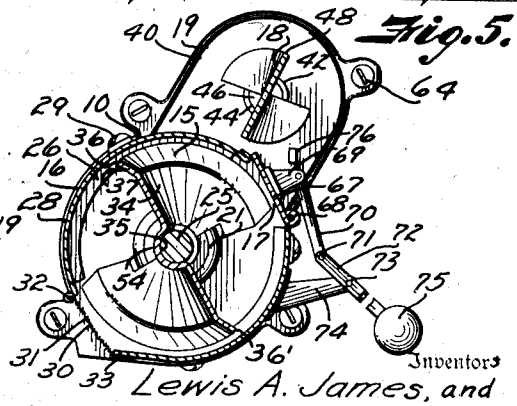


Fig. 5.



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IMPELLER ASSEMBLY FOR DISHWASHERS

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12 Claims. (Cl. 299—63)

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This invention relates to dishwashing machines and impeller assemblies therefor and more particularly to a dishwasher impeller assembly including a self-cleaning filter and a rotary or oscillating baffle against which washing liquid is directed with considerable velocity for distribution in a sweeping movement over articles to be washed.

The objects of the present invention are to provide a dishwasher having an unitary impeller assembly in the washing compartment for moving liquid from the bottom of the compartment and delivering said liquid against a moving baffle at considerable velocity for deflection onto articles to be washed; to provide a filter screen on the impeller unit for removing food particles and the like from liquid drawn into the impeller unit; to provide an impeller housing and related structure for directing delivery of liquid whereby a portion thereof automatically cleans the particles from the screen and prevents clogging thereof; to provide related curvatures in the impeller and baffle for effecting a sweeping action of the liquid over articles to be washed and minimizing noise and vibration of operation; to provide automatic apparatus for stopping delivery of liquid from the impeller when the level of liquid in the washing compartment is low and thereby reducing collection of mist or droplets on the washed articles as the liquid is being drained from said washing compartment; and to provide a dishwashing machine and impeller assembly therefor which are economical to manufacture and efficient in operation for washing and rinsing dishes and the like and reducing the formation of droplets thereon.

In accomplishing these and other objects of the present invention, we have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a dishwasher impeller assembly with portions broken away to better illustrate the structure thereof.

Fig. 2 is a side elevation of the impeller assembly with portions broken away at the ends thereof to better illustrate the mounting of the impeller, baffle and baffle drive.

Fig. 3 is a transverse sectional view through a portion of a dishwasher with the impeller assembly mounted therein.

Fig. 4 is an end elevation of the impeller assembly with a portion broken away to illustrate the baffle moving apparatus.

Fig. 5 is a transverse sectional view through the impeller assembly with the liquid delivery from the impeller closed.

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Referring more in detail to the drawings:

1 designates a portion of a dishwashing machine having a washing compartment 2 formed by side walls 3, end walls 4, bottom wall 5 and a cover (not shown). The bottom 5 is preferably cylindrical with the axis thereof longitudinally of the washing compartment, whereby said bottom forms a sump for liquid 6. A drain 7 has communication as at 8 with the washing compartment and is controlled by a suitable valve 9 for selectively draining wash or rinse liquid from the washing compartment.

An impeller assembly 10 is mounted in the washing compartment and suitably driven to deliver washing and/or rinse liquid at considerable velocity onto articles 11 to be washed which are preferably supported on a suitable rack 12 arranged in the washing compartment and supported on the walls thereof. The impeller assembly 10 preferably is so constructed to form a unit adapted to be mounted in the washing compartment 2 and extend longitudinally thereof, said impeller assembly being substantially coextensive with the washing compartment with gaskets 13 and 14 between the ends of the impeller unit and the end walls 4 of the washing compartment. The impeller unit 10 generally consists of an impeller 15 rotatably mounted in a housing 16 and arranged to deliver washing or rinsing liquid at considerable velocity through a longitudinal opening or slot 17 in said housing and directing said liquid against a movably mounted baffle 18 which deflects the liquid in a sheet which sweeps over and impinges against articles to be washed. The housing 16 is provided with end members 19 and 20 having inwardly extending bearing bosses 21 and 22 provided with bores 23 and 24 respectively for rotatably mounting the ends of the impeller shaft 25. The end members 19 and 20 are also provided with inwardly extending flanges 26 and 27 substantially coaxial with the bores 23 and 24.

