Aug. 17, 1954 P. E. FRANTZ 2,686,526

DISHWASHER

Filed Oct. 21, 1950 2 Sheets-Sheet 1

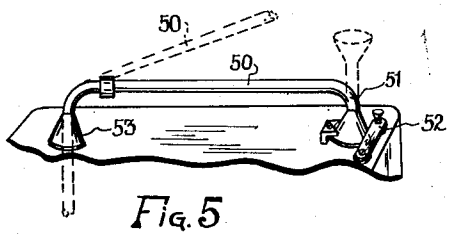


Fig. 5

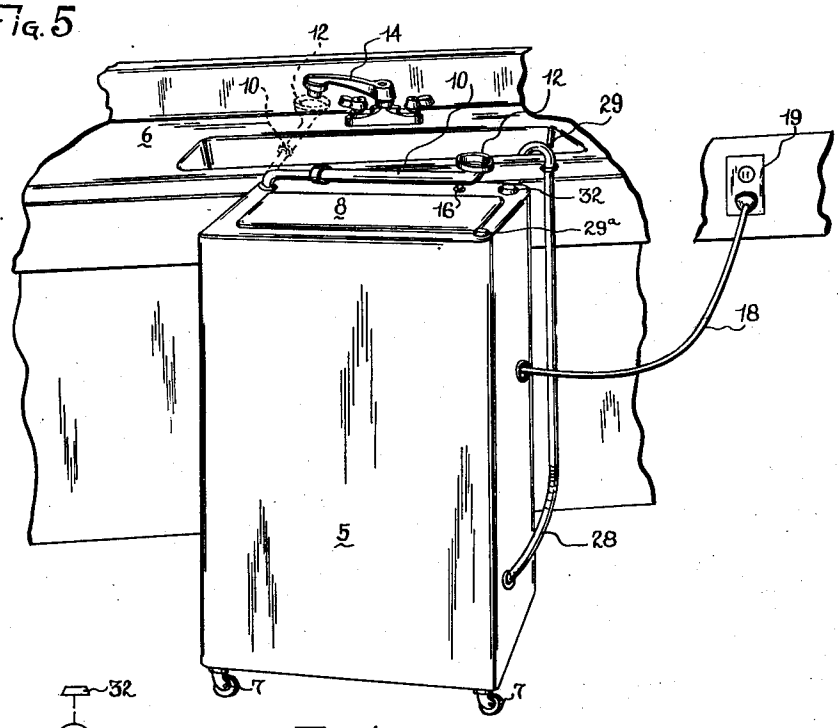


Fig. 1

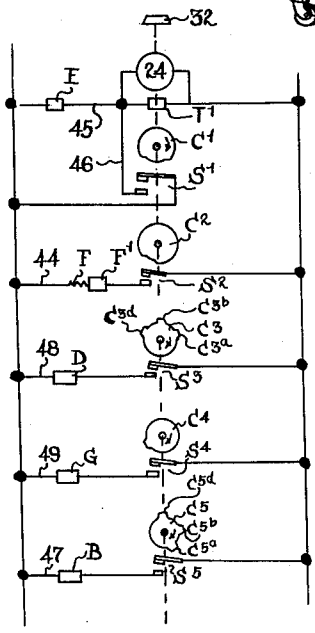


Fig. 3

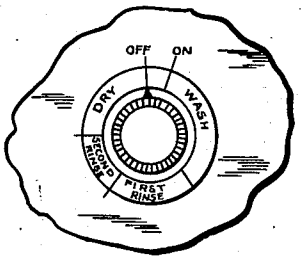


Fig. 4

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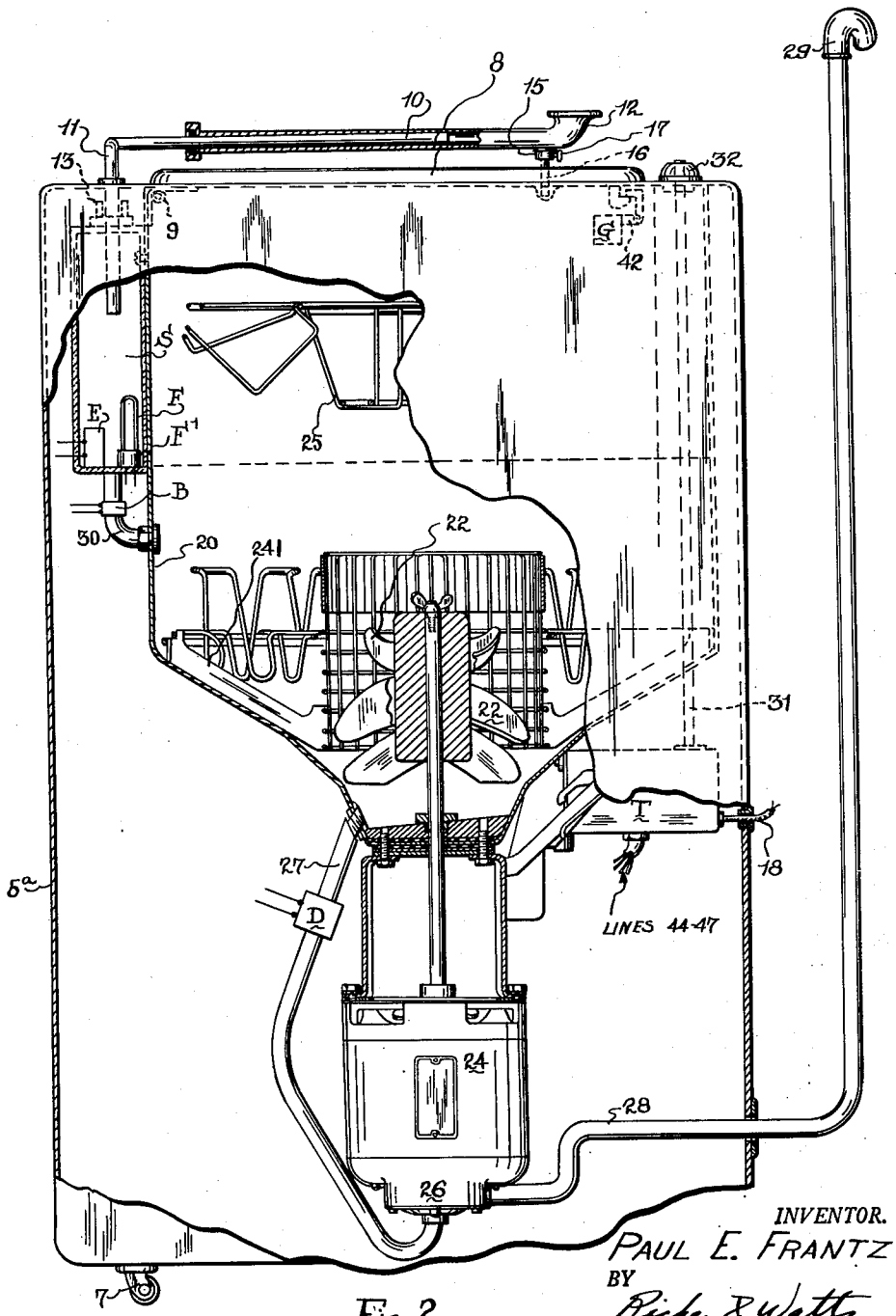


Fig. 2

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2,686,526

DISHWASHER

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7 Claims. (Cl. 134—57)

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This invention relates to dishwashing machines and more particularly to an improved portable type domestic dishwashing machine.

