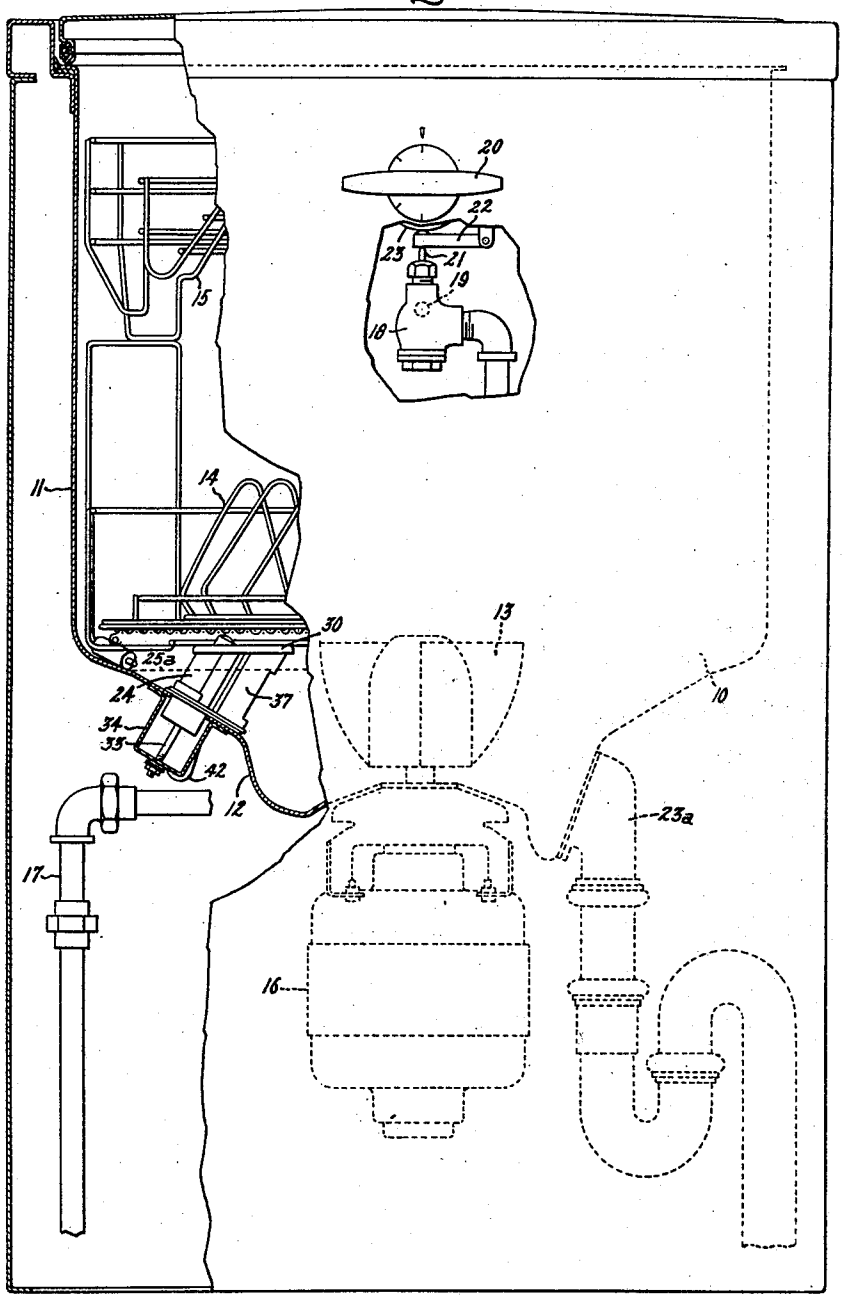
Dec. 21, 1943. E. S. STODDARD 2,337,356

WASHING APPARATUS

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Fig. 1.



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Fig. 2.

