

March 28, 1944.

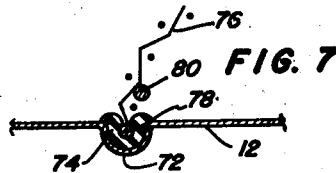
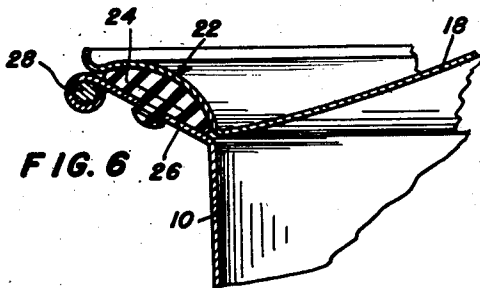
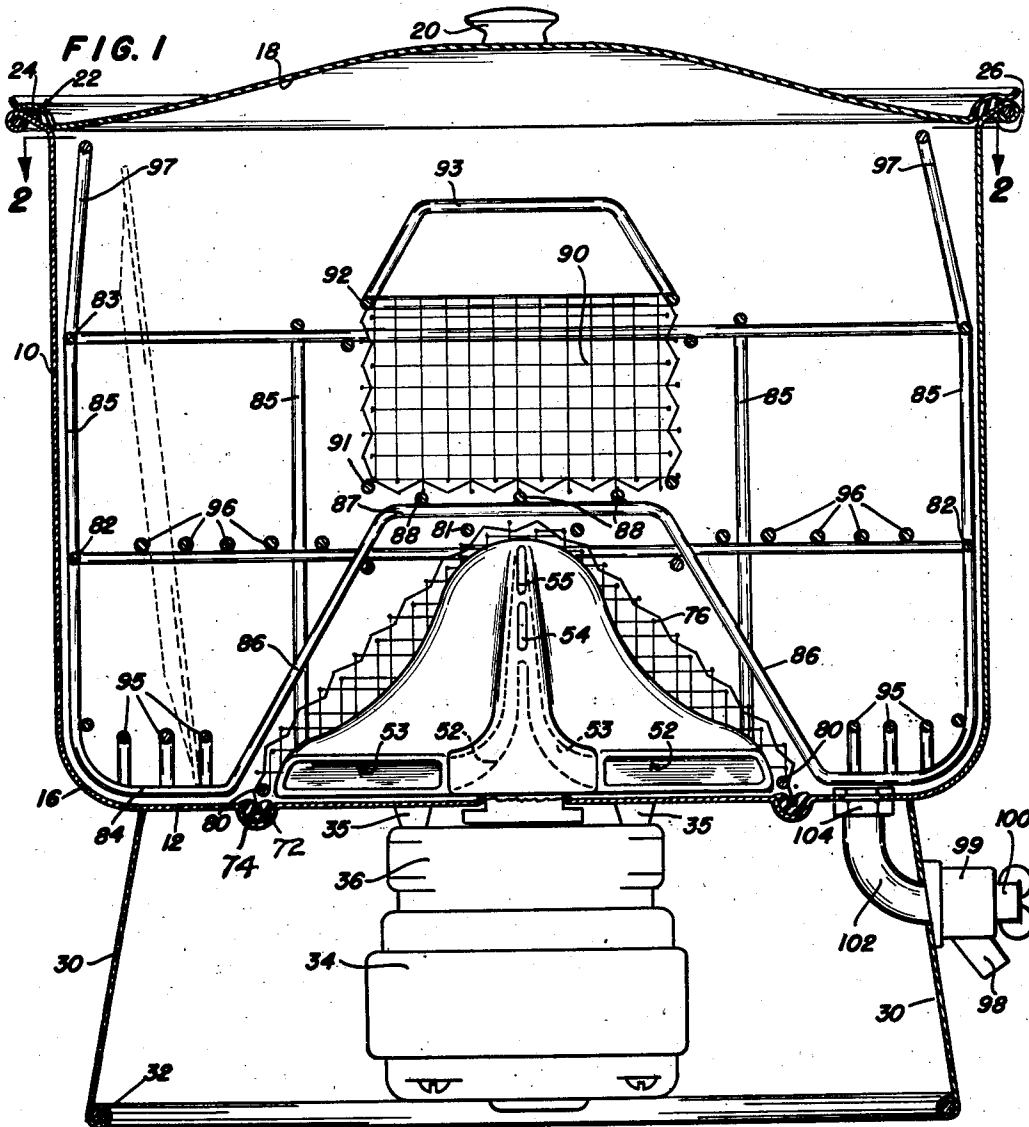
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2,345,185

