

UNITED STATES PATENT OFFICE

2,664,094

DISHWASHER

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Application August 1, 1947, Serial No. 765,597

4 Claims. (Cl. 134-58)

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This invention relates to dishwashers and is particularly useful for domestic dishwashers.

The primary object of the invention is to provide a dishwasher which is simple, economical to operate, and which effectively washes the dishes, leaving no film thereon, whereby the need of wiping is eliminated.

In domestic dishwashers, it is usually necessary to wipe the dishes to remove film. They employ hot water but, with rare exceptions, the water is not heated to a temperature sufficiently high to avoid the formation of films. In fact, most domestic hot water heaters are practically incapable of developing a temperature sufficiently high.

My improved washer relies upon steam for the washing operation, followed by a hot water rinse. In the washing operation, I also employ a detergent in the nature of a wetting agent which cooperates to ensure the absence of film by its wetting and detergent action on the surfaces of the dishes and adhering matter.

How the foregoing, together with such other objects and advantages as may hereinafter appear or are incident to my invention are realized is illustrated in the accompanying drawings, wherein—

Fig. 1 is a vertical section through a washer embodying my improvements, and

Fig. 2 is a plan view of Fig. 1, with the cover removed.

Figure 3 is a diagrammatic sketch of a timer mechanism.

Referring now to Fig. 1, A represents the case of the washer. B is the dish receiving wire basket located in the upper compartment D of the washer, and C is the cover for the upper compartment. The lower portion of the compartment D constitutes a tank for the water leaving the dishes.

A typical timing mechanism 8 for controlling the sequence of operation is somewhat diagrammatically shown in Figure 3. When the motor M is energized, it rotates cams $c-c_4$, which actuate switches $s-s_4$ to cyclically control the operation of the washer as described hereinafter.

During operation, to prevent discharge of vapor or water to the exterior, the cover C is held tightly closed by means of latch mechanism 4 which is preferably automatically actuated by a solenoid 5 to release the cover at a proper time in the cycle of operations. When the latch 4 is released, the springs 3 slightly open the cover to allow the drying to take place by the escape of vapor and the entrance of air.

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In order to supply washing steam into the washing compartment, I provide the well 6 which opens laterally into the washing compartment. This well holds a given amount of water, which I have found, by experience, need only be relatively small, say, for example, a well holding a pint or more of water for an average washer. Water is supplied to the well 6 from the main supply line 11, and the water in the well is maintained at a predetermined level by the float actuated valve mechanism 9. Located in the well is an electrical heating coil E, the flow of current through which is controlled preferably by a conventional automatic timing mechanism 8 such as used in clothes washers for example, the one shown in Figure 3.

The wetting agent is supplied from the reservoir 7 and preferably delivers into the well casing above the water. The wetting agent should desirably be one having a boiling point substantially the same as that of water. Thus, when the water in the well is boiled by the heater, the steam generated will carry along with it the wetting agent in vapor form. The steam thus generated fills the compartment D contacting with the dishes to be washed and which are located in the racks. Condensation occurs on the dishes and runs down thereover and into the bottom of the compartment D. This condensate will include the wetting agent which functions along with the steam and condensate to cut and remove grease. For the detergent, I prefer to use "Igepal CA," a polymerized ethylene oxide condensation product. This product is non-ionogenic and its aqueous solutions are neutral in reaction and completely stable in the presence of acids, alkalis and metallic salts. It does not form soaps with lime, magnesium or other metals. It comes as a viscous yellow-brown liquid and dissolves immediately when poured into water, irrespective of the hardness of any salts which may be present in the water. As stated, it has a boiling point substantially the same as that of water, and it does not contain any salt-forming groups. Any other wetting agent having similar properties may be used.

After the dishes have been steamed, as above described, for say a five minute period, the timer 8 operates to break the circuit of the heating coil E and completes the circuit to the solenoid 12a for the automatic valve 12 which opens to supply hot water to the spray coils 10-10 from the main source of supply 11. The water passing the valve 12 first enters the instantaneous electric heater 13 where its temperature is raised by heating coil 13a. The hot water flushes off

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the dishes, its action being assisted by the wetting agent remaining in the condensate adhering to the dishes.

After a period of time, the circuit for solenoid 12a of the valve 12 is broken and the solenoid 15a operating switch 15 which controls the pump 14 is energized. The pump 14 now pumps out the water from the tank to a suitable place of discharge. Thereafter, the coil 5a of solenoid 5 which controls the latch 4 is energized and the cycle of operations controlled by timer 8 is completed.

To prevent the building up of too much pressure, compartment D has a small vent 16, shown in the drawings on greatly exaggerated scale.

Instead of automatic operation, manual switches may be employed.

I have found that the described washer very effectively cleans the dishes, requires but a relatively small amount of water, and is economical to operate. After steaming for about 5 minutes and flushing with hot water and exhausting the waste water from the tank, the residual heat rapidly dries the dishes due to the opening of the cover and the consequent escape of vapor and its replacement by air. All scum is removed, leaving the dishes sterile and sparkling clean. No soap is needed. Where the foods are of such character as to stick relatively tightly the cycle may be repeated two or more times.

I claim:

1. In a dishwasher, a washing compartment, a water well opening therein, a heating element in said well for generating steam, a hot water spray means within the compartment, a water supply pipe leading to said spray means, a valve in said pipe, and an instantaneous water heater in said pipe between said valve and the spray means.

2. In a dishwasher, a washing compartment, a water well opening therein, a heating element in said well for generating steam, a hot water spray means within the compartment, a water supply pipe leading to said spray means, a valve in said pipe, and an instantaneous water heater in said pipe between said valve and the spray means, said heating element and said heater being electrical, together with a common source of current and switch means for controlling the supply of current.

3. A dishwasher comprising, in association

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with a washing chamber, a steam generator including a controllable heating unit, a hot water spray means including a control device, an automatic timer coupled with said unit and with said device and constructed to operate said unit first to introduce steam into said chamber for washing the dishes and thereafter operating said device to spray hot water into the chamber to rinse the dishes, and further incorporating an electrical heater in said steam generator, an electrical heater for the water, an electrically-controlled valve for the water spray means, and an electrical timer for all said elements.

4. A dishwasher comprising, in association with a washing chamber, a steam generator including a controllable heating unit, a hot water spray means including a control device, an automatic timer coupled with said unit and with said device and constructed to operate said unit first to introduce steam into said chamber for washing the dishes and thereafter operating said device to spray hot water into the chamber to rinse the dishes, a vapor escape door adapted for air circulation to dry the dishes, a releasable latch for said door, electro-mechanical connections from said control device to said latch, an electrical heater in said steam generator, an electrical heater for the water, an electrically-controlled valve for the water spray means, an electrical operator for said latch, and an electrical timer for all of said elements.

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