

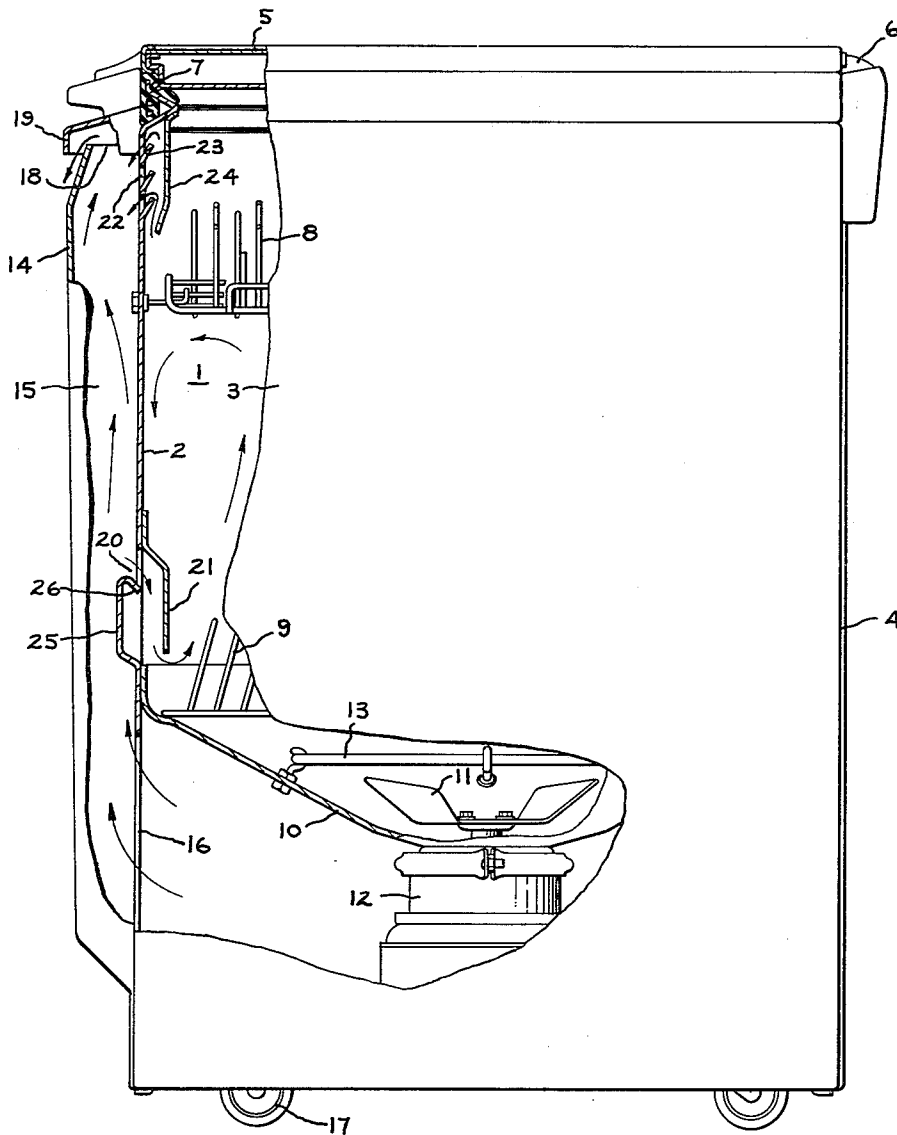
Aug. 28, 1962

H. J. MACEMON

3,050,866

DISHWASHER WITH DRYING MEANS

Filed June 13, 1960



INVENTOR.

HERBERT J. MACEMON

BY

Sheridan & Co.

HIS ATTORNEY

1

3,050,866

DISHWASHER WITH DRYING MEANS

Herbert J. Macemon, Jeffersonton, Ky., assignor to General Electric Company, a corporation of New York
Filed June 13, 1960, Ser. No. 35,791
5 Claims. (Cl. 34-78)

This invention relates to dishwashers, more particularly to automatic dishwashers for use in the home, and it has for its general object the provision of improved means for effecting the circulation of drying air through the washing vat for assisting in the drying of the dishes after being washed.

More specifically, this invention contemplates dishwashing apparatus arranged so that ambient air may pass into the vat and up through the vat for drying the dishes, and the air thus used for drying then discharged out of the vat into the room; and the invention further contemplates means for effecting a cooling of the vat walls by a flow of ambient air outside of the vat and thereby promote moisture condensation from the drying air while in the vat so as to reduce the amount of moisture discharged into the room with the air passed out of the vat.

Briefly stated, in accordance with one aspect of this invention walls are provided which define a flue outside of a wall area of the vat. This flue has an air intake opening at the bottom and an air discharge opening at the top so that ambient cooling air may enter at the bottom from the room and discharge back into the room at the top. The lower end portion of the flue is connected with the lower part of the vat so that air may enter the bottom of the vat from the room in order to effect a drying action on the dishes in the vat, and the upper part of the vat is connected with the upper end of the flue so that air may discharge from the vat into the flue and thence into the room; drying air circulating in this way through the vat and over the dishes. The proportion of the moisture in the air ultimately discharged into the room from the flue will have been reduced first by moisture condensation in the vat due to the action of the cooling air flowing up the flue, and secondly by the mixing of the air from the vat with the air flowing up in the flue. I have found that the percentage of moisture present in the discharging air is so small that generally the "steam" issuing into the room will be invisible.