WASHING APPARATUS

Filed Dec. 23, 1940

2 Sheets-Sheet 1



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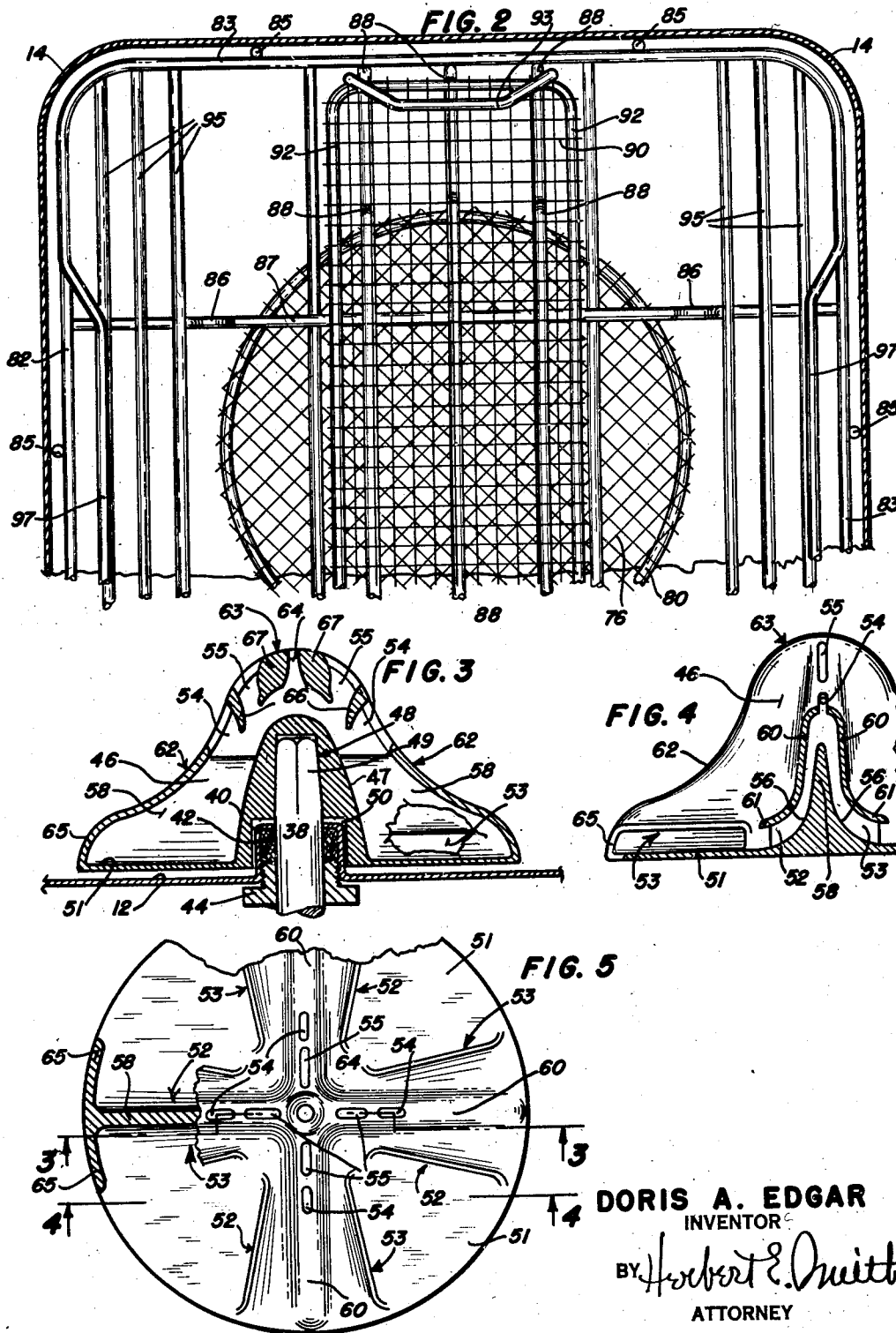
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UNITED STATES PATENT OFFICE

2,345,185

WASHING APPARATUS

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6 Claims. (Cl. 299—63)

My invention relates to improvements in washing apparatus and more particularly to apparatus for washing soiled dishes as well as clothes in the same vat and by the use of the same mechanism for imparting a turbulence to washing fluid in the case of clothes washing, and for imparting a spray movement for the washing fluid in the case of dishes.

In carrying out my invention I have devised washing apparatus that is mounted in a vat or washing chamber and is driven in an oscillatory manner by an electric motor or other suitable power driving mechanism. It is a prime object of my invention to provide improved apparatus of this character whereupon when the washing vat is supplied with a predetermined quantity of cleansing water for either clothes or dishes a most efficient cleansing action will be effected.

