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DISHWASHING MACHINE

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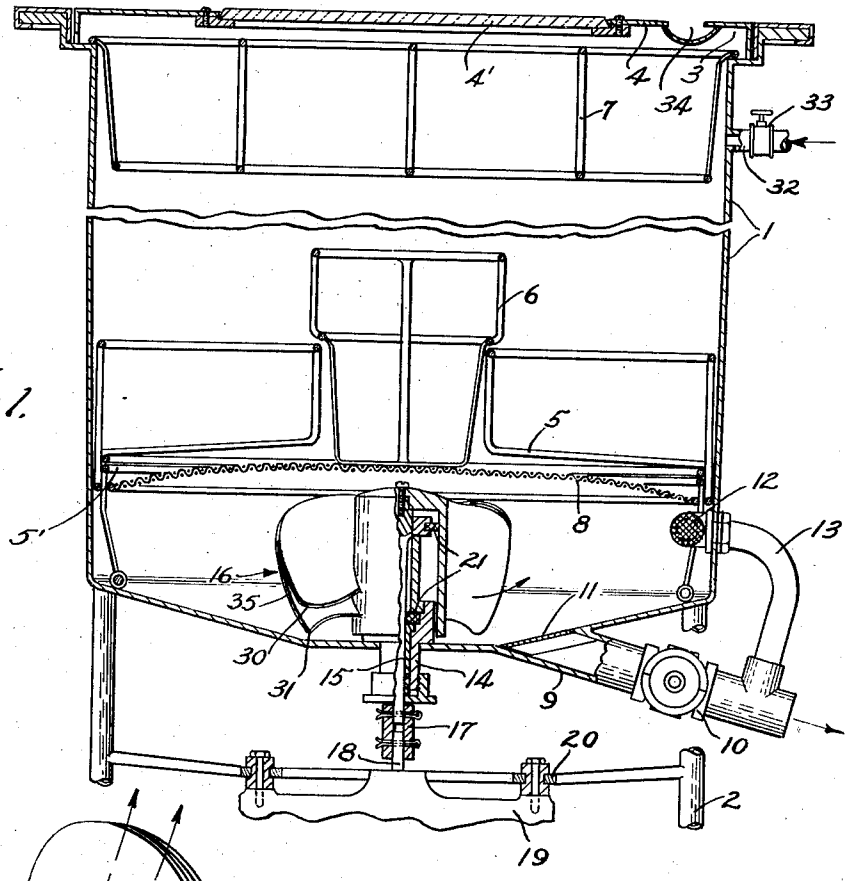


Fig. 1.

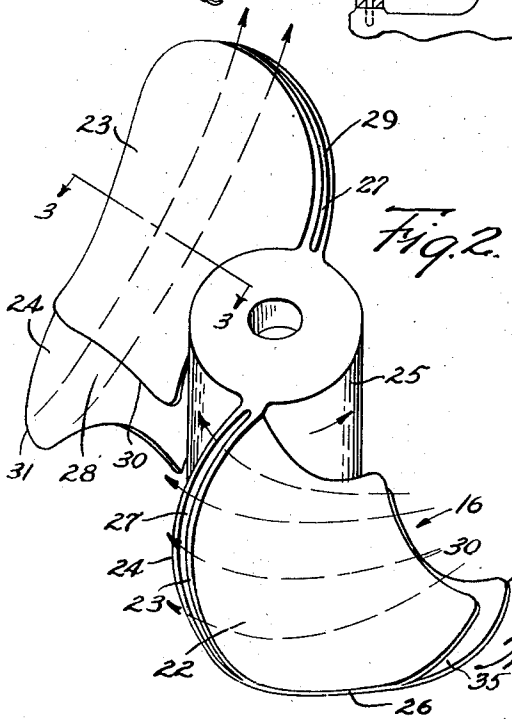


Fig. 2.

