Jan. 3, 1956 W. SMITH, JR 2,729,219

DISHWASHING MACHINE

Filed Feb. 19, 1952 3 Sheets-Sheet 1

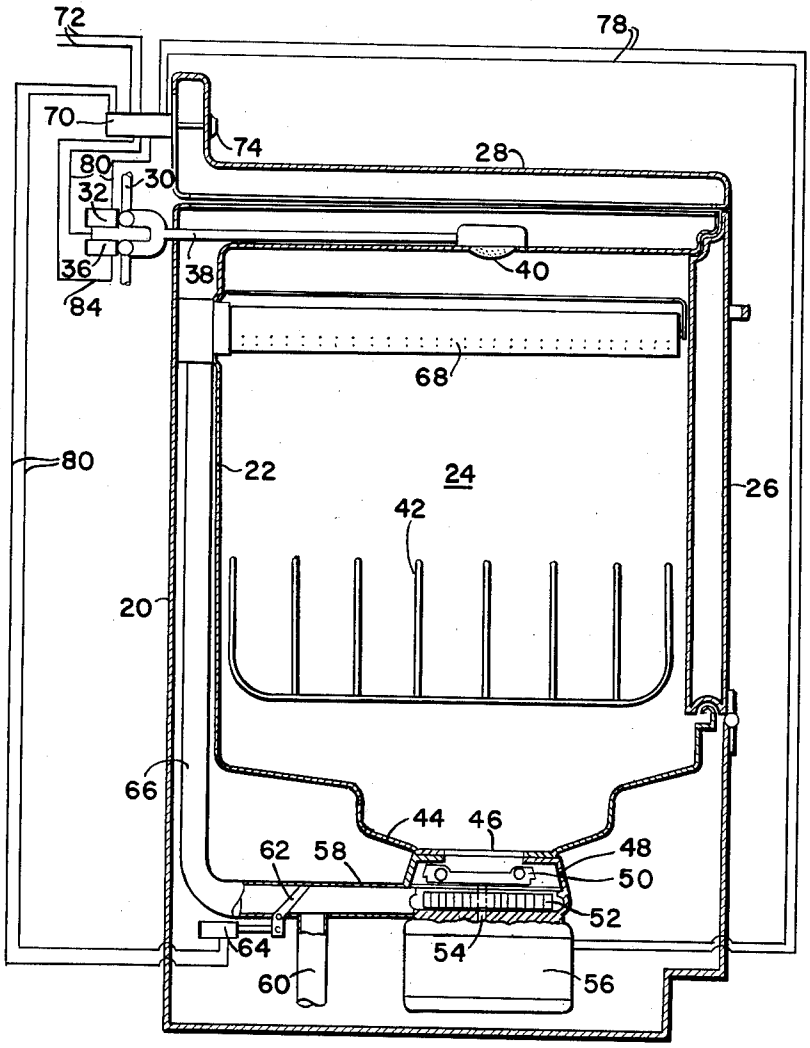


Fig. 1

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Filed Feb. 19, 1952 3 Sheets-Sheet 2