Numerous efforts have been made to provide a domestic dishwashing machine that will satisfactorily wash the dishes and which may be constructed so as to be sold within a price range acceptable to the average householder. Most of the prior art dishwashing machines—more particularly the portable type—have presented certain difficulties in connection with their use and are so constructed and arranged that it is difficult to provide sufficient water at the proper temperature for doing a satisfactory job of washing the dishes. Many of the difficulties associated with the prior art devices grow out of a construction which requires the machine to be connected so that it is subjected to the domestic water line pressure which in many cases exceeds 100 pounds per sq. inch. It is usual in the portable type of dishwashing machine to provide a coupling or adapter which is intended to be connected to the fresh water supply and to remain connected to that supply throughout the dishwashing cycle. A part of the difficulty encountered in machines of this type is that there is such a wide variety of kitchen faucets that it is difficult or impossible for the dealer to carry adapters that will satisfactorily connect the filling hose to the kitchen faucet. Another difficulty grows out of the wide use of the swing type of mixing faucet wherein the hot and cold water are directed through a swing nozzle mounted on the sink. The pivotal connection for this type of nozzle is not intended to be subjected to the domestic water line pressure and the result of coupling the adapter to the swing type faucet is that large quantities of water spray out through the pivotal connection in the faucet. Another defect common to prior art machines relates to the temperature of the water supply. In the average household there is a substantial length of pipe between the domestic hot water heater and the kitchen sink where the dishwashing machine is intended to be used. Because of this length of pipe between the heater and the point of use, much of the heat in the water in the pipe is dissipated during the time elapsed between the washing operation and the rinsing operation. Thus, even though the housewife should let the hot water run until it has reached its maximum temperature and uses water at this temperature for the washing operation, the water available for the rinse will be cooled in the pipe by the time the washing operation is completed.

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It has been proposed that the dishwashing machine be provided with thermostatically controlled mixing valves so that the rinse water will be by-passed until it has reached its maximum temperature, but such expedients waste water and disrupt the timing cycle where an automatic timer is used to effect the various operations.

It is among the objects of my invention to provide a portable dishwashing machine that may be used without coupling the machine with pressure type connections to the domestic water supply and wherein the water required for a complete cycle of washing and rinsing is stored in the machine under atmospheric pressure and wherein the water from the storage supply is delivered into the dishwashing compartment at the optimum temperature for dishwashing operations.

It is a further object of my invention to provide a portable dishwashing machine according to the preceding object, which is provided with a gravity filled water storage tank and wherein the tank is constructed to store and heat a sufficient quantity of water to carry out a complete dishwashing and rinsing cycle.

It is a further object of my invention to provide a dishwashing machine wherein a storage tank in the machine is connected to a rigid filler conduit pivoted on the machine so that the conduit may be moved from a storage position parallel to a surface of the machine to a filling position where said conduit projects laterally from the machine.

It is a further object of my invention to provide a dishwashing machine according to the preceding object wherein the end of the conduit remote from its pivotal connection with the machine is detachably secured to the machine so that the conduit may serve as a convenient handle for tilting and moving the machine.

It is a further object of my invention to provide a dishwashing machine having a gravity filled storage tank, a gravity filled dishwashing compartment, and a timer and timer controlled valves constructed and arranged so that the machine will periodically discharge measured quantities of water from the storage tank into the dishwashing compartment and from the dishwashing compartment to the drain, open the cover for the dishwashing compartment, and dry the dishes without further attention on the part of the operator after the storage tank is filled and the control for the machine turned to the "on" position.

Further objects and advantages relating to low

cost, simplicity of construction, and convenience in operation will appear from the following description and appended drawings wherein:

Fig. 1 is a perspective view of the dishwashing machine of my invention arranged alongside a conventional kitchen sink;

Fig. 2 is an elevation with parts in section of the machine shown in Fig. 1;

Fig. 3 is a diagrammatic showing of the control apparatus for the dishwasher of my invention;

Fig. 4 is a plan view of the control knob showing the cycle of operations of the machine; and

Fig. 5 is a perspective view with parts broken away showing a modified form of filler tube and handle.

Referring to the drawings, the machine is indicated in Fig. 1 in its entirety as 5. It preferably comprises a rectangular upright cabinet about 31 inches high so that the upper surface thereof will be in about the same plane as the conventional household sink indicated at 6. The outer casing 5a of the machine is supported by casters 7 so that it may be moved about from place to place in the home or apartment. The outer casing 5a is provided with a cover as at 8 hinged along one edge as at 9 (Fig. 2). The hinges are preferably of the spring biased type so that when the cover latch 42 is released, the cover is raised to an open position.