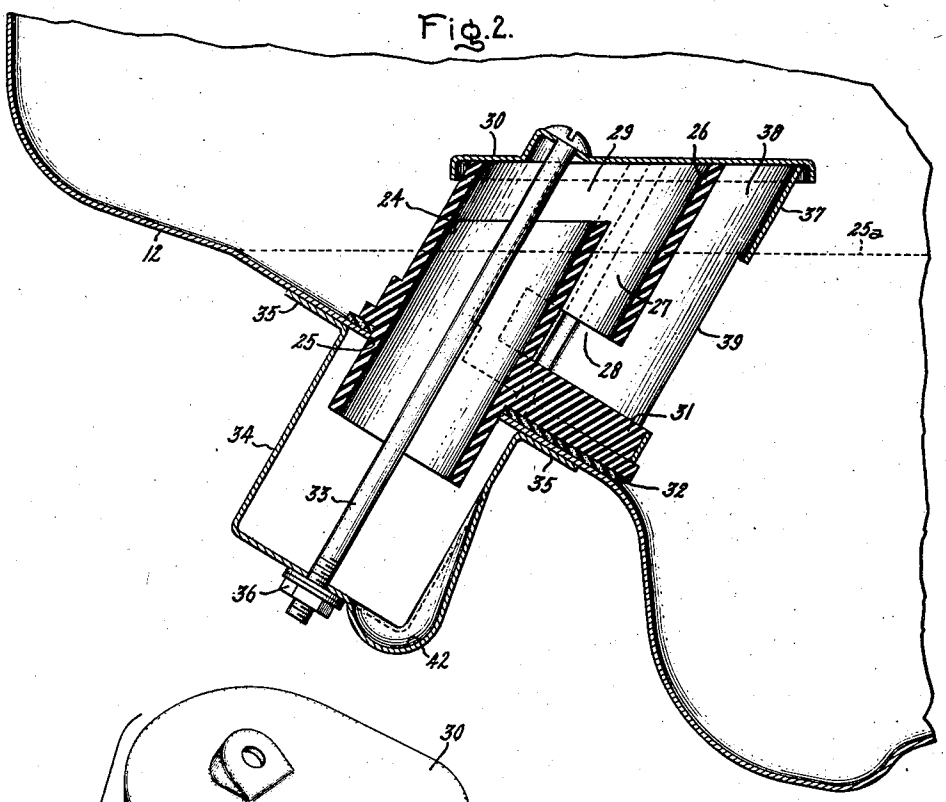
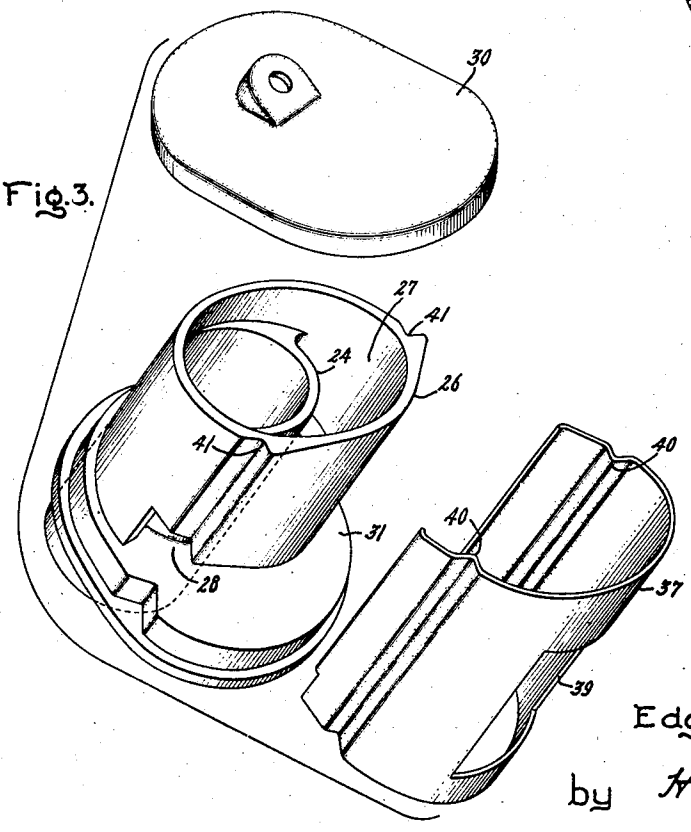


Fig. 3.



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WASHING APPARATUS

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Application September 1, 1942, Serial No. 456,873

4 Claims. (Cl. 141—9)

This invention relates to washing apparatus, more particularly to dishwashing apparatus, and it has for its object the provision of an improved liquid over-flow structure in apparatus of this character.