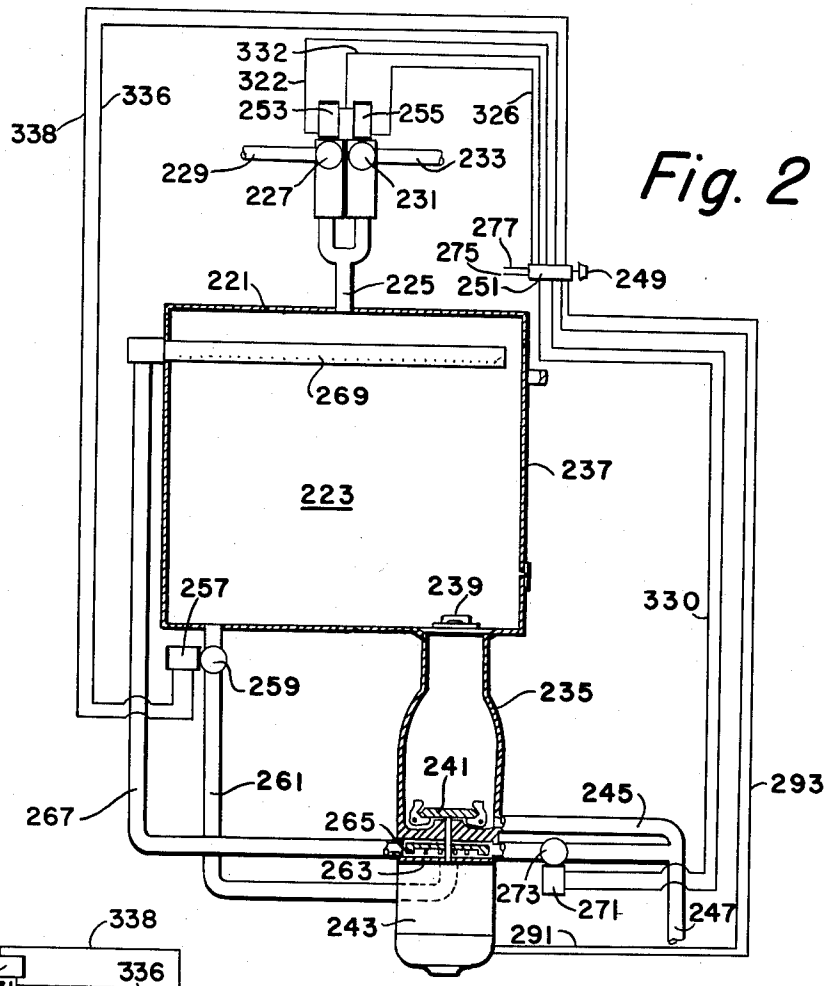


Fig. 2

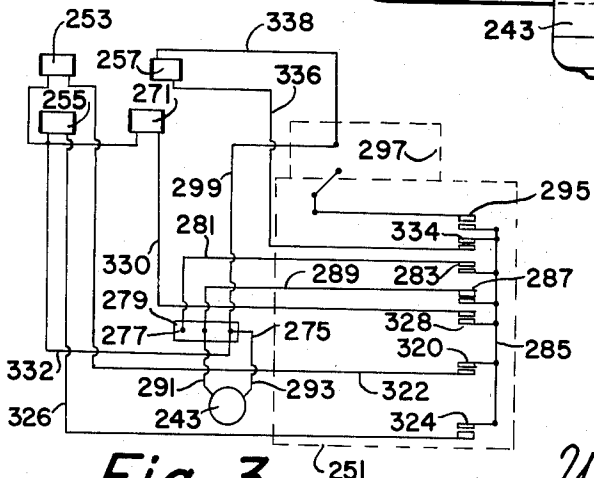


Fig. 3

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Filed Feb. 19, 1952 3 Sheets-Sheet 3