For a more complete understanding of this invention, reference should be had to the accompanying drawing in which the single figure is a side elevation view of dishwashing apparatus embodying this invention, parts being shown in section and parts being broken away so as to illustrate certain details of construction.

Referring to the drawing this invention has been shown in one form as applied to domestic automatic dishwashing apparatus of the portable type, although it will be understood that this invention is applicable equally as well as to stationary or built-in dishwashers. As shown in the drawing, the dishwashing apparatus comprises an open top vertical vat 1 which is designed to receive the dishes to be washed and the washing fluid for effecting the washing operation. The vat may have any suitable shape but the embodiment illustrated shows a vat having a rectangular shape in horizontal cross section; it is provided with a front wall 2, a pair of side walls 3, and a rear wall 4. The open top of the vat 1 is closed by means of a cover 5 which is hinged by suitable hinges 6 to the rear wall 4. A suitable sealing gasket 7 is provided around the top edge of the vat and is arranged to seal the cover 5 when it is closed. Positioned in the vat are suitable upper and lower open-work dish and utensil supporting racks 8 and 9. Located below the lower rack 9 in a depressed bottom wall 10 is a suitable circulating

2

rotary impeller 11 which will rotate generally in the vertical central axis of the vat 1 and which will be rotated by any suitable means such as an electric motor 12. Any suitable impeller may be used but I prefer to use the impeller described and illustrated in the co-pending application of Russell M. Sasnett et al., Serial Number 671,070 filed July 10, 1957, now Patent No. 2,959,179, and assigned to the General Electric Company, the assignee of the present application. A heating unit 13 is provided in the bottom of the vat.

It will be understood that in the operation of the apparatus thus far described the dishes will be loaded in the racks 8 and 9, an appropriate quantity of hot water will be added to the vat along with a suitable detergent and then the motor 12 will be energized to rotate the impeller 11. The impeller 11 will hurl the washing fluid upwardly and outwardly through the racks 8 and 9 to effect the washing action during this operation. The heater 13 may be energized to heat the washing liquid. At the conclusion of the washing operation the water will be drained from the vat by the operation of a suitable drain valve (not shown) and the dishes allowed to dry, preferably while the heater 13 remains energized in order to heat the air within the vat.

In accordance with this invention I provide means for permitting a drying air to circulate through the vat, means for cooling a wall of the vat so as to condense moisture in the vat and furthermore to permit the drying air to discharge out into the room carrying with it as little moisture as possible, but insuring that the moisture which does emerge from the vat is in substantially invisible form. To the foregoing ends, I provide across the front wall 2 of the vat and substantially coextensive with its entire front area a vertical panel 14 arranged to define a space or flue 15 between itself and the front wall of the vat. At the bottom the flue 15 is provided with an air intake opening 16 which actually is formed in the lower portion of the front wall 2 below the bottom wall 10 of the vat, as shown; it will be understood that the lower end of the casing defined by the walls 2, 3 and 4 will be opened and, as shown in the drawings, this lower edge will be spaced above the floor of the kitchen in which the apparatus is placed by means of suitable supporting wheels 17. At the upper end of the flue 15 is an air discharge opening 18 extending across the front of the vat and which preferably faces upwardly, and over which there is placed a fixed cowl or hood 19 arranged to deflect downwardly the air which flows out of the opening 18. Intermediate the upper and lower end portions of the flue 15 there is an opening 20 extending cross-wise of the wall 2 from one side thereof to the other and leading from the flue into the lower portion of the vat 1. Mounted to overlie the opening 20 is a baffle 21 arranged in the vat to prevent the water in the vat as it is agitated by the impeller 11 from flowing out into the opening 20. The flue 15 at its upper end is connected with the interior of the vat by a series of elongated openings 22 which are provided with upwardly and inwardly inclined vanes or flanges 23. A downwardly extending baffle 24 is supported from the upper edge of the vat in position to overlie the openings 22, as shown, and thereby in conjunction with vanes 23 to function to prevent water from flowing from the vat out through these openings. The opening 20 is formed by an outwardly offset portion 25 formed in the wall 2 so that its upper outer edge is spaced from the outer surface of the wall 2, and by a re-entrant downturned lip 26 which extends from this outwardly deflected wall portion 25 downwardly back into the vat, as shown. The opening 20 thus faces upwardly and is contiguous with the front surface of wall 2.

