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DISHWASHING MACHINE

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Fig. 1

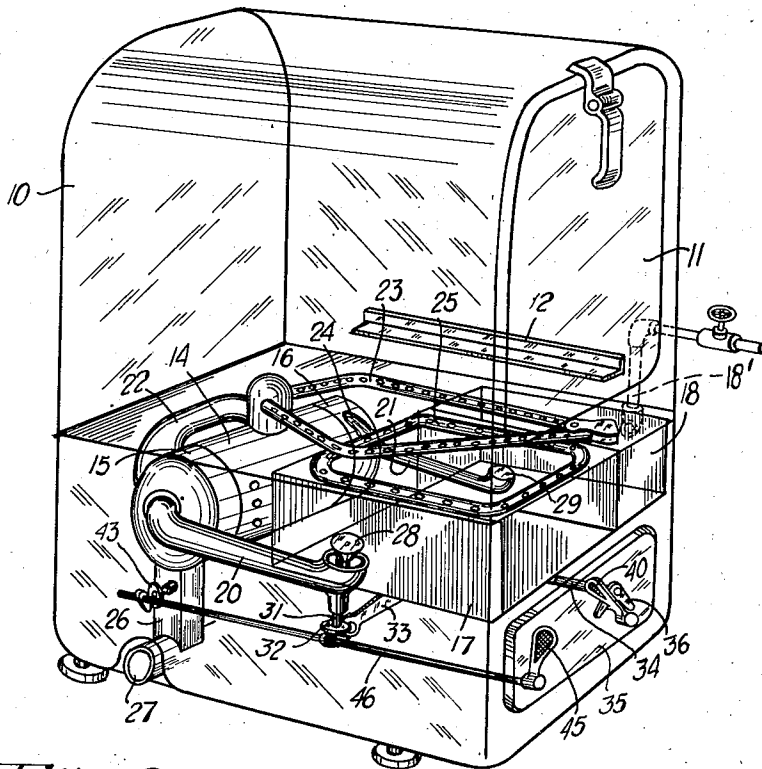
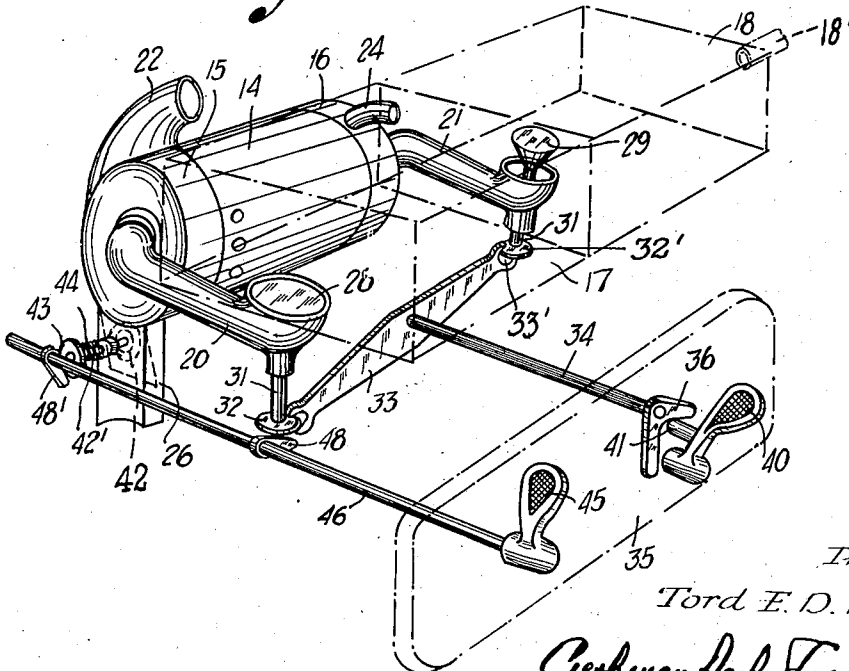


Fig. 2



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DISHWASHING MACHINE

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4 Claims. (Cl. 141-9)

The present invention relates to dish-washing machines having two spraying systems, one for washing liquid and the other for rinsing liquid, as well as a motor driven pump provided in each system.

In dishwashing machines it is of the greatest importance to keep the machine completely pure. A source of contamination resides in the fact that after the washing and rinsing operations are completed, the liquid is removed from the machine only incompletely, such remaining liquid which is more or less contaminated due to its contact with the dishes, has a tendency of falling into putrefaction, thus causing the dishes in a subsequent washing operation to be infected and to have a disagreeable smell and taste. Only by observing the outflow of the liquid from the machine can a safe control of the machine being completely emptied from liquid, be attained, and in machines of certain types such an observation is impossible.