This invention is particularly applicable to washing apparatus having a vat and a power-driven, liquid-circulating impeller in the bottom of the vat for hurling the cleansing liquid upwardly and outwardly in the vat to cleanse the dishes and utensils supported in racks above the impeller. And it contemplates an improved over-flow structure that will prevent the static liquid level in the vat from rising above a predetermined height. It is especially useful in washing apparatus having a water inlet extending into an upper section of the vat in that it will prevent the static liquid level from ever rising so high that it will submerge the inlet opening; it thereby functions to prevent back-siphoning from the vat to the water supply pipe.

In accordance with this invention, the over-flow structure has an over-flow tube extending upwardly into the vat from its bottom wall. The tube has a liquid entrance opening at the top and it discharges through the bottom wall. A series of baffle walls form a hood-like cover for the top of the tube, and further, define a tortuous passageway leading from the vat to the top opening in the tube. The parts are arranged so that liquid from a static pool can readily flow from the vat to the top of the tube, but prevent substantially any liquid from reaching the tube when the impeller is operating to hurl the liquid up through the vat in the normal washing operation.

For a more complete understanding of this invention, reference should be had to the accompanying drawings in which Fig. 1 is a vertical elevation of dishwashing apparatus embodying this invention, parts being shown in section and broken away so as to illustrate certain details of construction; Fig. 2 is a fragmentary sectional view taken through a portion of the washing apparatus of Fig. 1, the figure being drawn to a larger scale than Fig. 1; and Fig. 3 is an expanded perspective view illustrating certain elements of the overflow structure arranged in accordance with this invention.

Referring to the drawings, this invention has been shown in one form as applied to dishwashing apparatus comprising an upright vat 10; the vat 10, as shown, is provided with an upright side wall 11 and a bottom wall 12. Arranged within the vat above the bottom wall 12 is a liquid circulating impeller 13 that is arranged to engage the liquid in the bottom of the vat and to hurl it upwardly and outwardly within the vat through suitable utensil supporting racks 14 and 15 located above the impeller. The impeller is driven by means of a suitable electric motor 16.

Water is supplied to the upper portion of the vat through a water supply pipe 17 and a control valve 18, the water flowing through the valve discharging through a port 19 into the vat. The valve 18 is controlled by a suitable manually operable knob 20 operating a valve plunger 21 through a suitable lever arm 22 and a cam 23. It will be understood that the parts are so arranged that when the knob is turned clockwise from its position of Fig. 1 it will operate the cam 23 to depress the arm 22 and hence the pin 21 to open the valve and thereby permit water to flow into the upper section of the vat; whereas, when the knob is returned to its position of Fig. 1, it will permit the valve to close.

A valve controlled drain pipe 23a is connected with the vat 10.

The overflow structure arranged in accordance with this invention to prevent the static liquid level in the vat from rising beyond a predetermined height comprises a cylindrical over-flow tube 24 which has its lower end projecting through an opening 25 provided for it in the bottom wall 12 of the vat, as clearly shown. The section of the bottom wall 12 through which the tube extends is arranged at an angle to the horizontal, and hence the longitudinal axis of the tube 24 is at an angle to the vertical; because of this, the top edge of the tube is arranged at an angle to the longitudinal axis of the tube so that it is parallel to the surface of a static pool of liquid in the vat; for example, it will lie parallel to a liquid level 25a, which level is that of a static pool formed when the proper quantity of washing liquid has been supplied to the vat.

The lower end of the tube 24 which extends through the opening 25 discharges to the outside of the vat, as shown. Therefore, liquid which flows into the top end of the tube will be directed through it and will be discharged to the exterior of the vat.

The overflow structure further comprises a second cylindrical member 26 which is arranged in external, tangential relation to the inner tube 24. The point of tangency of the tubes 24 and 26 is at the sides of the tubes opposite the im-

peller. Therefore, the two tubes 24 and 26 arranged in this tangential fashion define between them a crescent-shaped channel 27 which faces the impeller. The bottom section of the wall of the outer tube 26 is cut away to define a relatively low, elongated, laterally extending opening 28 through which the liquid in the vat can flow into the crescent-shaped channel 27. The outer tube 26 is higher than is the inner tube 24 so that a passageway 29 is provided above the tube 24 which extends laterally across the top of the tube 24 and communicates with the top end of the crescent-shaped channel 27, as clearly shown. It will be observed, therefore, that the channels 27 and 29 define a liquid passageway between the vat and the upper end of the tube 24. The passageways 27 and 29 are closed at the top by means of a cover 30, which preferably will be formed from a suitable metal, such as brass.

