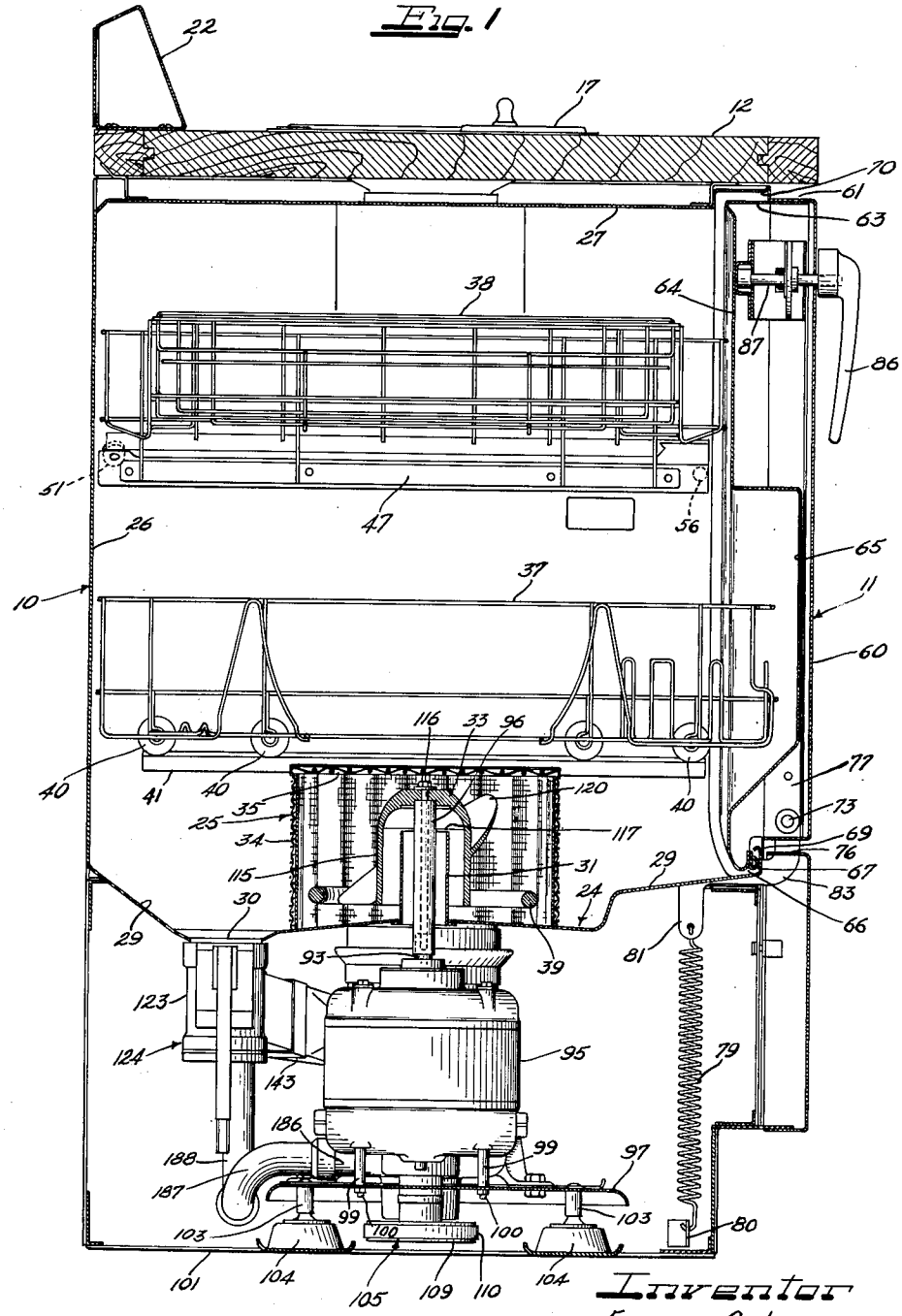
April 24, 1962 E. C. LEVIT 3,031,564

DISHWASHING MACHINE

Original Filed Sept. 9, 1954 2 Sheets-Sheet 1

Fig. 1



Inventor
EDWARD C. LEVIT

Weil, Akerman, Manning, Cross & Davidson Attys.