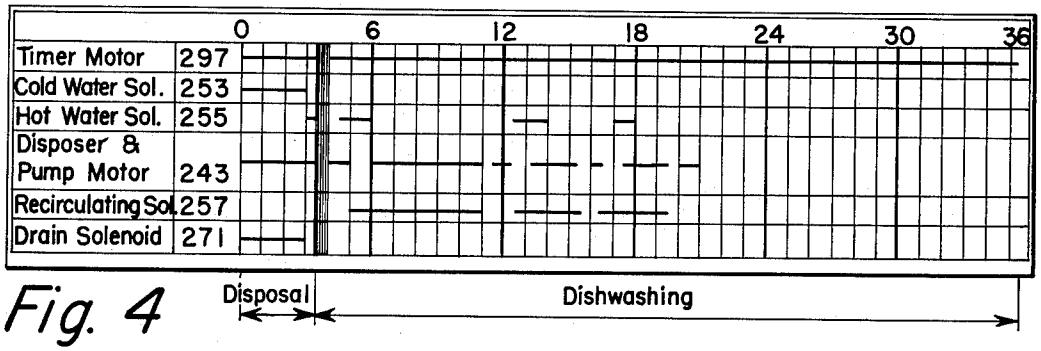


Fig. 4

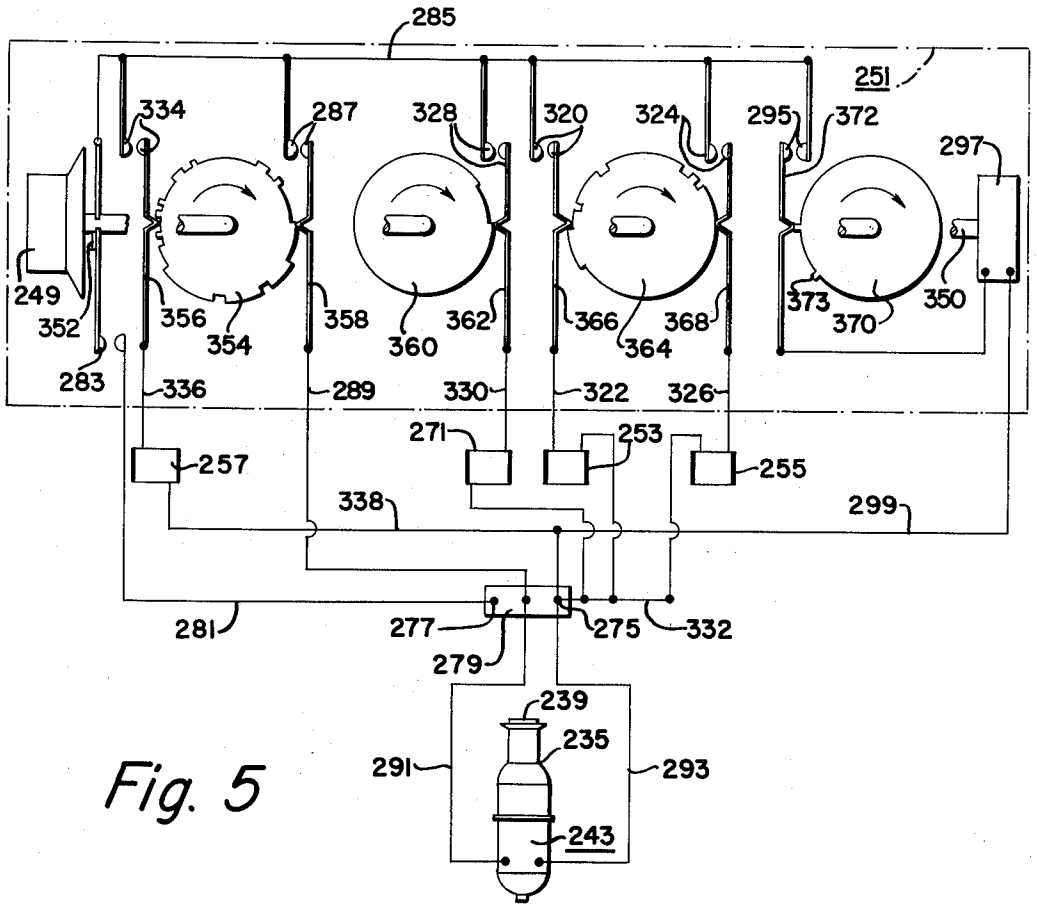


Fig. 5

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DISHWASHING MACHINE

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Application February 19, 1952, Serial No. 272,391

5 Claims. (Cl. 134—95)

This invention relates to a domestic appliance and more particularly to dishwashing machines for domestic kitchens.

Dishwashing machines now being sold require that a portion of food residue be scraped from the dishes before being placed in the dishwashing machine. To many people, this scraping of the dishes and the disposal of the food wastes are the most unpleasant part of cleaning dishes.

It is an object of my invention to provide a dishwashing machine in which this unpleasant part of cleaning dishes is minimized.

It is another object of my invention to provide a dishwashing machine in which the food wastes may be readily disposed of.

It is another object of my invention to provide a dishwashing machine in which food wastes may be readily washed off the dishes and disposed of within the machine at the start of the dishwashing operation.

It is another object of my invention to provide a dishwashing machine in which the shredder of a food waste disposal unit and the water flow system are directly operated by a single motor.

It is another object of my invention to provide a dishwashing machine in which the liquid spray circuit for dishwashing is used also for flushing the food waste disposal unit.

