This invention relates to a dishwasher and more particularly to a dishwasher utilizing gas for heating of water used therewith.

An object of this invention is to provide a new and improved gas dishwasher. Another object of this invention is to provide a dishwasher having a tub with a bottom, water circulating means in the form of an impeller and also a drain located centrally of the tub bottom, and means disposed beneath the tub bottom and spanning a substantial part of the tub bottom, forming a passage through which fluid from a gas burner is directed whereby the hot gases pass along a substantial part of the tub bottom underside and are then exhausted from the chamber to obtain heating of the water within the tub quickly and economically.

A further object of the invention is to provide a dishwasher as defined in the preceding paragraph in which the chamber beneath the tub bottom is defined by a generally U-shaped frame secured to the tub bottom, said frame being generally trough-like, whereby the chamber permits the passage of gases therethrough, and the frame having a pair of openings with the burner associated with one opening and an air blower associated with the other opening for drawing gases from the chamber and mixing the gases with air for exhaust from the dishwasher, and also a plurality of fins within the chamber to increase the heat exchange.

Further objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective elevational view of a gas dishwasher with the front loading door open;

FIG. 2 is a horizontal section on an enlarged scale taken generally along the line 2-2 in FIG. 1;

FIG. 3 is a perspective detail view of the water heating components associated with the dishwasher;

FIG. 4 is a fragmentary front elevational view of the lower part of the dishwasher;

FIG. 5 is a fragmentary side elevational view of the lower part of the dishwasher taken of the side opposite from that shown in FIG. 4;

FIG. 6 is a schematic view of the gas system associated with the dishwasher; and

FIG. 7 is a sectional view taken generally along the line 7-7 in FIG. 2.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an embodiment of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

The dishwasher embodies a cabinet 19 in which a tub is positioned having a bottom plate 11 and the cabinet has a front loading door 12 all as is conventionally known in the art. The tub bottom plate 11 has a central flat section 15 and upwardly sloped surrounding sections 16, 17, 18 and 19 on the four sides of the central section. The central section 15 has water circulating means for the tub in the form of a conventional impeller 20 which is positioned above the tub bottom plate and which is driven from a motor 21 positioned beneath the tub bottom plate 11. The central section also has a drain 22 which communicates with a boot 23 beneath the tub bottom plate and which has a drain pump 24 associated therewith for draining water from the tub. The boot 23 also has a line 25 extending therefrom to a water fill switch 26.

In order to heat water within the tub quickly and economically, a gas system is associated therewith and embodies a trough-like frame indicated generally at 30 having a generally U-shaped configuration with an inner side wall 31 and an outer side wall 32. As is evident from FIGS. 3 and 7, the side walls 31 and 32 are of different height to compensate for the slope of the tub bottom plate 11. A frame bottom 33 spans the side walls and the ends of the frame are enclosed by end walls 34 and 35. The side walls 31 and 32 have turned-out flanges 36 and 37, respectively, whereby the frame is secured to the underside of the tub bottom plate 11 by suitable means such as welding. It will be seen that the frame 30 in association with the bottom plate defines a heat exchange chamber of a U-shape which partially surrounds the conventional washer components located beneath the tub bottom plate 11. The frame 30 has a pair of openings 40 and 41 at the opposite ends thereof in the frame bottom 33 with the opening 40 having a gas burner 42 disposed there beneath. The gas burner 42 is suspended from the frame 30 by a bracket 43 which holds the outlet end of the burner in position beneath the frame opening 40. The opening 41 in the frame 30 overlies a blower 44 driven by a motor 45 and the blower scroll 46 has its outlet supported in spaced relation with the opening 41 by a bracket 47. The bracket 47 has openings 48 therein whereby external air may enter the blower inlet as well as gases coming from the heat exchange chamber. An outlet 49 for the blower lies directly behind a screen 50 at the front of the dishwasher cabinet, whereby the gases exhausted from the heat exchange chamber which have been cooled and diluted by air coming in through the openings 48 are exhausted from the dishwasher.

The heat exchange rate is increased by having a pair of upstanding fins 51 and 52 disposed within the heat exchange chamber and having flanges for supporting attachment to the underside of the tub bottom plate 11. As shown in FIG. 7, suitable heat insulation 53 encloses the frame walls 31, 32 and 33. This element has been omitted from the other views for clarity.

The gas system is shown particularly in FIGS. 3, 5 and 6 in which the burner 42 receives gas from a supply line 60 which connects to a main control valve 61 with an outlet line 62 therefrom leading to a solenoid valve 63 which controls the supply of gas through a line 64 to the burner. A branch line 65 supplies gas to a burner pilot 66 which is disposed adjacent the burner 42 with a thermocouple line 67 connecting the pilot to the main valve 61 to control supply of gas to the burner dependent upon operation of the pilot.

Water for the dishwasher is supplied through a valve 70 connectable to a water line, not shown, with water passing to the tub through a fill line 71. It will be seen from the foregoing that a heat exchange chamber has been associated with the dishwasher to cover a substantial area of the tub bottom plate underside, to obtain as much heat transfer as possible, while still allowing the placement of the conventional dishwasher components in their generally conventional locations.

I claim:

1. In a dishwasher, in combination, a tub having a bottom, an impeller positioned centrally within the tub above the bottom for circulating water in the tub, a motor for the impeller beneath said tub bottom, a water drain system for a central drain pipe in the tub bottom and a drain pump beneath the bottom and means for heating water in the tub including a generally U-shaped
frame beneath and secured to the tub bottom disposed about the central area having the drain and impeller to define a U-shaped chamber, a gas burner operatively associated with one end of the chamber for passing hot gases thereto, and an air blower operatively connected with the other end for drawing the gases through the chamber and having external air inlets whereby the gases and air mix prior to room discharge.

2. A dishwasher as defined in claim 1 in which fins means are disposed in said chamber and touching said bottom to facilitate heat transfer.

3. In a dishwasher, in combination, a tub having a bottom, an impeller positioned centrally within the tub above the bottom for circulating water in the tub, a motor for the impeller beneath said tub bottom, a water drain system for the tub including a central drain in the tub bottom, and means for heating water in the tube including an elongate frame spaced from and secured to the tub bottom and having an opening at each end, a gas burner positioned adjacent one opening for directing a flame and heated gases into said chamber, and a blower having an inlet adjacent to the other frame opening for exhausting gases from the chamber.

4. In a dishwasher, a tub having a bottom plate with a central flat area and upwardly sloped surrounding sections, means within the tub for circulating water, and water heating means beneath the bottom plate including an elongate trough-like frame secured to said tub bottom plate and spanning a substantial part of said bottom plate to define a closed heat exchange chamber except for an opening at each end of said frame, a burner operatively associated with one frame opening, and a blower operatively connected with the other frame opening and additionally having external air inlets for mixing external air with the exhaust from said chamber.

5. A dishwasher as defined in claim 4 in which said trough-like frame has opposite side walls of different heights to compensate for the slope of the bottom plate surrounding sections and a plurality of heat exchanger fins are positioned in said chamber.

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