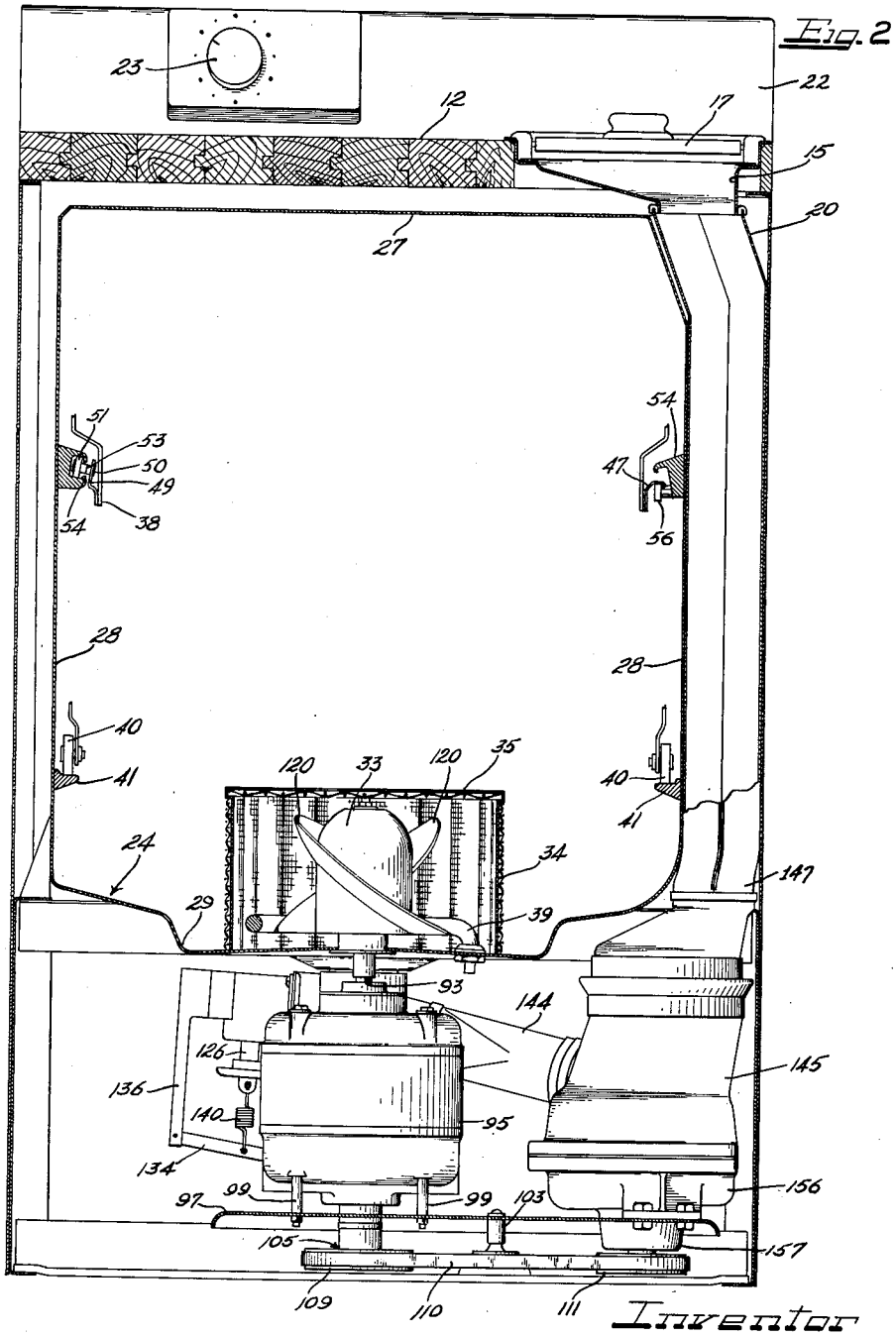
by

April 24, 1962 E. C. LEVIT 3,031,564

DISHWASHING MACHINE

Original Filed Sept. 9, 1954 2 Sheets-Sheet 2

Fig. 2



Inventor
EDWARD C. LEVIT

Neil, Sherman, Merani, Cross & Leighton
By Attys.

United States Patent Office

3,031,564
Patented Apr. 24, 1962

1

3,031,564

DISHWASHING MACHINE

Edward C. Levit, St. Joseph, Mich., assignor to Whirlpool Corporation, a corporation of Delaware

Continuation of application Ser. No. 454,941, Sept. 9, 1954. This application May 31, 1956, Ser. No. 588,566
1 Claim. (Cl. 219—39)

This application constitutes a continuation of copending application, Serial No. 454,941, filed September 9, 1954, now abandoned.