While the two cylinders 24 and 26 may be formed as separate members, and may be joined together at their line of tangency in any suitable manner, I prefer to form then into an integral structure, as shown; this integral structure may be made of any suitable material, but preferably it will be made by molding it from a suitable phenol condensation product. And preferably, the integral structure will be formed with an enlarged flange-like base 31 which is fitted above the bottom wall 12 of the vat around the opening 25. Interposed between this base and the inner surface of the bottom wall 12 is a suitable liquid sealing gasket 32 which may be formed of any suitable material, such as sponge rubber sheet.

The integral assembly, thus far described, together with the cover 30 are rigidly secured to the bottom wall 12 of the vat by means of an elongated screw 33 which is directed through an opening provided for it in the cover 30, as shown, and extends axially down through the tubes to a point below the bottom of the vat. The lower end of the screw is projected through an overflow base bracket 34 which has a substantially U-shape. Outwardly extending flanges 35 are provided on the upper ends of the legs of this member, and these flanges bear directly against the lower surface of the bottom wall of the vat. A nut 36 is threaded on the lower end of the screw in order to tightly clamp the parts together in their assembled relation with the vat, as shown.

As has been pointed out previously, the end of the tube 24 is slightly above the static level 25*a* of the water pool supplied to the vat for the proper washing operation. If for any reason more water should be supplied so that the level rises above the level of the top of the tube 24, the water is permitted to flow through the opening 28, up through the crescent-shaped channel 27, thence laterally through the channel 29 and into the upper end of the overflow cylinder 24; it will discharge through the lower end of this cylinder and the bracket 34 to the exterior of the vat.

As pointed out previously, the opening 28 is relatively elongated and is relatively short in height; it is arranged in this way in order to prevent water from entering the passageway 27 when the impeller 13 is rotating to circulate the water upwardly and outwardly in the vat in the normal washing operation. It will be understood that when the water is thrown by the impeller upwardly and outwardly in the vat, it will return to the impeller for recirculation down the side and bottom walls of the vat; the opening 28 being positioned at the side of the cylinder 26 facing the impeller and being relatively short tends to prevent any substantial amount of water returning to the impeller from flowing into the overflow tube 24.

In order to prevent the possibility of even small amounts of water from entering the opening 28, an overflow shell 37 is provided on the side of the cylinder 26 in which this opening is located. This shell defines with the adjacent wall of the cylinder 26 a second crescent-shaped chamber 38 which, as shown, is interposed between the first crescent-shaped channel 27 and the impeller. This chamber also is closed at the top by means of the cover 30. The shell 37 is provided with an opening 39 which is relatively high and narrow as compared with the height and width of the opening 28. The relatively narrow, vertically elongated opening 39 and the relatively wide and short opening 28 effectively prevent water from splashing or surging into the channel 27 and hence into the tube 24.

While the shell 37 may be molded with the tubular members 24 and 26, I prefer to form it separately from them, and to make it of a suitable metal, such as brass. It has in general a U-shape, and in each of the legs of the member are vertically arranged internal ribs 40 which are arranged to be received in complementary seats 41 provided for them in the walls of the tubular member 26. The inherent resiliency of the member 37 holds it in place on the tube assembly.

As an additional safeguard against water surging into the opening 28 and channel 27, the base 31 is made relatively thick, that is, it elevates the entire intake section of the overflow structure a predetermined distance above the bottom wall 12 of the vat.

The U-shaped overflow base bracket 34 at its lowest point preferably will be provided with a small depressed basin 42 in order to collect any of the small quantities of water which might possibly pass through the overflow structure in order to avoid wetting the floor under the washing apparatus during normal operation.