A substantially cylindrical shell 28, preferably formed of thin sheet metal is suitably secured to and supported by the end members 19 and 20. The ends of the shell 28 are preferably sleeved over the flanges 26 and 27 and secured thereto by fastening devices such as screws 29. The shell 28 is provided with an opening 30 for entrance of liquid into the impeller housing. The opening 30 preferably extends longitudinally of the housing and is substantially diametrically opposite the slot 17. A filter 31 of fine mesh wire

screen covers the opening 30 and is suitably secured to the shell 28 at the side edges 32 and 33 of the opening 30 whereby all liquid entering the impeller housing must pass through the filter 31, said screen being at an angle to the periphery of the shell 28 for facilitating cleaning, as later described.

The impeller 15 consists of a blade 34 preferably formed of a single sheet of metal suitably secured to the impeller shaft 25. In the structure illustrated, the blade 34 is provided with a plurality of longitudinally spaced cuts extending across the axis and perpendicular thereto and alternate portions of the blade defined by the cuts pressed laterally to form a bore 35 whereby the impeller may be sleeved on the shaft 25 and the alternate portions defined by the cuts arranged on opposite sides of said shaft, the impeller being located on the shaft between the bearing bosses 21 and 22 and suitably secured to said shaft as by welding or the like whereby said impeller blade will rotate with the shaft. The blade 34 has oppositely directed portions which terminate in side edges 36 and 36' slightly spaced from the inner surface of the shell 28 to provide clearance therebetween. It is preferable that the outer portions 37 of the blade be bent toward the direction of rotation of the impeller, and that the blade have a longitudinal twist or spiral of 180° to substantially equalize the force exerted between the blades and the liquid throughout the length of the impeller.

As illustrated in Fig. 3, the impeller unit is so arranged that when mounted in the washing compartment of the dishwasher the opening 30 in the shell 28 is positioned adjacent the bottom 5 and the slot 17 which extends longitudinally of the impeller and is substantially coextensive therewith is positioned whereby liquid moved by the impeller will be directed through the slot 17 substantially tangentially of the blade portion 37 and vertically at approximately the longitudinal center of the washing compartment.

The end members 19 and 20 have portions 40 and 41 extending upwardly and laterally of the axis of the impeller and have bearing bosses 42 and 43 provided with aligned bores 44 and 45 rotatably mounting trunnions 46 and 47 which are fixed to the ends of the baffle 18, whereby the baffle rotates on an axis substantially parallel with the axis of the impeller shaft and in alignment with the stream of washing liquid delivered by the impeller through the slot 17. The baffle 18 preferably consists of a thin, flat, elongated strip of metal of such length that the ends extend beyond the ends of the slot 17, the side edges 48 of said baffle having clearance with the shell 28. The baffle 18 is preferably provided with a longitudinal twist or spiral of substantially 180°, the direction of the spiral being opposite to the direction of the spiral of the impeller blade 34.

The end member 19 is preferably provided with an outwardly extending peripheral flange 49 and mounted on said flange is a plate 50 which cooperates with the end member to enclose a drive which rotates the baffle 18, the plate 50 being provided with bores 51 and 52 through which extend the impeller shaft 25 and trunnion 46 respectively. Suitable seal rings 53 and 54 are provided in the bore 51 and bore 23 to retain any necessary lubricants in the baffle drive. It is preferable that the baffle rotate at a much slower speed than the impeller and in the same direction, and while various driving mechanisms

may be used in the illustrated form the outer end of the shaft 25 extends beyond the bore 51 and is adapted to be suitably connected and driven by a prime mover for rotating the shaft 25. An eccentric 55 is fixed to the shaft 25 between the end member 19 and the plate 50 and rotatably mounted on the eccentric is a strap 56 having a detent 57 extending therefrom. The strap is shown as consisting of two arcuate members 58 and 59 engaging around the eccentric and held thereon by a spring 60 extending around the peripheries of said arcuate members. The spring effects resilient engagement of the arcuate members with the eccentric whereby rotation of said eccentric holds the end of the detent in engagement with the teeth 61 of a ratchet wheel 62 fixed on the trunnion 46. Rotation of the eccentric 55 moves the detent to turn the ratchet wheel by increments, said ratchet wheel being held against backward movement by means of a spring pawl 63 suitably secured to the end member 19 and having its end engaging in teeth 61 of said ratchet wheel.