The principal object of the invention is to provide a control device for the valves of the machine which insures a simple, efficient and positive manipulation of the valves and which also effects the complete emptying of the liquid from the machine at the end of each operation.

Another object of the invention is to provide a dishwashing machine of the class described in which a flow control valve and a discharge valve of the washing system are connected with each other in such manner that the flow control valve is opened when the discharge valve is opened. Consequently, emptying of the washing system will take place when the flow control valve is opened, with the result that no liquid will be left in the system, nor in the whole machine as the rinsing system discharges into the washing system.

These and other objects of the invention will be apparent according as the following description proceeds reference being had to the accompanying drawing in which an embodiment of the invention is shown by way of example.

In the drawing—

Fig. 1 is a perspective phantom view of a dishwashing machine according to a first embodiment of the invention;

Fig. 2 is a somewhat diagrammatic view of the control device shown in Fig. 1 on an enlarged scale.

According to Fig. 1 the dish-washing machine is enclosed in a casing of substantially parallelepipedic shape having a downwardly swingable door 11. The two spraying systems for washing

liquid and rinsing liquid are as a whole located in the lower portion of the casing, whereas the upper portion thereof forms a spraying chamber. Thereby a basket or the like supporting the dishes and introduced into the spraying chamber on guides 12 (only one guide shown in Fig. 1) will be sprayed exclusively from below by washing liquid as well as by rinsing liquid.

The spraying systems comprise each a motor driven pump, a liquid tank and a spraying device (see also Fig. 2). The housing 14 of an electric motor and the housings 15 and 16 of the two pumps for washing and rinsing liquid arranged one on either side of the motor are formed as a unit located at the side of a receptacle which by means of a partition is divided into two spaces or tanks, an open tank 17 for washing liquid and a closed tank 18 for rinsing liquid. Fresh liquid is supplied to tank 18 through conduit 18'. Communicating with a central inlet of each pump is one end of a rigid conduit 20 and 21, respectively, the other end of which communicates with an opening in the bottom of the washing tank 17 and the rinsing tank 18, respectively. Connected with a peripheral outlet of the washing pump is a pipe 22 communicating with the spraying device for washing liquid which in the embodiment shown comprises a spray pipe 23 swingable to and fro. Connected with a likewise peripheral outlet of the rinsing pump is a pipe 24 communicating with the spraying device for rinsing liquid which is shown to comprise a stationary spray pipe 25 arranged along the upper edges of the washing tank 17. At its lowermost point the washing pump is provided with an outlet pipe 26 communicating with a discharge pipe 27.

At their end connected with the respective liquid tank, the rigid conduits 20 and 21 are each formed as a valve seat for a flap valve having a spherical valve body 28 and 29, respectively, secured to a spindle 31 and 31' respectively, guided in a stuffing box on the conduit and each of said spindles carries a disk 32 and 32' respectively at its lower end. A double-armed lever 33 engages said disks 32 and 32' at its forked-shaped ends 33'. The lever is fixed on a shaft 34 guided in a switch-board 35 arranged on the machine casing 10, the shaft 34 carrying at its end projecting outside said switch-board an angle piece 36. A handle 40 mounted on the switch-board has a finger 41 adapted to co-operate with said angle piece 36 in a manner to be described.

A valve of any known type 42 is provided in the discharge pipe 26 of the washing pump 15, 55

the spindle 42' of said valve passing through a stuffing box on said pipe and carrying at its projecting end a disk 43. A spring 44 arranged around the spindle 42' urges the valve towards closed position. A handle 45 mounted on the switch-board 35 is fixed on a shaft 46. Secured to the shaft 46 are spaced arms 48 and 48'. The arm 48 is arranged to engage the disk 32 on the spindle 31 of the suction valve 28, while the arm 48' engages the disk 43 on the spindle 42' of the discharge valve 42.