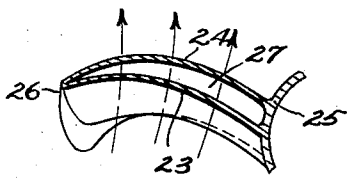


Fig. 3.

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DISHWASHING MACHINE

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2 Claims. (Cl. 299—63)

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The present invention relates to improvements in dish washing machines.

It is one of the objects of the present invention to provide a dish washing machine having improved characteristics so far as the water spraying impeller is concerned.

A further object of the invention is to provide a dish washing machine having an impeller so constituted as to throw upwardly against the dishes or other objects therein a powerful spray of a mixture of air and water or other liquid.

A still further object of the invention is to provide a dish washing machine provided with automatic means for controlling the water level therein and means for throwing the water so controlled as to its level forcibly against the dishes in the machine.

Further objects of the invention will appear from the description and drawing filed concurrently herewith in which

Figure 1 is an elevational view partly in cross section;

Fig. 2 is a perspective view on an enlarged scale of the special impeller used in the machine; and

Fig. 3 is a cross section along the line 3—3 of Fig. 2.

The dish washing machine of the present invention comprises an upright container 1 supported on a suitable supporting structure 2 and provided with an opening 3 which may be covered by means of a cover 4 which is provided preferably with a transparent glass plate 4'. Housed within the container 1 are a plurality of baskets, for example a basket 5, intended, for instance, for the reception of dishes, a centrally located somewhat taller basket 6 intended for the reception of knives, forks, spoons, etc., and an upper basket 7 which is intended for cups, glasses and the like. The lower basket 5 rests on a suitable support 5' having depending legs resting on the bottom of the container. Intermediate between the lower portion of the machine and the basket 5 is a transversely extending upwardly arched screen 8. The lower portion of the container is provided with a discharge pipe 9 which is located in the bottom of the vessel and which is covered by means of the screen 11, the said pipe also being provided with a discharge valve 10.

In order to automatically maintain a definite water level in the lower part of the container 1, there is provided a screened discharge opening 12 which is connected with a bent pipe 13 which leads to the discharge line 9 at a point beyond the valve 10 so that irrespective of the closing of the valve 10 only as much water can be placed

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in the bottom of the vessel 1 as will correspond to the overflow level provided by the screened opening 12. Passing through a suitable bearing 14 provided in the central bottom portion of the container is a suitable vertical axle 15 to which there is attached the hub of an impeller, the blades of which are broadly designated by the reference numeral 16. The axle 15 is connected preferably by means of a resilient coupling 17, which may be made of rubber or the like, to the drive shaft 18 of a suitable prime mover 19 which may take the form of an electric motor. This motor is, moreover, secured by means of the ring 20 to transverse supports which are a part of the supporting structure 2 of the machine. The impeller is moreover provided with a hub 25 which is secured by means of suitable fastening means 21.

The propeller blades 22 are, in accordance with the present invention, made with spaced double walls 23 and 24, the ends of which are secured to or made integral with the hub 25 of the impeller, the two walls 23 and 24 being secured together or made integral along a portion of their outer edges 26, thus providing between the two walls a channel or passageway 27 (see particularly Fig. 3), the cross section of this channel being more or less crescent shaped and also gradually diminishing from the hub outward to the outer edge of the impeller. There will thus also remain a lateral or side opening 35 leading to the passageway 27.

As can best be seen by examining the part of the impeller which is at the upper portion of Fig. 2, the foremost wall 23 does not extend quite so far along the hub 25 as does the rear wall 24, and moreover, it will be seen that there is an intake 28 leading to the channel 27 and also an outlet 29 at the upper or trailing edge of the impeller. The two adjacent edges 30 and 31 constitute what will hereinafter be referred to as the leading edge of the impeller blade.