It is preferable that screws or the like 64 retain the plate 50 on the end member 19 and that the shanks of said screws extend outwardly through suitable openings in the end wall 4 of the washing compartment for mounting the impeller unit in said compartment in the position shown in Fig. 3. With the impeller unit arranged in this manner in the washing compartment a pipe 65 connected to a suitable source of washing and rinse liquid, for example a hot water tank in the water system of a house, extends through the bottom 5 of the washing compartment and into the impeller housing adjacent the end member 20. A nozzle fitting 66 is mounted on the pipe 65 and so arranged as to direct liquid into the impeller housing in a jet substantially parallel to the axis of the shaft 25.

The prime mover (not shown) is operated to drive the impeller 15 during the admission of liquid to the impeller housing and throws liquid upwardly around the interior of the shell 16 and delivers said liquid in a relatively flat stream or jet through the slot 17, substantially tangentially to the arc of rotation of the impeller blade portion 37. As the impeller is rotated, the eccentric 55 is also rotated to move the detent 57, thereby rotating the ratchet wheel 62 by increments. A stream of water discharged by the impeller through the slot 17 strikes the side surfaces of the baffle 18 and is deflected thereby in flat, thin sheets or jets having considerable velocity to impinge on the articles to be washed. As the baffle is rotated, it presents a gradual changing angularity of the side faces relative to the stream of water delivered by the impeller, and this gradual changing surface deflects the stream of water in a sheet which sweeps the entire washing compartment.

When sufficient liquid is admitted to the washing compartment the supply is turned off and operation of the impeller unit continued for a considerable period of time to thoroughly wash the articles, the wash liquid being drawn into the impeller housing through the filter 31 and delivered through the slot 17. Movement of the liquid through the filter 31 tends to carry food particles and the like and deposit same on the screen filter, and if said particles are not removed said filter would soon be clogged. Due to the particular location of the opening 30 and filter therein and the slot 17, a portion of the liquid moved by the impeller is carried around inside of

the shell 28 and thrown against the inside of the screen filter 31 passing through same and carrying off the collected food particles. This action is facilitated by having the screen 31 arranged at a slight angle to the periphery of the shell 16 with the lower portion of the screen having greater spacing from the impeller blades than the upper portion as illustrated in Fig. 3. Also the filter cleaning action repeats itself on each revolution of the impeller. Food particles thereby are washed from the screen and settle to the bottom of the washing compartment where they remain during the balance of the washing action.

After the articles are washed for a suitable period of time the valve 9 is actuated to drain the liquid from the washing compartment. After draining the wash liquid from the washing compartment, rinse liquid is supplied through the nozzle fitting 66 and the impeller unit operated to throw the rinse liquid through the slot 17 and direct same against the side faces of the baffle 18, which deflects the rinse liquid in a sheet sweeping the entire washing compartment. After rinsing the articles the valve 9 is again operated to drain the rinse water from the washing compartment.

It has been found that as the liquid is drained from the washing compartment the liquid delivered by the impeller gradually decreases in quantity and finally becomes a fine mist which is deposited in droplets on the articles in the washing compartment. When the droplets dry there are small spots on the articles. To eliminate this condition a valve in the form of a flat vane 67 is hingedly mounted as at 68 on the shell 28 at the side of the slot 17, said valve being of such size that when the free end thereof is swung toward the shell 28 it engages the upper side edge of the slot 17 and substantially closes same to cut off delivery of liquid through the slot 17. The valve is provided with an ear 69 which is pivotally connected to one end of a link 70, the other end of said link being pivotally connected as at 71 to a float lever 72 which is pivotally mounted, as at 73, on an ear 74 mounted on and extending laterally of the shell 28. A float member 75 is mounted on the lever 72 whereby when the level of liquid raises in the washing chamber the float swings the lever 72 exerting force on the link 70 to swing the valve 67 to open position which is substantially vertically, whereby said valve forms an extension of the shell and is substantially tangential thereto. In open position the valve engages a lug 76 on the end member 19 which serves as a limit to the opening of the valve. When the liquid lowers in the washing compartment, as when it is being drained, to a predetermined level at which the impeller will tend to deliver mist instead of a stream of liquid, the float moves downwardly with the level of liquid and swings the valve to closed position shutting off the delivery of the mist from the impeller, thereby permitting the wet articles in the washing compartment to drain and dry normally with substantially no liquid spots thereon.