An object of my invention is to provide a dishwashing unit in which water and air are circulated through the dishes by an impeller in the bottom of the tub, and in which the efficiency of air circulation through the dishes for drying is increased by providing an air circulating vane within the hollow interior of the impeller.

A still further object of my invention is to provide an improved form of dishwashing machine having an air and water circulating impeller in the bottom of the tub for the dishwashing machine, enclosed by a screen forming a shroud for the impeller, in which the impeller circulates air and water through the dishes when rotating in one direction and backwashes the screen when rotating in a reverse direction.

Still another object of my invention is to provide an improved form of dishwashing machine in which an air and water circulating impeller enclosed by a screen is provided in the bottom of a tub and in which a reversible motor is provided to drive the impeller to effect the circulation of air and water through the dishes when driven in one direction, and in which the motor when rotating in a reverse direction drives a pump to drain water from the tub and drives the impeller in a direction to backwash the screen and clean articles of food therefrom.

Still another object of my invention is to provide a novel and improved form of combined dishwasher and waste disposal unit in which an impeller in the bottom of the dishwashing tub is provided for circulating air and water for washing the dishes, and a waste disposal unit spaced horizontally from the impeller outside of the tub is provided for the disposal of waste, and in which the drain from the dishwashing tub is through a wall of the waste disposal unit.

FIGURE 1 is a side cross-sectional view of a dishwasher embodying my invention.

FIGURE 2 is a front cross-sectional view showing additional structural details of my invention.

In the embodiment of my invention illustrated in the drawings, I have shown generally a combined dishwashing machine and waste disposal unit comprising a cabinet **10** having a front opening door **11** for the dish washing unit, a top **12**, shown as being made of wood to provide a work surface, but which may be made of steel coated with enamel or porcelain or any other desired material.

A sink **15** for a disposal unit is recessed beneath the top **12** and has an upwardly opening cover substantially flush with the top **12**, and closing the sink when not in use.

The top of the cabinet **10** is also shown as having an upwardly and rearwardly inclined panel **22** extending upwardly therefrom along the back thereof and forming a mounting for controls **23**, controlling operation of the dishwashing machine and disposal unit. The controls **23** may be cyclically operated controls for operating the disposal unit and dishwashing machine in a predetermined

2

cycle and are not herein shown or described, since they form no part of my present invention.

Within the cabinet **10** is a tub **24** for a dishwashing machine. The tub **24** is shown as having a rear wall **26** formed by the rear wall of the cabinet **10**, a top wall **27**, side walls **28, 28** spaced inwardly of the outer side walls of the cabinet, and a bottom **29** sloping downwardly to a drain opening **30** at one side of the center of the tub. The bottom **29** is also shown as having a standpipe or sleeve **31** extending upwardly therefrom in the center thereof and forming a conduit for drawing air into the tub **24** from beneath the bottom of the cabinet, by the operation of an impeller **33**, for drying the dishes.

The impeller **33** is shown as being encircled or enclosed by a generally cylindrical screen **34** of a corrugated form in cross section and shown as having a generally flat top **35**. The screen **34** and its top **35** form, in effect, a shroud enclosing the impeller **33**, for directing the flow of air and water upwardly through vertically spaced dish racks **37** and **38** and the dishes therein, and also serve to prevent silverware or small dishes from dropping onto the impeller.

Within the screen **34** and encircling the impeller **33**, adjacent the bottom thereof is an immersion heater **39**, suitably mounted in vertically spaced relation with respect to the bottom of the tub. The immersion heater **39** may be of any well known form and is provided to heat the air for drying, and also to keep the water up to temperature during washing and rinsing, and is no part of my present invention so need not herein be shown or described further.

The dish racks **37** and **38** are shown as being in the form of wire baskets for containing the dishes and glasses during washing and are of a well known form, so need not herein be described in detail.

The dish rack **37** is provided with spaced rollers **40, 40** adjacent the bottom thereof which are adapted to ride along a track **41**, extending inwardly from side walls **28, 28** of the dishwashing tub **24**.