At the top of the cabinet and at one corner thereof is mounted the filler conduit 10 which comprises a telescopic tube turned downwardly at the left-hand end as at 11 and turned upwardly at the right-hand end as at 12. The down-turned end 11 is telescoped inside an inlet tube 13 which leads to the fresh water storage tank S. The right-hand end of the tube 10 is enlarged as at 12 in the fashion of a funnel so that when the tube 10 is swung from the full line position shown in Fig. 1 to the dotted line position, the portion 12 serves to catch the water from the kitchen sink faucet 14 disposed thereabove. It will be understood that the telescoped arrangement as at 11—13 permits the conduit to be raised or lowered bodily as well as pivot so as to accommodate different height sinks and different vertical positions of faucets. At the underside of the conduit at the end remote from the pivotal connection at 11, a cup-like recess or boss 15 is provided. When the conduit 10 is moved to its storage or full line position, the boss 15 is brought into alignment with a projecting pin 16, the upper end of which is received by the boss 15. The coupled relation of pin 16 and boss 15 may be maintained by a thumbscrew 17 carried by the boss; and when the thumbscrew 17 is tightened, it will be noted that the conduit 10 provides a convenient handlebar whereby the machine may be tilted or moved about.

The dishwashing compartment is indicated as at 20 and comprises an open-topped receptacle with the bottom thereof tapering toward the center; and said compartment is mounted in the cabinet 5a so that it is spaced from the rear wall and the left-hand side wall whereby the cabinet may accommodate the storage tank S which embraces two sides of the washing compartment 20. Preferably the storage tank S is made of fiberglass so as to minimize the loss of heat due to radiation and because of the dielectric advantages of such material. The storage tank may be molded under heat and pressure by using a preform of matted glass fibers and an unsaturated polymerizable resin as will be understood by those skilled in molded resin art. A water impeller 22 is rotatably mounted at the bottom in the center of the dishwashing compartment. The impeller is connected by shaft 23 to a motor 24 mounted therebeneath. During the washing and rinsing operations the water in the dishwashing compartment is thrown upwardly against the dishes contained therein as will be understood by those familiar with this art. A dish rack 24 is mounted in the lower part surrounding the impeller and a silverware and glass rack 25 is mounted thereabove. The rack 24 is supported by the bottom of the container 20 and the rack 25 may be detachably supported from the sidewall of the container 20.

A drain pump indicated at 26 is mounted on the lower end of the motor shaft and a drain conduit 27 leads from the bottom of the container 20 through solenoid operated valve D to the inlet of the pump. The outlet for the pump is connected to a flexible conduit 28 which terminates at a gooseneck 29 adapted to hang over the edge of the sink as shown in Fig. 1. The water for the dishwashing operations is conducted from the storage tank S into the container 20 by a conduit 30 which has intermediate its ends a solenoid operated valve B. The storage tank S is also provided with an electric heating element F which along with circuit 44 is constructed and arranged by way of thermostat control E to maintain the water in the storage tank S at a predetermined optimum temperature, such as for instance 180 degrees Fahrenheit.

The timer indicated at T is provided with a vertically extending control shaft 31 which terminates exteriorly at the top of the cabinet in control knob 32. The mechanical details of the timer form no essential part of the instant invention and may be of a type currently used in this and related arts such as, for instance, the type disclosed in the patent to B. W. Jones 2,155,271, April 18, 1939. Such timers are ordinarily provided with a motor and reduction gears arranged to rotate a series of cams. The cams in turn make and break the electrical circuits required to operate the solenoid fill and drain valves, the heating element, and the starting and stopping of the main motor. The cams referred to may be selected as to number and shape so as to carry out the desired "On" and "Off" time of the electrical elements thereby controlled. In the sectional view of Fig. 2, the wires leading to the various controlled elements have been omitted for purposes of clarity of disclosure; and Fig. 3 diagrammatically shows the connections between the controlled elements and the timer. Fig. 3 illustrates diagrammatically the cams, switches and circuits employed to automatically carry out the dishwashing operations.