These objects are attained by providing a dishwashing machine in which the dishwashing chamber is provided with an outlet leading to a food waste disposal unit having a shredder for grinding food wastes so that they may be readily flushed into the drain. In one form this shredder connects directly into the pump which can discharge the food wastes to the drain during the initial part of the washing operation and by a suitable valve the washing liquid is recirculated after the food wastes are disposed of for additional cleaning of the dishes after the food wastes are disposed of. The shredder and the pump are driven by the same motor and the water supply and circulating system are used for flushing the food wastes off the dishes and through the food waste disposal portion.

In a second form, a single motor drives the shredder for the disposal unit and the pump for dishwashing located in separate circuits. However the water supply system used for dishwashing is also used for flushing the food waste disposal unit.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical sectional view through a dishwashing machine embodying a food waste disposal element for directly disposing of the food wastes from the dishes in the machine;

Fig. 2 is a vertical sectional view partly diagrammatic of another form of dishwashing machine in which a food waste disposal unit is made a part of the machine;

Fig. 3 is a wiring diagram for the dishwashing machine shown in Figure 2;

Figure 4 is a chart showing the periods during which the contacts illustrated in the wiring diagram in Figure 3 are closed to secure operation of the various electrical devices controlled by the contacts; and

Figure 5 is an enlarged view of the wiring diagram including in addition the cams and cam followers operated by the timing motor and the knob for controlling the switch contacts.

Referring now to the drawings and more particularly to Fig. 1, there is shown a dishwashing machine including an outer shell 20 within which there is provided an inner shell 22 enclosing a dishwashing chamber 24. This dishwashing chamber is provided with a door 26 at the front. Above the outer shell 20 there is provided a table top 28 similar in appearance to other cabinets provided for the kitchen. The dishwashing machine includes a cold water supply source 30 controlled by a solenoid operated valve 32 and a hot water supply source 34 controlled by a solenoid operated valve 36. The outlets of the valves 32 and 36 are connected by a common pipe 38 to a spray head 40 fastened to the top of the inner shell 22 as shown in Figure 1. Within the dishwashing compartment 24 there is provided a rack 42 upon which dishes, silverware and pots and pans may be placed. The bottom of the inner shell 22 is provided with a sump 44, the bottom of which is provided with a discharge outlet 46.

The dishes, silverware and pots and pans may be placed on the rack 42 without being cleaned or scraped in the usual manner. The food upon these dishes, silverware and pots and pans is washed off by the initial spray from the spray head 40 and washed into the sump 44 and through the discharge outlet 46. To make it possible for this food waste to be discharged directly into the drain, there is provided a simplified food waste disposal unit 48 directly beneath the outlet 46 and including a shredder or grinding element 50 shown diagrammatically for grinding the food wastes into particles of such size that it may be pumped directly to the drain. The food waste disposal unit 48 has a central outlet discharging into the interior of a centrifugal pump 52 mounted upon the same shaft 54 as the shredder 50. This shaft 54 is driven by an electric motor 56 beneath the pump 52. To first dispose of the food wastes the pump 52 discharges the mixture of cold water and ground food wastes into an outlet conduit 58 which connects with the discharge conduit 60. A two-way valve 62 is normally held to connect the outlet conduit 58 with the discharge conduit 60.

After the food wastes are washed off of the articles in the dish rack 42 and discharged into the discharge conduit 60, the cold water solenoid valve 32 is deenergized to shut off the cold water and the hot water solenoid valve 36 is energized to cause hot water from the pipe 34 to be sprayed from the spray head 40 for a limited period of time. After the hot water has been sprayed into the dish washing chamber a sufficient length of time to provide an adequate amount of hot water in the washer, the operating solenoid 64 for the two-way valve 62 is energized to move the valve 62 to a position closing the discharge conduit 60 and causing the discharge conduit 58 to be connected to the vertical conduit 66 connecting with the horizontal spray tube 68 in the upper portion of dishwashing chamber 24. The motor 56 continues to operate, recirculating the hot washing liquid by withdrawing the liquid from the sump 44 and discharging it from the spray tube 68.

Through the second operation the dishes are thoroughly cleaned and sterilized. After this recirculation of hot washing liquid is completed, the solenoid 64 is deenergized to cause the valve 62 to return to its position shown in Fig. 1 so that the discharge from the pump 62 is connected to the drain 60 so as to remove all of the hot washing solution carrying the residue of the material which was on the plates into the drain.