The operation of my invention is as follows: when the

dishes are in their drying cycle with the heater 13 energized, as previously described, the heat in the vat wall 2 will cause air to flow upwardly through the flue 15 by "stack" action. Also because of stored heat in the dishes and the vat and its associated structure and because of the heat generated by heater 13 convection currents will be set up in the vat which will tend to flow from the lower parts of the vat upwardly therein so as to induce cooling air to enter the opening 20; this cooling air will circulate around and about the dishes and other utensils in the vat and finally flow outwardly through the upper openings 22, all as indicated by the arrows. The ambient cooling air which is continuously flowing upwardly through the flue 15 will cool the wall 2 which will promote moisture condensation on the inside of this wall and thus decrease the total amount of moisture which will be discharged through the openings 22 by the air flowing out of these openings; it will be understood that because of the cool wall 2 and the fact that heat is generated in the general area of the center of the vat there will be generated a circulation of air up the central area of the vat and down along the cooler wall 2. This circulation, of course, promotes the condensation of moisture from the air of all parts of the vat.

Preferably and as shown the openings 22 will be positioned a little below the level of the discharge opening 18 at the top of the flue so that the air emerging from the openings 22 and what moisture there is carried with it will commingle with the air flowing up in the flue before being discharged through the opening 18. By this arrangement I practically insure that what "steam" there is that is discharged will be practically invisible.

Generally there will be a small amount of moisture condensation at the discharge openings 22 which will drop down the front surface of wall 2. This moisture will drain back into the vat through the upwardly facing opening 20.

While I have shown and described a specific embodiment of my invention, I do not desire the invention to be limited to the particular construction shown and described and I intend by the appended claims to cover all modifications within the true spirit and scope of the invention.

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

1. A dishwasher comprising walls defining a vat into which dishes may be placed for a washing operation, heating means in said vat for heating the air and drying the moisture therein, a wall spaced from and coextensive with a wall area of said vat having openings adjacent the top and bottom to form a flue so that relatively cool ambient air may flow up through said flue and cool the said wall area to promote moisture condensation on the inside of the vat, and an air passageway between the top of said flue and said vat serving to remove the moisture in the air leaving the vat to reduce the amount of water vapor seen issuing from the dishwasher, said vat being formed to be in communication with ambient air during washing and drying of dishes substantially only through said flue.

2. A dishwasher comprising walls defining a vat into which dishes may be placed for a washing operation, heating means in said vat for heating the air and drying the moisture therein, walls including a wall area of said vat defining a vertical flue adjacent said wall area, said flue having inlet and discharge openings in the bottom and top portions respectively thereof so that relatively cool ambient air will flow upwardly through said flue and effect cooling of said wall area and promote moisture condensation on the inside of the vat, and said walls hav-

ing air passageways connecting the interior of said vat with the lower and upper portions of said flue, the heating means setting up convection currents in the vat so that ambient air may also flow from said flue into the lower portion of said vat and moisture-laden air discharge from the upper portion of said vat into the upper end of said flue, said vat being formed to be in communication with ambient air during washing and drying of dishes substantially only through said flue, the relatively cool ambient air in the flue tending to remove the moisture in the air leaving the vat to reduce the amount of water vapor seen issuing from the dishwasher.

3. A dishwasher as specified in claim 2 wherein the passageway connecting the vat with the upper portion of said flue is located adjacent to but below said discharge opening at the top of said flue so the air flowing out of said vat into the top of said flue will commingle with the cooling air flowing in said flue before it is discharged.

4. A dishwasher comprising walls defining a vat into which dishes may be placed for a washing operation, heating means in said vat for heating the air and drying the moisture therein, walls including a wall area of said vat defining a vertical flue adjacent said wall area, said flue having inlet and discharge openings in the bottom and top portions respectively thereof so that relatively cool ambient air may flow upwardly through said flue and effect cooling of said wall area and promote moisture condensation on the inside of the vat, and said walls having air passageways connecting the interior of said vat with the lower and upper portions of said flue, and heating means setting up convection currents within the vat the passageway between the lower portion of said flue and said vat being formed with a liquid collecting lip to direct into said vat liquid condensate flowing down the outside of said wall area from the upper end portion of said flue, said vat being formed to be in communication with ambient air substantially only through said flue during washing and drying of dishes.

5. A dishwasher comprising walls defining a vat into which dishes may be placed for a washing operation, heating means in said vat for heating the air and drying the moisture therein, said vat having one of said walls positioned substantially vertically, a wall spaced from said one wall to form with it a substantially vertical flue having an ambient air intake at the lower end and an air egress opening at the upper end whereby relatively cool ambient air may flow up through said flue in cooling relation with said one wall to promote moisture condensation on said one wall within the vat said one wall also being provided with an air discharge opening connecting the interior of said vat with the upper end of said flue, and said one wall also having formed therein a lower opening connecting said flue intermediate its lower and upper ends with the interior of said vat and said lower opening being contiguous with said wall area and also facing upwardly so that condensate dripping down said wall in said flue from said air discharge opening will flow through said lower opening and into said vat, said vat being formed to be in communication with the ambient air substantially only through said flue during washing and drying of dishes.

References Cited in the file of this patent

UNITED STATES PATENTS

1,370,222	Pemberton	Mar. 1, 1921
2,704,896	Hopkins	Mar. 29, 1955
2,734,520	Abresch et al.	Feb. 14, 1956
2,859,755	Burke	Nov. 11, 1958
2,918,068	Karig	Dec. 22, 1959
2,960,990	Jones et al.	Nov. 22, 1960