In the operation of the machine made according to my invention the filler tube 10 is swung beneath the kitchen sink faucet 14 and the storage tank S is filled. The dishes to be washed are placed in tank 20, detergent added and the cover closed. Thereafter the tube 10 may be swung to its storage position and the sink and faucet thus made available for other purposes. The control knob 32 at the top of the machine is turned from the "Off" position as indicated in Fig. 4 to the "On" position. The knob by means of shaft 31 running to the timer, turns the cam C2 of the timer (Fig. 3) so that the switch S2 is closed and the line voltage is available through line 44 for the heating of the resistance heating element F

disposed in the storage tank. Preferably the heating element F includes a thermostat F' which opens the heating element circuit at some predetermined high temperature so as to prevent burning out of the heating element circuit or damage to the fiberglass tank S. When the water in the storage tank S has reached the predetermined optimum temperature, such as for instance 180 degrees, the normally open thermostat switch E in line 45 closes so as to start the timer motor T–1 and the main motor 24. As the timer motor continues to run, it turns the cam C1, which through the switch S–1 and line 46 maintains the main motor 24, and the timer motor T1 in operation even though the thermostat E should return to its open position. It will be understood that the timer motor and the main motor continue to run throughout the washing, rinsing, and drying cycle and that said motors are shut off when the timer control knob and cam C1 reach the "Off" position.

The continued operation of the timer motor turns cam C5 so that the high point C5*a* thereon closes the switch S5 and through line 47 operates the solenoid valve B thereby directing hot water from the tank S into the dishwashing tank 20. Since the water in the storage tank S is under atmospheric pressure, the quantity of water to be discharged into the tank 20 may be accurately measured by the dwell of the cam portion C5*a*. When the predetermined quantity of hot water has been discharged into the water tank 20, the cam C5 is moved by the timer to a low point thereon, the switch S5 opens line 47 and the solenoid valve B returns to its closed position. The dishes stored on the racks 241—25 are washed for a period determined by the timer and thereafter the high point C3*a* on cam C3 actuates the switch S3 so as to open the drain valve D through line 48 and discharge the water from the tank 20 into the sink. The dwell of the cam portion C3*a* is such that the switch S3 remains closed until all of the wash water has been discharged into the sink. The cam C3 then moves to a low position closing valve D and thereafter the cam portion C5*b* on cam C5 operates switch S5 and valve B so as to discharge the first rinse water into the washing tank 20. When the measured quantity of hot rinse water has been transferred from tank S to tank 20, the valve B closes and the first rinsing operation is carried on by the impeller 22.

After the first rinse is completed as determined by the movement of the cams the high point C3*b* on cam C3 is effective to close switch S3 and again drain the dishwashing tank 20. Thereafter the filling for the second or last rinse is effected by the cam portion C5*d*, switch S5 and valve B. At the conclusion of the drain for the second rinse, the cam C4 is turned by the timer so that the high point thereof closes switch S4 which through line 49 operates the solenoid G and releases the cover latch. The cover moves to open position in response to the spring hinge 9 and the impeller continues to operate for a drying period such as indicated on the knob control of Fig. 4.

It will be understood that the cycle above described may be varied by using one rinse instead of two as indicated and that mechanically operated valves may be substituted for the electrically operated valves I have shown and described.

The dishwashing machine is now ready for another complete cycle or it is ready to be moved after swinging the conduit 10 to its storage position and hanging the gooseneck 29 in the opening 29A on the top of the machine cabinet. It will be observed from the foregoing description that when the dishwashing cycle is ready to start, the conduit 10 may be swung from the faucet 14 and into its storage position and the entire cabinet rolled away from the front of the sink within the limits provided by the length of the drain hose 28. Thus the sink and faucet are available to the housewife throughout the dishwashing cycle for food preparation or other household tasks.