Following this there is a hot water rinse period in which the solenoid valve 36 is opened to spray hot water from the spray head 40 onto the articles on the rack 42 and the solenoid valve 64 is later energized to move the valve 62 to a position closing the drain conduit 60 and recirculating the hot rinse water over the dishes to completely clean and sterilize the dishes. After sufficient hot water has been supplied, the valve 36 is deenergized and the supply of hot water is cut off. Recirculation of the hot rinse water continues until all the residue of the washing liquid and food particles are removed from the dishes. Finally the solenoid valve 64 is deenergized to allow the valve 62 to move back to the position shown in Figure 1 so that the hot rinse water is discharged through the drain conduit 60 to terminate the dishwashing operation.

The dishwashing operation is preferably under the control of a suitable timed electrical control switch means 70 connected with the supply conductors 72. This timed control switch means 70 has an operating knob 74 which makes it possible to start the machine at any point in the operating cycle and also serves to indicate the particular part of the operating cycle of the dishwashing machine which has taken place. The timed control switch 70 controls the supply of electric energy through the conductors 78 to the motor 56. It also controls the supply of electrical energy through the conductors 80 to the solenoid 64. The conductors 82 and 84 connect the timer switch 70 with the respective solenoids of cold water solenoid valve 32 and the hot water solenoid valve 36.

If the dish rack 42 is removed the machine may be used for food waste disposal other than in connection with washing dishes. To do this the food waste merely is dumped into the sump 44 and the knob 74 turned to the starting position for the dishwashing operation. This will cause cold water to be sprayed from the spray head 40 under the control of the solenoid operated valve 42. This will wash the food waste through the outlet 46 into the food waste disposal unit 48. At the same time, the motor 56 is operated which will operate the shredder 50 of the food waste disposal unit 48 to grind the food waste, and the pump 52 will discharge the ground waste through the outlet 58 into the drain conduit 60.

Referring now more particularly to Figure 2, there is shown diagrammatically another form of dishwashing machine including a shell 221 inclosing a dishwashing chamber 223. The top wall of the shell 221 is provided with a liquid spray conduit 225 connecting through the cold water solenoid valve 227 with the cold water supply 229 and through the hot water solenoid valve 231 with the hot water supply 233. The bottom of the shell of the dishwashing compartment 223 is provided with a food waste disposal unit 235 near the door 237 at the front of the compartment 223. The top of the food waste disposal unit 235 is provided with a removable lid 239. At the bottom of the food waste disposal unit 235 there is provided a shredder or grinding element 241 directly connected to the drive shaft of an electric motor 243. The food waste disposal unit 235 is connected at one side adjacent the shredder 241 to an outlet conduit 245 connecting directly with the drain conduit 247.

When dishes with food thereon are to be cleaned they are placed in the dishwashing chamber 223 and the lid 239 is removed. The control knob 249 of the timing electrical control switch 251 is moved to a position wherein the solenoid 253 of the cold water valve 227 is energized to open the valve 227 to wash the food wastes off the dishes into the food waste disposal unit 235. At the same time motor 243 is energized to operate the shredder 241 so that the food wastes are carried into the outlet conduit 245 and the drain conduit 247 to a suitable drain.

After the food wastes are washed from the dishes and other articles to be cleaned in the dishwashing chamber 223, the lid 239 is replaced as shown in Figure 2. The operating knob 249 of the timer controlled switch 251 is moved to a position in which the solenoid 255 is energized to open the hot water valve 231 while the solenoid valve 253 is deenergized to close the cold water valve 227. This flow of hot water continues for a definite period of time under the control of the timer 251. The motor 243 is idle during the initial hot water flow. After a predetermined time interval of hot water flow the timing control switch 251 energizes the solenoid 257 to open the drain valve 259 having its inlet connected at the bottom of the dishwashing chamber 223 and its outlet connected by a conduit 261 to the inlet of a centrifugal pump 263. This pump 263 has its impeller 265 mounted directly on the drive shaft of the motor 243 between the inlet and the shredder 241 of the food waste disposal unit 235. The outlet of the pump 263 is connected by the conduit 267 to the spray tube 269 in the top of the dishwashing chamber 223. The pump 263 circulates hot water through this circuit so that the dishes are provided with a continuous hot water spray for cleansing and spraying the dishes in the dishwashing chamber 223. After the dishes are thoroughly cleaned, the timing control switch 251 energizes the solenoid 271 of the pump outlet disposal valve 273 which connects the second outlet of the pump 263 with the drain discharge conduit 247 to dispose of the hot washing liquid. After the pump 263 has discharged all of the hot washing liquid, the disposal solenoid 271 is deenergized by the timing control switch 251 to close the valve 273.