The dish rack **38** is shown in FIGURE 1 as having a rail **47** depending therefrom and extending along each side thereof. Each rail **47** is shown as having a rear support portion **49**, for a roller **51**, extending a slight distance upwardly from the upper margin thereof and inclined inwardly and forming a mounting for a pin **50** having the roller **51** mounted thereon. The pin **50** may be riveted to the projecting end portion **49** and may have a head at its outer end to retain the roller **51** thereto. A spacing collar **53** is shown as spacing the roller outwardly from the support portion **49**. The roller **51** is shown in FIGURE 2 as riding within a channel like track **54**. The tracks **54, 54** are mounted on and extend along and inwardly from opposite walls **28, 28** of the dishwashing tub **24**. The track **47** is also shown as having an outwardly turned downwardly facing channel-like extension extending from the upper end thereof for fitting within the channel of the track **54** and riding upon a roller **56** at the outer end thereof, supporting the forward end portion of the rail **47** when the door **11** is closed.

The door **11** is shown in FIGURE 1 as being formed from a generally rectangular outer panel **60** having an inturned flange **61** extending around the periphery thereof and fitting over a corresponding flange **63** of an inner panel **64**. The inner panel **64** is shown as having a recess **65** formed therein and conforming generally to the form of the lower dish rack **37** to accommodate the

rack to extend within the door panel, when the door is closed.

Counter balancing springs 79, 79 are provided to bias the door in a closed position and to hold the door open when off-center with respect to the hinge pins 73, 73. As herein shown, each spring 79 is connected at its lower end to an ear 80 extending inwardly from a side wall of the cabinet. The opposite end of the spring 79 is connected to a depending arm 81 of a crank 83. The crank 83 extends outwardly from the depending arm 81 toward the hinge pin 73 and thence extends upwardly within the channel 77 and is secured thereto as by nuts and bolts 84, 84. The springs 79, 79 thus bias the door to a closed position, and when the door is fully open are positioned off-center with respect to the hinge pins 73, 73 by the arms 81, 81 to hold the door open for loading the dish racks with dishes to be washed.

The door 11 is latched closed by suitable latching bars guided between the panels 60 and 64 and operated by a door handle 86 on the outer end of a shaft 87 journaled in the space between the panels 60 and 64.

The dishwashing impeller 33 is shown in FIGURE 1 as being coaxial with a shaft 93 of a motor 95 and as being driven therefrom through a coupling sleeve 96 which also forms a support for said impeller. The motor 95 may be a well known form of electric motor and is shown as being mounted on a base plate 97 on spacer sleeves 99, through which extend bolts 100, 100 which may may be threaded within the motor casing. The base 97 is supported in vertically spaced relation with respect to a bottom 101 of the cabinet 10 on pedestals 103, 103. The pedestals 103, 103 may have resilient bases indicated generally by reference character 104 and made from rubber, an elastomer or the like, to damp vibration of the motor 95.

The opposite end of the motor shaft 93 from the impeller 33 projects downwardly beneath the base 97 and has an overrunning clutch 105 thereon. The overrunning clutch 105 is of a well known form, to drive the casing when the motor is rotating in one direction, and to free the casing when the motor is rotating in an opposite direction. The overrunning clutch 105 is grooved at its periphery to form a pulley 109 having a belt 110 trained thereabout. The belt 110 has driving connection with a pulley 111 on the lower end of a shaft of the disposal unit.

The impeller 33 is shown in FIGURE 1 as having a hollow hub 115 of a dome-like form, mounted on the coupling 96 forming an upward continuation of the motor shaft 93. The impeller 33 is secured to the motor shaft as by a through bolt 116 extending through the top of the dome of the hub through the coupling sleeve 96 and threaded within the end of the motor shaft 93.

Within the hollow interior of the hub 115 at the discharge end of the standpipe 31 is an air impelling vane or blade means 117. The air impelling vane or blade means 117 thus serves to draw air up through the standpipe 31 and discharge it through the bottom of the impeller during the drying operation. During the washing operation the level of the water in the tub 24 is above the level of the bottom of the impeller 115 and thus seals the impeller and prevents the drawing of air onto the dishes during washing.

The impeller 33 is shown as having a plurality of liquid circulating blades 120 spaced around the hub 115. The blades 120 are shown in FIGURE 1 as being inclined upwardly from said hub and as extending downwardly along said hub from the top of the dome thereof to the bottom thereof in a spiral path in the direction of rotation of said hub, to draw water upwardly through the shroud and screen 34 and 35 onto the dishes in the dish racks 37 and 38 during washing and to force air drawn upwardly through the shroud by the impelling vane 117 upwardly over the dishes during drying.