In adapting a washing vat that is suitable for clothes washing, to use for dish washing it is necessary to provide suitable racks or baskets of an open work nature for supporting the utensils in the vat during the washing operation. Such mechanism must be capable of being readily installed in the vat and of adequately supporting dishware, glasses, cups and the like that may be placed therein and also be equipped to receive silverware and small pieces of culinary use that it may be desired to wash. Such equipment must also support the glassware and the like out of possible contact with the impeller mechanism to preclude damage that may occur. It is therefore another object of my invention to provide an improved removable dish, glassware and flatware, supporting trays and baskets for use in a washing apparatus.

In order to wash both dishes and clothes, a washing apparatus, to be practical, must be capable of imparting turbulence to a relatively large quantity of cleansing fluid for the clothes washing operation and of imparting a stream or jet-like motion to quantities of a relatively small amount of cleansing fluid for the dish washing operation.

A further object of my invention, therefore, has been the provision in a washing apparatus of an impeller capable of violently agitating and stirring quantities of washing fluid and clothes therein being washed; and also, on other occasions and in relatively shallow water, be capable of scooping up and throwing streams or jets of washing fluid for dishwashing operation.

A still further object of this invention has been the provision of an impeller of the nature described and which is operable in an oscillatory manner within the washing vat.

Still another object of the invention resides in the provision of an impeller of the nature described that is simple of construction and of operation in a washing apparatus.

Other objects and advantages of the invention will be apparent during the course of the following description wherein I set forth a preferred embodiment of my invention.

Referring to the drawings for a more complete understanding of this invention, it will be seen that

Figure 1 is a vertical, medial sectional view through a washing vat having installed therein the elements of my invention.

Figure 2 is a fragmentary horizontal, sectional view taken as though on lines 2—2 of Figure 1.

Figure 3 is a vertical sectional view through the impeller taken on lines 3—3 of Figure 5.

Figure 4 is a vertical cross-sectional view through a portion of the impeller taken on lines 4—4 of Figure 5.

Figure 5 is a plan view, with portions broken away for convenience of illustration, of the impeller employed in my washing apparatus.

Figure 6 is an enlarged sectional detailed view of the manner of joining the vat lip and the edge of the cover in a water-tight manner.

Figure 7 is an enlarged detailed sectional view of the joinder I have devised for the edge of a protective hood that I fit over my impeller, with the bottom of the vat.

Referring now to Figure 1 I have shown my invention in assembled form as comprising an upright rectangular washing chamber or vat 10 having a relatively flat bottom 12 and adapted for receiving clothes to be washed as well as for receiving racks and trays for the placement of dishes and other utensils to be cleansed, together with a quantity of suitable washing fluid such as hot soapy water. The vat 10, while rectangular, is provided with round vertical corners 14 and rounded bottom corners 16 so that it has a smooth unobstructed interior adapted to be enameled or finished with a total absence of cracks or crevices in which dirt might accumulate.

A suitable removable cover 18 is shown in Figure 1 as having a handle or knob 20. This cover has a lip 22 that is slightly arcuate and is adapted to seat firmly against a resilient gasket or seal 24 that is supported on the lip 26. Lip 26 is disposed angularly outward around a perimeter of the upper edge of the vat. Lip 26 may have a rolled rim 28 as can clearly be seen in Figures 1 and 6. While the vat together with its bottom wall and cover may be made of any suitable material I

prefer to form them of sheet metal preferably of the rest resisting type which may be either plated or enameled.

Depending from the bottom exterior of the tub is a frusto conical skirt 30 that may be either round or rectangular. This skirt is rigidly joined to the vat bottom and has the rolled rim 32 to make it rigid and strong enough to support the weight of the vat and its contents. Approximately centrally of the chamber formed interior of the depending skirt 30, I mount on bases 36 a suitable electric motor 34 that has associated therewith a speed reducer mechanism 36 from which protrudes the drive shaft 38. Shaft 38 extends upwardly through the vat bottom and engages the impeller to drive it.

In the form of my invention that is described and illustrated, I employ an oscillating impeller that may be rotated a part of a revolution clockwise and then be reversed as to direction and rotate a portion of a revolution counter-clockwise. Therefore, with this form of my invention, not only is the mechanism 36 required to reduce the speed of the motor 34 but also it must convert a uni-directional rotary motion into an intermittent oscillatory motion.