The timing control switch 251 then energizes the hot water solenoid 255 to open the valve 231 to again supply hot water to the dishwashing chamber 223 while the solenoid 257 is deenergized to close the valve 259. After a sufficient quantity of hot water is provided the solenoid 257 and the motor 243 are again energized to withdraw hot water from the bottom of the dishwashing chamber 223 past the open valve 259 through the conduit 261 to the inlet of the pump 263. This hot water is discharged through the conduit 267 and sprayed through the spray tube 269 to wash the washing liquid from the dishes and to thoroughly rinse and sterilize the dishes. After rinsing is completed the disposal solenoid 271 is energized by the timing control switch 251 to discharge the hot rinse water into the drain conduit 247 after which the motor is deenergized.

The electrical circuits are shown in Figure 3. The supply conductors are indicated by the reference characters 275 and 277. They connect to a terminal block 279. The supply conductor 277 through the terminal block 279 is connected by the conductor 281 with the line switch 283 which is operated by pushing the knob 249 inwardly to close the switch and outwardly to open this switch 283. This switch 283 connects to a common conductor 285. This common conductor 285 is connected by the motor switch 287 through the conductor 289 and the terminal block 279 to the motor supply conductor 291 which connects to the motor 243. A conductor 293 connects the second terminal of the motor 243 with the supply conductor 275 and the terminal block 279.

The common conductor 285 also connects through the timing motor switch 295 with the electrical timing motor 297 which drives the cams in the timer 251 which operate the various switches shown inside the dash outline designated 251 in Fig. 3. The second terminal of the timing motor 297 is connected by the conductor 299 with the terminal block 279 and the supply conductor 275.

The common conductor 285 is connected by the switch contacts 320 and the conductor 322 with the cold water solenoid 253. The switch contacts 324 connect the com-

mon conductor **285** through the conductor **326** with the hot water solenoid **255**. The switch contacts **328** connect the common conductor **285** through the conductors **330** with the pump outlet disposal solenoid **271**. The second terminal of the solenoids **253**, **255** and **271** are connected by a common conductor **332** through the terminal block **279** with the supply conductors **375**. The switch contacts **334** connect the common conductor **285** through the conductor **336** with the solenoid **257** which operates the dishwasher drain valve **259**. The second terminal of the solenoid **257** is connected by the conductor **338** with the conductor **299** which connects to the supply conductor **275**. This control system is merely given as one example of a control system which might be operated to control a dishwashing machine of either of the types shown in Figures 1 and 2 which will dispose of food wastes as well as wash dishes.

Within the timing control switch **251** the timer motor **297** is connected by an operating shaft **350** with the knob **249**. This shaft **350** is rotated either by the timer **297** when it is energized by the electrical circuit or by the knob **249**. The shaft **350** has fixed thereon directly behind the knob **249** a pin **352** for moving the switch **283** to closed position when the knob **249** is pushed toward the timer motor **297**. This shaft **350** is also provided with a cam **354** provided with a follower **356** forming a part of the switch mechanism **334**. This cam has its periphery suitably shaped to close the contacts **334** at the proper times as indicated by the chart Figure 4. On its opposite side the cam **354** is provided with the second follower **358** for closing the motor switch **287**. This cam **334** also has a suitably shaped periphery to close the contacts **287** at the proper times as indicated in Figure 4.