The impeller 33, except for the internal air circulating vane or blade means 117, is therefore of a conventional construction, and when a body of cleansing liquid is placed in the tub 29, the impeller blades 120, 120 will engage and hurl this liquid upwardly through the screen 35 over the surfaces of the dishes, glasses, silverware and other utensils placed in the racks 37 and 38. This action continues as long as the impeller is operated and as long as the body of liquid is retained in the tub.

In operation of the disposal unit, the cover 17 for the sink 15 may be opened to accommodate the scraping of garbage into the sink 15. Assuming that the controls 23 are in a disposal position, when the cover 17 for the sink is open, a spray of water will flow downwardly along the sink through and along the duct 20 into the shredding chamber 145. During the period of dislodging food from the dishes, the shredding impeller is operated by the motor 95 to rotate in a clockwise direction and shred the food for discharge through the pumping chamber and discharge pipes 187 and 188. At the end of the disposal cycle the motor 95 will stop. At this time the dishes free from garbage may be placed in the racks 37 and 38, which may be moved into the sink along the tracks 41 and 54 when loaded. The door 11 may then be closed and the dishwashing operation may be initiated, the tub 24 being first partially filled with water to a level above the bottom of the impeller 33 and the motor 95 then being started to rotate in a direction opposite to its direction or rotation when driving the shredding impeller. This will drive the dishwashing impeller 33 in a direction, which in FIGURE 1 is a counterclockwise direction, when looking downwardly onto said impeller to impel the hot water upwardly through the dishes in the racks 37 and 38. At the end of the dishwashing operation, the motor 95 stops. Its direction of rotation is then reversed, to drive the shredding impeller and effect pumping of the water drained from the tub 24 upwardly along the pipe 187 to drain. At the same time, the drain valve 124 is opened under control of the cyclic control means 23.

The dish water thus drains directly through the shredding chamber 145 and pumping chamber 156. During the draining operation, the direction of rotation of the motor 95 being reversed to drain the spent dishwater from the pumping chamber 156 of the disposal 16, the dishwashing impeller 33 will reverse its direction of rotation and wash particles of food which may lodge on the screen 35, back from said screen to pass to drain through the disposal unit 16.

As the spent dishwater has been drained from the tub 24, a rinsing operation may then be effected, the drain valve 124 may again be closed and the tub 29 be partially filled with water, and the direction of the motor 95 be reversed to drive the dishwashing impeller 33 in a direction to spray clear hot water over the dishes in the racks 37 and 38. After this operation the drain valve 124 may again be opened and the direction of the motor 95 be reversed, to again effect operation of the shredding impeller 113 to pump the spent rinsing water from the pumping chamber 156.

The valve 124 remaining open, the direction of the motor 95 may again be reversed to drive the impeller 33 in an impelling direction, for drying the dishes by air drawn up the standpipe 31 and circulated by the pumping vane or blade means 117 and circulating blades 120, it being understood that during the entire washing, rinsing and drying operation the immersion heater 39 is on both to maintain the dishwashing water hot and to heat the air for drying the dishes.

It should here be noted that during the drying and draining operations when the drain valve 124 is open that the vapor or moisture entering the drain 30 and the shredding chamber 145 of the disposal unit will tend to pass upwardly along the duct 20 and that the duct being relatively cool and outside of the tub, will serve as a condenser for the vapor, allowing the condensed

water to flow downwardly for discharge through the pumping chamber **156**.

It will be understood that modifications and variations in the present invention may be effected without departing from the spirit and scope of the novel concepts thereof.

I claim as my invention:

In a dishwasher, a vat having a sump, a vertical axis rotary impeller in said sump, said impeller being hollow and having a depending imperforate annular skirt, a drive shaft for said impeller projecting upwardly through the bottom of said sump, an air inlet conduit in the bottom of said sump extending upwardly within said hollow impeller, air circulating means including impeller blade means mounted internally upon said impeller skirt for drawing air upwardly through said conduit, and an annular electric heating unit positioned in said sump and

surrounding said impeller and adapted to heat air entering said conduit and emitted beneath the impeller skirt into the vat.

References Cited in the file of this patent

UNITED STATES PATENTS

1,637,376	Gibney	Aug. 2, 1927
2,022,637	Huppmann	Nov. 26, 1935
2,418,366	Powers	Apr. 1, 1947
2,422,022	Koertge	June 10, 1947
2,432,291	Dayton	Dec. 9, 1947
2,514,528	Wahl	July 11, 1950
2,634,739	Walker	Apr. 4, 1953
2,675,459	Pace	Apr. 13, 1954