The operation is as follows:

In Fig. 1 the machine is shown in washing position, the finger 41 on the handle 40 bearing on the one arm of the angle piece 36 and the suction valve 28 of the washing pump being open, the discharge valve of said pump being closed and the suction valve 29 of the rinsing pump being closed. In this position the handle 45 assumes its neutral position in which the arms 48 and 48' are out of engagement with the disks 32 and 43. When the motor is started the washing pump is set into function causing the dishes to be sprayed by jets issuing from the swinging spray pipe 23. When after the washing is completed the machine is to be set into rinsing position handle 40 is turned in clockwise direction from the position shown in Fig. 1 to that illustrated in Fig. 2. When the finger 41 is brought into engagement with the other arm of angle piece 36, said piece as well as shaft 34 are turned in counter-clockwise direction causing the lever 33 to close valve 28 and to open valve 29 due to the engagement with the disks 32 and 43. Thereby the washing pump is set out of function and the rinsing pump is set into function, causing the dishes to be rinsed by jets issuing from the spray pipe 25, which discharges into the washing tank 17.

In the two set positions of handle 40 finger 41 should assume such a position in relation to the co-operating surfaces of the angle piece 36 that the angle between them forms on the one hand a plane through the tangential point of the finger 41 and the axis of rotation of the handle 40 and on the other hand is tangent to the surface of the angle piece 36 when the tangential point has attained or surpassed 90 degrees during the turning movement. Thereby lever 33 and, thus, the valves 28, 29 are locked in set position so that any torque in shaft 34 or in any elastic member provided in the transmission can not disturb the setting of the valves. The surfaces of angle piece 36 co-operating with finger 41 should, preferably, have such a curvature that in set positions of handle 40 the centre of the curves coincides with the axis of rotation of the handle. Thereby any turning of the handle beyond the set position does not cause any further turning of the shaft 34.

When after the rinsing operation is completed the machine is to be emptied handle 40 is shifted to washing position (Fig. 1) causing the suction valve 28 to be opened. Then handle 45 is turned in counter-clockwise direction causing arm 48' on shaft 46 co-operating with spindle 42' of the discharge valve 42 of the washing pump to press said spindle inwardly so that the valve 42 is opened resulting in the liquid in the washing pump 15, washing tank 17 and spray pipe 23 flowing out through the discharge pipe 27. If after the rinsing operation is completed handle 40 is not set into washing position and, thus, suction valve 28 of washing pump is not opened before handle 45 is turned into discharge posi-

tion, valve 28 is automatically shifted into this position by arm 48 which co-operates with disk 32 lifting valve 28 into open position, when handle 45 is turned into discharging position.

Thereby the machine will be fully emptied from liquid in spite of the setting of the suction valves 28, 29 taking place independently of that of the discharge valve 42, which arrangement per se is of importance with regard to the alternate opening and closing of said suction valves. This safety means is of great importance as the operator as a rule cannot observe how much liquid is flowing out from the machine at the opening of the discharge valve and, thus, cannot ascertain, whether the machine is empty or not. The advantages of the safety means is apparent particularly in machines of those types such as machines built into a drainboard or other worktable in which the liquid outlet is masked.

Although in the embodiment shown the connections between the spraying devices and the pumps are controlled by suction valves, it is also within the scope of the invention to control said connections by valves provided in the pressure conduits of the pumps.

What I claim is:

1. A dishwashing machine, comprising a spraying system for washing liquid, a spraying system for rinsing liquid, a pump in each system, a flow control valve in each system, a discharge valve in the washing system, and means operable to connect said flow control valves and said discharge valve, said means comprising manipulating means to actuate the valves so as to open and close the flow control valves alternately and to open the flow control valve of the washing system when the discharge valve is opened.

2. A dishwashing machine, comprising a spraying system for washing liquid, a spraying system for rinsing liquid, a pump in each system, a flow control valve in each system, means operable to connect said flow control valves, said means comprising a manipulating member to actuate said operating means so as to open and close the valves alternately, a discharge valve in the washing system, another manipulating member to actuate said discharge valve, and means operable to connect said last-mentioned manipulating member with the flow control valve of the washing system so as to open said flow control valve, when the discharge valve is opened.

3. A dishwashing machine, comprising a spraying system for washing liquid, a spraying system for rinsing liquid, a pump in each system, a flow control valve in each system, a discharge valve in the washing system, means operable to connect said flow control valves to control the setting thereof, and means to control the setting of the discharge valve, said last-mentioned control means being operatively connected with the flow control valve of the washing system so as to open said flow control valve when being set to open the discharge valve.

4. A dishwashing machine, comprising a spraying system for washing liquid, a spraying system for rinsing liquid, a pump in each system, a flow control valve in each system, a discharge valve in the washing system, means operable to connect said flow control valves to control the setting thereof, and independent means to control the setting of the discharge valve and the flow control valve of the washing system.

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