The filler tube made according to my invention is well suited for attractive design as a handle for the manipulation of the machine. As shown in Fig. 5 the fillter tube 50 of this modification is telescopically constructed as described in connection with the form shown in Fig. 1. In this modification, however, the portion 51 of the filler tube 50 which is designed to swing beneath the faucet is rotated on its horizontal axis and the open end thereof detachably secured to the top of the dishwasher cabinet by a pivoted cam type of latch 52. The other end of the filler tube 50 is provided with a shroud as at 53 which surrounds that portion of the filler tube which extends downwardly into the storage tank. It will be understood that a filler tube which also serves as a handle for moving the machine about may be mounted on a vertical wall of the machine or upon a storage tank secured to a vertical wall of the machine, as well as on the top as shown in the drawing.

Although I have disclosed in the drawings and have described one form of my invention in considerable detail, it will be appreciated by those skilled in the art that numerous modifications may be made therein without departing from the scope of the invention as defined by the following claims.

What is claimed is:

1. A gravity filled dishwashing machine wherein the water for washing flows by gravity into a storage tank open to atmospheric pressure and thence flows by gravity into a dishwashing compartment and thence flows by gravity to a drain pump beneath the dishwashing compartment, comprising a tubular conduit having an upwardly disposed opening at one end adapted to be arranged beneath a water faucet and being connected at its other end to the top of said storage tank, and a conduit connecting said storage tank and said dishwashing compartment to discharge storage water into said compartment, and a conduit establishing a fluid flow passageway between the bottom of the dishwashing compartment and said drain pump, said second named conduit including a valve maintained in a closed position in response to predetermined low temperatures in said storage compartment.

2. A dishwasher comprising a cabinet, a dishwashing compartment therein, a water storage tank in said cabinet, means for supplying water to said storage tank, said storage tank being provided with a conduit leading to said dishwasher compartment whereby water stored in said tank may be directed into said dishwasher compartment, a valve in said conduit adapted to be selectively opened and closed by a timing device, and a timing device adapted to be started responsive to a predetermined high temperature of water in said storage tank for controlling said valve whereby measured quantities of water are directed to said dishwasher compartment.

3. A dishwasher comprising a casing, a liquid-holding dishwashing compartment mounted therein, a storage compartment in said cabinet mounted adjacent the dishwasher compartment and secured thereto, the bottom wall of said storage compartment being disposed vertically above the bottom wall of the dishwasher compartment, a conduit leading from the storage compartment into the dishwashing compartment, a solenoid operated valve in said conduit, an electric heating element and a temperature responsive switch in said storage compartment, an electric motor-driven dishwashing device in said dishwashing compartment and electric power circuits connecting said switch, valve and motor whereby said valve is opened and said motor driven device operated in response to a predetermined elevated temperature in said storage compartment.

4. In a dishwashing machine, a cabinet, a washing compartment in the cabinet adapted to contain articles to be washed, a water storage compartment in the cabinet having sufficient capacity for washing-rinsing operations during the dishwashing cycle, manually controlled means for supplying water to said storage compartment, heating means for said storage compartment, conduit means extending between the storage and washing compartments, a valve controlling flow of water through the conduit means from the storage compartment to the water compartment, a timer operable by an electric motor controlling selectively opening and closing of said valve, and a thermal switch responsive to a predetermined temperature in said storage compartment for energizing said motor.

5. The dishwashing machine as defined in claim 4 and wherein electric motor powered rotating washing means are provided in the washing compartment to direct water over articles

therein, and switch means actuated by said timer are adapted to establish a circuit energizing the motor of said washing means.

6. The dishwashing machine as defined in claim 4 and wherein a drain conduit extends from the washing compartment, a pump is disposed in said conduit, an electric motor is provided for driving the pump, and switch means actuated by the timer establishes a circuit to said pump motor.

7. The dishwashing machine as defined in claim 4 and wherein the heating means for said storage compartment comprises an electric heating element, a thermostat responsive to a predetermined high temperature in the storage compartment is provided for controlling the heating element, and the thermal switch is operable independently of said thermostat.

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