The shaft **350** also has fixed thereon a cam **360** operating a follower **362** for controlling the opening and closing of the contacts **328** for controlling the recirculating solenoid **271** as indicated by the chart Figure 4. The shaft **350** also has a third cam **364** fixed thereon having its periphery engaged by a cam follower **366** operably connected to the contacts **320**. On its opposite side the cam **364** is engaged by the cam follower **368** for controlling the opening and closing of the contacts **324**. The periphery of the cam **364** is so shaped so as to close the contacts **320** and **324** at the proper time as indicated by the chart Figure 4 in order to control the opening of the cold water solenoid **253** and the hot water solenoid **255**. The shaft **350** also has fixed thereon the timer cam **370** having a notch thereon for stopping the operation of the timer **297** at the end of the garbage disposing cycle and also at the end of the dishwashing cycle as indicated by the chart Figure 4. The periphery of this cam **370** is contacted by the cam follower **372** for operating the switch **295**. If it is desired to omit stopping between the disposal period and the dishwashing period the cam projection **373** is omitted.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. A dishwashing machine including a cabinet having walls enclosing a dishwashing compartment, means for supplying a washing liquid to said compartment, a motor, the bottom wall of said compartment being provided with a discharge outlet, a refuse shredder and a pump in said discharge outlet directly connected to said motor, the inlet of said pump being connected to the outlet of said shredder, said pump being provided with a two way outlet provided with a two way valve, a spray means in said compartment connected to one branch of said outlet and a drain connection connected to the second branch of said outlet.

2. A dishwashing machine including a cabinet having walls enclosing a dishwashing compartment, means for supplying a washing liquid to said compartment, a motor, the bottom wall of said compartment being provided with a discharge outlet, a refuse shredder and a pump in said discharge outlet directly connected to said motor, the inlet of said pump being connected to the outlet of said shredder, said pump being provided with a two way outlet provided with a two way valve, a spray means in said compartment connected to one branch of said outlet and a drain connection connected to the second branch of said outlet, a sequential timed control device having means connected to said supply means and said motor and said valve means to open said supply means, energize said motor and operate said valve to connect said pump to said drain, subsequently to operate said valve to connect said pump to said spray means and close said supply means, and later to operate said valve to connect said pump to said drain.

3. A dishwashing machine including a cabinet having walls enclosing a dishwashing compartment, means for supplying a washing liquid to said compartment, a motor, the bottom wall of said compartment being provided with a discharge outlet, a refuse shredder and a pump in said discharge outlet directly connected to said motor, the inlet of said pump being connected to the outlet of said shredder, said pump being provided with a two way outlet provided with a two way valve, a spray means in said compartment connected to one branch of said outlet and a drain connection connected to the second branch of said outlet, a sequential timed control device having means connected to said supply means and said motor and said valve means to open said supply means, energize said motor and operate said valve to connect said pump to said drain, subsequently to operate said valve to connect said pump to said spray means and close said supply means, and later to operate said valve to connect said pump to said drain, said control device having means to finally open said supply means, energize said motor and operate said valve to connect said pump to said drain.

4. A dishwashing machine including a dishwashing container, means for spraying a washing liquid into said dishwashing container, the bottom wall of said container being provided with discharge outlet means, a refuse shredder and a pump connected to said discharge outlet means, a motor for operating said shredder and said pump, conduit means connecting the outlet of said pump to said spraying means and to a drain, means for supplying cold and hot liquid to said container, valve means for controlling the flow through said conduit means either to the spraying means or to the drain, a sequential timed control device having means connected to said supply means and said motor and said valve means to provide a supply of cold liquid to said container and operating said motor and opening said conduit means to the drain for disposing of food wastes and providing a supply of hot liquid to said container and closing said conduit means to the drain and operating said motor to recirculate the liquid through the spray means to wash dishes.

5. A dishwashing machine including a dishwashing container, means for spraying a washing liquid into said dishwashing container, the bottom wall of said container being provided with discharge outlet means, a refuse shredder and a pump connected to said discharge outlet means, a motor for operating said shredder and said pump, conduit means connecting the outlet of said pump to said spraying means and to a drain, means for supplying cold and hot liquid to said container, valve means for controlling the flow through said conduit means either to the spraying means or to the drain, a sequential timed control device having means connected to said supply means and said motor and said valve means to provide a supply of cold liquid to said container and operating said motor and opening said conduit means to the drain for disposing of food wastes and providing a supply of

hot liquid to said container and closing said conduit means to the drain and operating said motor to recirculate the liquid through the spray means to wash dishes and subsequently opening said conduit means to the drain and finally terminating the liquid supply.

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