The tub bottom 12, as can best be seen in Figure 3, is raised upwardly to form the inverted packing cup 40 to receive packing 42. The gland nut 44 is threaded therein and encircles the smooth portion of the shaft 38. Depending upon the degree of tightness that the packing 42 is compressed by the nut 44, it is possible by this structure to produce a water tight connection at the point where the shaft enters the vat.

My impeller, designated as a whole by the numeral 46, is of the multiple-blade type wherein a plurality of blades are disposed angularly to each other and all radial from a common point. As can best be seen in Figures 3, 4, and 5 the impeller comprises a central member or hub 47 rotatable or oscillatable on a vertical axis. Interiorly of the hub is the socket 48 that is adapted to receive and engage the splined or squared end 49 of shaft 38 and this socket is enlarged at 50 in the lower end of member 47 so as to fit over the packing cup 40 and permit the bottom flange 51 attached to the hub to lie close to the inner surface of the vat bottom 12.

Above the impeller bottom and surrounding the hub are a series of water scoops 52 that are all directed in a single direction. In the impeller of the drawings another series of water scoops 53 is also supported on said impeller but in opposed relation to those numbered 52. These scoops curve to direct liquid upwardly and they terminate in upwardly directed discharge ports 54 and 55. As the impeller is rotated in one direction fluid is scooped by the members 52 or 53 and impinges because of inertia upon the curved wall 56 and thereby is caused to change direction and to rise to the ports 54 and 55.

The form of impeller, illustrated in the drawings forming a part of this specification, is that which I prefer to use for oscillatory motion in the vat and comprises the opposed series of scoops so that a compound action results from its operation. In other words cleansing fluid is scooped and raised in each stroke of the oscillating impeller. In the case of a uni-directional impeller it is probable that a single series of scoops will be sufficient and in certain oscillatory impellers a single scooping action may suffice. In that event the opposed series of scoops may be dispensed with in constructing the impeller.

In forming the scoops 52, 53 on impeller 46, I provide a plurality of divider walls 58 which radiate from hub 47 and rise perpendicularly from bottom flange 51. The lower portions of these divider walls curve outwardly as at 56 and merge into the plane of the upper surface of flange 51. Disposed over each wall and in spaced relation thereto is the agitator blade shell 60 which may be substantially U-shaped and is relatively thin. Shell 60 has a curved lip 61 that is spaced from flange 51 to form the mouth of the water scoops 52, 53. As the shell contour curves upwardly from lip 61 it tends to converge with the contour of the wall 58 to restrict the cross-sectional area of the water scoops formed thereby. The outer edge 62 of the blade shells 60 curves upwardly and inwardly to a crown 63 through which the ports 54, 55 are formed as well as the central jet opening 64.

On the outer ends of walls 58, the lower reaches of the blade shells 60 widen out into wings 65 that join with the bottom 51 and enclose the side area of the scoops 52, 53 to prevent centrifugally outward movement of fluid picked up by the scoops.

Between the openings 54 and 55 I provide the downwardly curved baffles 66 which part a rising stream of liquid cleanser and direct a portion outward through port 54. Similarly baffles 67 direct fluid through ports 55 and through the nozzle 64.

In the bottom of the vat 12, and encircling the area in which the impeller is operated, is an annular depression 72 into which I fit the grooved resilient gasket ring 74. A reticulated hood 76 of approximately conical shape is fitted over the impeller and has a lower lip ring 78 that fits into the groove of the gasket 74 and is retained in position by the resilient lips on either side of the groove. The hood 76 may also have rings 80 and 81 to afford it structural rigidity.

A suitable utensil supporting open-work basket is provided to fit into the vat and to support dishes and the like in close position around the impeller and its reticulated hood. This basket is readily removable and comprises enclosing rings 82 and 83 of wire that are bent to conform to the shape of the vat. Vertical stays 85 tie these rings together in a rigid manner.

Centrally of the basket lateral tie bars are bent upwardly at an angle as 86 and rise to a cross bar 87 to which are fastened supporting rails 88. These rails extend laterally in a direction opposite to bars 84 over the top of the impeller hood. The supporting rails 88 taken together form a shelf for the reception of the reticulated basket 80. This basket I form of rectangular frame members 91 and 92 and has end handles 93.

In the lower portion of the main basket I provide a plurality of arches 95 that stand upwardly from the bottom of the basket above the vat bottom and are useful in holding plates upright so that when they are stood on edge in the basket they will not slide on the bottom. Lateral divider bars 96 separate plates and are secured immediately of the baskets, to the rail 82, to also assist in supporting and dividing plates that are stood in the baskets.