Accordingly it will be seen that if the impeller is rotated in a counterclockwise direction as shown by the arrow in Fig. 2, any water contained in the lower portion of the dish washing machine, which water will have a level no higher than that corresponding to the overflow pipe 12, will be picked up by the lowermost leading edge 31, and the uppermost leading edge 30, so that the water will be caused to pass into the channel 27 and, as a result of the centrifugal forces developed, will be caused to pass more or less along the lines of the dotted arrows shown in Fig. 2, to be discharged with considerable violence from

the upper and trailing edges of the impeller. It will of course also be evident that such water as is picked up by the edge **30** will have a tendency to be thrown outwardly and upwardly toward the inner walls of the vessel **1**. However, a considerable portion of the water will travel almost straight upwardly, that is to say, parallel to the axis of rotation of the hub **25** so that the water will traverse the center portion of the basket **6** and also baskets **5** and **7**.

As the water is thrown upwardly and no further water is introduced into the machine, it will be evident that the water level in the lower portion of the vessel will be lowered by reason of the amount of water which is now in process of impinging upon the dishes which are being washed, with the result that openings **35** at the outer edges of the blades are partly above the water level so that air will be drawn into the channel **27** and will hence traverse said channel together with the water therein. Inasmuch as this channel is somewhat narrower at the top than at the bottom, and also narrower at the trailing edge than at the leading edge, the air will first be compressed and then, as it escapes from the trailing edge **29**, will again expand, thereby causing the water to be discharged in the form of numerous air bubbles. The total effect is a very violent general upwardly directed spray of air and water which serves to wash the dishes placed in the apparatus.

The action of the double-walled impeller is particularly effective in that it provides not only an upwardly directed spray developed primarily in the channel **27**, but also a certain amount of tangential spray from the forward outer portion of the wall **22** of the impeller blades **16**.

For purposes of readily filling the apparatus, it may be provided with an inlet pipe **32** under the control of a valve **33** as shown in the upper right hand portion of Fig. 1.

Moreover, for easy lifting of the cover, a suitable indent **34** may be provided as shown at the top of Fig. 1, although of course a handle or any other suitable lifting means can be substituted therefor. The cover may merely rest on the device if it is circular, or may be hinged if the cross section of the machine is rectangular. For most purposes, however, the vessel **1** is to be considered as being cylindrical, but the invention is by no means limited to such a construction.

The dish washing machine of the present invention may be constructed of any suitable material such as aluminum, stainless steel, Monel metal, copper or enameled metal, or even plastic material, provided only that the essential features herein illustrated for purposes of example are present.

The impeller may be made of any suitable material, but is preferably made of bronze or brass, or other material which is not subject to rusting or ready deterioration. The impeller may therefore be either cast or the parts may be attached by welding, while the portion **26** where the two walls **23** and **24** meet, may either be integral or may be produced by welding, swaging or brazing.

Obvious modifications such as lie within the skill of the trained mechanic are to be construed as within the scope and purview of the present invention, for which applicant claims:

1. An impeller for dish washing machines and the like comprising a hub, at least two impeller blades secured thereto and radiating therefrom, said blades consisting of two components of substantially the same shape spaced slightly apart but secured to each other along a portion of their outer edges, thereby leaving a channel therebetween, the leading edges of said components being flared and with the most advanced edge being longer than the other whereby liquid will be scooped up by said leading edges upon rotation of the hub and the liquid caused to pass rapidly through said channel and to be discharged violently from the trailing edges of the blades in the general direction of the axis of rotation of said hub.

2. In a dish washing machine having a housing, means for holding articles to be washed, and means for agitating and spraying liquid contained in the lower portion of said housing in an upward direction, the improvement which comprises a vertical shaft and a hub mounted thereon, said hub carrying radially spaced laminar impeller blades, the outer edges of which are secured to each other along a portion of said edges so as to provide a channel therebetween, whereby liquid will be scooped up by said blades with their leading edges and caused to flow violently through the same and be discharged upwardly from the trailing edges of said blades, while air will be drawn in through the open portions of the outer edges.

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