The related spirals of the impeller blade and baffle and the relative fast rotation of the impeller and slow rotation of the baffle direct the liquid delivered by the impeller in the form of a jet that moves longitudinally of the washing compartment and at different angles determined by the spiral of the baffle, and rotation of the baffle causes the jet to sweep transversely of the washing compartment. Therefore the jet, in effect, moves back and forth and simultaneously advances transversely of the washing compartment to completely sweep the entire interior of said washing compartment. Also the spiral arrangement of the impeller blade tends to equalize the force between the blade and the liquid being moved, reducing vibration and noise in the operation of the unit.

It is believed obvious that we have provided a dishwasher and impeller unit therefor which is economical to manufacture and efficient in operation of delivering a powerful stream of liquid against articles to be washed with a self-cleaning filter for preventing returning of food particles to the articles, said unit eliminating delivery of mist to the articles and thereby facilitating drying without liquid spots thereon.

What we claim and desire to secure by Letters Patent is:

1. An impeller unit for dishwashing machines comprising, an elongated housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having openings substantially oppositely arranged therein, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing and extending longitudinally thereof, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, an elongated baffle spaced above and aligned with the discharge opening of the housing and movably mounted thereon whereby liquid discharged through said opening is directed in a stream against the baffle, and means for moving the baffle for deflecting the stream of liquid and providing a sweeping action thereto.

2. An impeller unit for dishwashing machines comprising, an elongated housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having substantially opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, an elongated baffle substantially coextensive with the impeller blades and parallel thereto, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening is directed in a stream against the baffle, and means for moving the baffle for deflecting the stream of liquid and providing a sweeping action thereto.

3. An impeller unit for dishwashing machines comprising, an elongated substantially cylindrical housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades

fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, said blades being in the form of a spiral about said shaft, an elongated baffle substantially coextensive with the impeller blades and parallel thereto, said baffle being on a spiral reversely to the spiral of the impeller blades, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, and means for rotating the baffle for deflecting the stream of liquid and providing a sweeping action thereto.

4. An impeller unit for dishwashing machines comprising, an elongated substantially cylindrical housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, an elongated baffle spaced above and aligned with the discharge opening of the housing and movably mounted thereon whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, means for moving the baffle for deflecting the stream of liquid and providing a sweeping action thereto, a valve on the housing for opening and closing the discharge opening thereof, and means responsive to the level of liquid around the exterior of the housing for operating said valve closing the discharge opening in the housing when the level of liquid relative to the inlet opening is inadequate to supply a suitable quantity of liquid to the impeller.

5. An impeller unit for dishwashing machines comprising, an elongated substantially cylindrical housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, said blades being in the form of a spiral about said shaft, an elongated baffle substantially coextensive with the impeller blade and parallel thereto, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, means for rotating the baffle for deflecting the stream of liquid and providing a sweeping action thereto, and a filter screen covering the liquid inlet opening of the housing, said screen being at an angle to the periphery of the housing with the lower portion of said screen having the greater spacing from the impeller blades whereby a portion of liquid not discharged through the discharge opening is carried around in the housing by the impeller and directed across and through the screen for cleaning any material therefrom.

6. An impeller unit for dishwashing machines comprising, an elongated substantially cylindrical housing adapted to be used in a fixed horizontal position with the lower portion below the level of liquid used for washing dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, an elongated baffle substantially coextensive with the impeller blades and parallel thereto, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, means for moving the baffle for deflecting the stream of liquid and providing a sweeping action thereto, a filter screen covering the liquid inlet opening of the housing, said screen being at an angle to the periphery of the housing whereby movement of liquid in the housing in response to rotation of the impeller discharges a portion of said liquid from the housing through the screen for cleaning any material therefrom, a valve hingedly mounted on the housing for opening and closing the discharge opening thereof, and means responsive to level of liquid around the exterior of the housing for operating said valve closing same when the level of liquid relative to the inlet opening is inadequate to supply a suitable quantity of liquid to the impeller.

7. An impeller unit for dishwashing machines comprising, an elongated substantially cylindrical housing adatped to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, an elongated baffle substantially coextensive with the impeller blades and parallel thereto, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, an eccentric fixed to the impeller shaft, a ratchet wheel fixed to the baffle, and a pawl operated by the eccentric and engaging the ratchet

wheel and operated in response to rotation of the impeller for rotating the baffle by increments for deflecting the stream of liquid and providing a sweeping action thereto.