It will be understood that the reticulated basket 90, which is useful for small objects like silverware and other similar utensils, glasses, and the like, can be lifted out of the vat by means of the handle 93. Handles 97 are also useful in lifting out the entire utensil supporting tray and the main basket and its contents if that be desired.

To wash dishes in my apparatus fluid, preferably hot water having a certain desirable soap content, is placed in the vat to a depth of about two inches. This depth may be varied according to the wishes of the operator.

This cleansing fluid may be introduced to the vat either by removing the cover and pouring it into the upper mouth of the vat or through a flexible hose it may be introduced to the nozzle 98 of the inlet and drainage valve 99 which is mounted at one point in the frusto-conical skirt 30. The key 100 on the valve stem operates the enclosed valve to open or close it. The valve 99 is connected to the elbow 102 which is in turn connected by means of the coupling 104 to the vat bottom 12. When fluid is to be introduced to the vat through this mechanism to the vat a hose may be slipped over the nozzle 98, the valve is opened and fluid under pressure is caused to flow upwardly into the vat. The valve 99 is useful to control the flow of fluid from the source into the vat as well as to control the drainage of the vat when that be desired.

When the electro-motor 34 is energized and power is supplied to the oscillatory reducer mechanism 36, the impeller will be caused to rotate to and fro through partial revolutions to agitate the fluid in the vat. In the dishwashing operation it is desirable to immerse the impeller about half its height but not to cover the slits 54 and 55 nor the jet opening 64. Thus, when the impeller oscillates in such a quantity of fluid, depending upon the direction of travel, either scoop 52 or scoop 53 will pick up and elevate a quantity of fluid. By reason of the sloping surfaces of the divider walls 58 this fluid will be conducted to the slits 54 and 55 and the jet opening 64, from whence it will be ejected in a spray that is thrown over the dishes or other utensils that have been placed within the vat.

When it is desired to use the washing mechanism for the cleansing of clothes, or of other objects that may be cleaned by being agitated in a liquid, the dishwashing racks are removed from the vat and a quantity of cleansing fluid is supplied thereto to a suitable depth and preferably to cover the impeller. The material being cleansed is added, the cover placed over the mouth of the vat, and the motor 34 is next energized. The washing operation proceeds as is conventional in all apparatuses employing a turbulence producing impeller.

The foregoing description and the accompanying drawings are believed to clearly disclose a preferred embodiment of my invention but it will be understood that this disclosure is merely illustrative and that such changes in the invention may be made as are fairly within the scope and spirit of the following claims.

I claim:

1. In a washing apparatus, an impeller comprising a central member mounted for motion

about a vertical axis, a horizontal bottom flange on said central member, a plurality of walls projecting outwardly from said central member and rising above said bottom flange, a blade shell over each said wall and spaced therefrom to form throats having pickup mouths adjacent the said flange.

2. An oscillatable impeller comprising a hub having a flange extending radially from the bottom of said hub and outwardly projecting divider walls, each said wall having its lower end curved to merge into the said flange in a substantially horizontal plane, a shell enclosing said hub and having hollow blades enclosing said walls in spaced relation on their faces to form passages on each side thereof, said shell being ported in its upper portion and having lower ports adjacent each curved lower end of each wall.

3. A liquid impeller comprising a hub having outwardly projecting vertical walls, each said wall having a lower flange inclined in the direction of rotation, a shell enclosing said hub and having hollow blades each enclosing a wall in spaced relation from one face at least to define a throat therebetween, said shell being ported adjacent each said lower flange and also being ported in its upper portion above said hub whereby liquid picked up by said flanges passes through the throats and is directed upwardly for discharge from the impeller.

4. An oscillatable liquid impeller having radially symmetrical hollow blades and being ported in its upper face, each hollow blade having a lower port on each side adapted to receive liquid in either direction of rotation, and a divider wall in each blade between said lower ports whereby interior throat-like passages are formed through which liquid received in the lower ports is conducted for discharge upwardly.

5. An oscillatable liquid impeller having radially symmetrical hollow blades, each hollow blade having a lower port on each side, a flange adjacent the lower edge of each said ports to pick up fluid in either direction of rotation, and a divider wall merging with the flanges of opposed openings in each blade and located between said ports whereby interior throat-like passages are formed through which fluid received in the lower ports is conducted for discharge upwardly.

6. An impeller having a flanged hub and radially symmetrical hollow blades, said blades being ported along their upper edges, each hollow blade having a lower side port adapted to receive fluid from the flange when the impeller is rotated, the hollow interior of each said blade constituting throat-like passages for conducting liquid received through the lower ports for discharge upwardly through the upper ports, and means between said upper ports for deflecting fluid conducted thereto from below by the said flange into the said passages.

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