It will be observed that the tube 24 is hooded at the top by means of the cover 30 and the walls of the higher cylinder 26—the cover 30 and cylinder walls 26 defining a baffle enveloping the top of the overflow tube. Furthermore, it will be observed that the baffle arrangement is supplemented by the walls of the shell 37 which define an outer baffle around the passageway 27, and its entrance opening 28. The parts are so arranged that if the impeller is not operating and an abnormal supply of water be fed to the vat, the water will overflow as soon as its free static level reaches the level of the upper end of the tube 24 and will be discharged through the bracket 34 onto the floor under the washing apparatus. However, if the normal supply has been fed to the vat and then the impeller be operating it is almost impossible for any of the water agitated by the impeller to enter the tube 24. Should a few drops enter the tube, they would be collected in the basin 42 in the bracket 34. Under normal conditions, this water will evaporate and never reach the floor under the machine.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claims to cover

any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In dish-washing apparatus provided with a vat having side and bottom walls, and an impeller in the lower part of said vat above said bottom wall and spaced from the side walls for circulating cleansing liquid upwardly and outwardly in said vat, the liquid gravitating down the side walls to return to said impeller for recirculation thereby, an overflow structure for said vat between said impeller and the side walls comprising an overflow tube extending upwardly from said bottom wall having its upper end located so as to prevent the static liquid level in said vat from rising above a predetermined height and its other end constituting a discharge opening, a pair of walls spaced laterally from said tube toward said impeller and forming with it a pair of channels extending vertically along its side and extending above the level thereof, the inner channel thereby opening into a space above said tube, and the inner wall of said pair having at its bottom a shallow elongated opening and the outer wall of said pair having a relatively narrow vertically elongated opening facing said impeller, and a wall covering the tops of said channels.

2. In dishwashing apparatus provided with a vat having side and bottom walls, and an impeller in the lower part of said vat above said bottom wall spaced from the side walls for circulating cleansing liquid upwardly and outwardly in said vat, the liquid gravitating down the side walls to return to said impeller for recirculation thereby, an overflow structure for said vat between said impeller and the side walls comprising a cylindrical overflow tube extending upwardly from said bottom wall having its upper end located at a level above the normal static liquid level in said vat and its other end discharging through said bottom wall, a second cylindrical tube arranged in external tangential relation to said first-named tube extending upwardly to a higher level in said vat than said first tube and having an opening facing said impeller adjacent said bottom wall providing communication between said vat and the space between said tubes but preventing the liquid returning to said impeller for recirculation from entering said overflow tube, and a means closing the top of said second tube.

3. In dishwashing apparatus provided with a vat having side and bottom walls, and an impeller in the lower part of said vat above said bottom wall and spaced from the side walls for circulating cleansing liquid upwardly and outwardly in said vat, the liquid gravitating down the side walls to return to said impeller for recirculation thereby, an overflow structure for said vat between said impeller and the side walls comprising a cylindrical overflow tube extending upwardly from said bottom wall having its upper end located at a level above the normal static liquid level in said vat and its other end discharging through said bottom wall, a pair of walls spaced laterally from said tube toward said impeller and forming with it a pair of channels extending vertically along its side and extending above the level thereof, the inner channel thereby opening into a space above said tube, and the inner wall of said pair having at its bottom a shallow elongated opening and the outer wall of said pair having a relatively narrow vertically elongated opening facing said impeller, and a wall covering the tops of said channels.

4. In dishwashing apparatus provided with a vat having side and bottom walls, and an impeller in the lower part of said vat above said bottom wall and spaced from said walls for circulating cleansing liquid upwardly and outwardly in said vat, the liquid gravitating down the side walls to return to said impeller for recirculation thereby, an overflow structure for said vat between said impeller and said walls comprising a member fitted in an opening in said bottom wall provided with integrally formed walls defining a pair of cylinders in tangential relation so as to define between them a crescent-shaped channel, the section of the inner cylinder in said vat being shorter than the outer so that a space is formed above it communicating laterally with said channel, and the inner cylinder extending downwardly through said bottom wall and thereby opening to the space below said wall, a baffle forming with the wall of said outer cylinder facing said impeller a second crescent-shaped channel and said baffle having therein an opening facing said impeller and defining a port between said vat and said second-named channel, and the wall of said outer cylinder being provided with an opening facing said impeller and forming a connecting port between said two channels, and a cover plate over the top of said outer cylinder and said second channel.

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