8. An impeller unit for dishwashing machines comprising, an elongated substantially cylindrical housing adapted to be used in a horizontal position with the lower portion below the level of a liquid used in washing of dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, said blades being in the form of a spiral about said shaft, an elongated baffle substantially coextensive with the impeller blades and parallel thereto, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, an eccentric fixed to the impeller shaft, a ratchet wheel fixed to the baffle, a pawl operated by the eccentric and engaging the ratchet wheel and operated in response to rotation of the impeller for rotating the baffle by increments for deflecting the stream of liquid and providing a sweeping action thereto, a filter screen covering the liquid inlet opening of the housing, said screen being at an angle to the periphery of the housing whereby movement of liquid in the housing in response to rotation of the impeller discharges a portion of said liquid from the housing through the screen for cleaning any material therefrom, a valve hingedly mounted on the housing for opening and closing the discharge opening thereof, and means responsive to level of liquid around the exterior of the housing for operating said valve closing same when the level of liquid relative to the inlet opening is inadequate to supply a suitable quantity of liquid to the impeller.

9. An impeller unit for dishwashing machines comprising, an elongated housing adapted to be used in a fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having openings substantially oppositely arranged therein, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted on the housing and extending longitudinally thereof, impeller blades fixed on the impeller shaft and extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, and a filter screen covering the liquid inlet opening of the housing, said screen being substantially tangential with the periphery of the housing adjacent the upper portion of the inlet opening and having greater spacing from the impeller blade at the lower portion of the inlet opening whereby a portion of the liquid not discharged through the discharge opening is carried around in the housing by the impeller and directed across through the screen for dislodging any material adhering to the exterior thereof.

10. An impeller unit for dishwasing machines comprising, an elongated substantially cylindrical housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades fixed on the impeller shaft extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, said blades being in the form of a spiral about said shaft, an elongated baffle substantially coextensive with the impeller blades and parallel thereto, said baffle being on a spiral reversely to the spiral of the impeller blades, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, means for rotating the baffle for deflecting the stream of liquid and providing a sweeping action thereto, a valve on the housing for opening and closing the discharge opening thereof, and means responsive to the level of liquid around the exterior of the housing for operating said valve closing the discharge opening in the housing when the level of liquid relative to the inlet opening is inadequate to supply a suitable quantity of liquid to the impeller.

11. An impeller unit for dishwashing machines comprising, an elongated substantially cylindrical housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having substantially diametrically opposite openings extending longitudinally thereof, one of said openings being in the lower portion of the housing and forming a liquid inlet and the other a liquid discharge opening, an impeller shaft rotatably mounted in the housing substantially on the longitudinal axis thereof, impeller blades fixed on the impeller shaft extending longitudinally thereof for discharging liquid through the discharge opening of the housing in response to rotation of the impeller shaft, said blades being in the form of a spiral about said shaft, an elongated baffle substantially coextensive with the impeller blades and parallel thereto, said baffle being on a spiral reversely to the spiral of the impeller blades, means on the housing mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening of the housing whereby liquid discharged through said opening substantially tangentially of the housing is directed in a stream against the baffle, means for rotating the baffle for deflecting the stream of liquid and providing a sweeping action thereto, a flat valve hingedly mounted on the housing at one side of the discharge opening thereof for opening and closing said discharge opening, stop means for limiting opening of the valve whereby said valve forms a tangential extension of the housing and extends toward the baffle, and means responsive to the level of liquid around the exterior of the housing for operating said valve closing the discharge opening in the housing when the level of liquid relative to the inlet opening is inade-

quate to supply a suitable quantity of liquid to the impeller.

12. An impeller unit for dishwashing machines comprising, an elongated housing adapted to be used in fixed horizontal position with the lower portion below the level of liquid used in washing dishes, said housing having a liquid inlet opening in the lower portion thereof and a liquid discharge opening in the portion above the level of liquid used in washing dishes, means in the housing for discharging liquid through the discharge opening, an elongated baffle spaced above and aligned with the discharge opening of the housing, said baffle being spiraled longitudinally thereof, means mounting the baffle for rotation about an axis spaced above and aligned with the discharge opening whereby liquid discharged through said opening is directed against the

baffle, and means for rotating the baffle for deflecting the stream of liquid and providing a sweeping action thereto.

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