

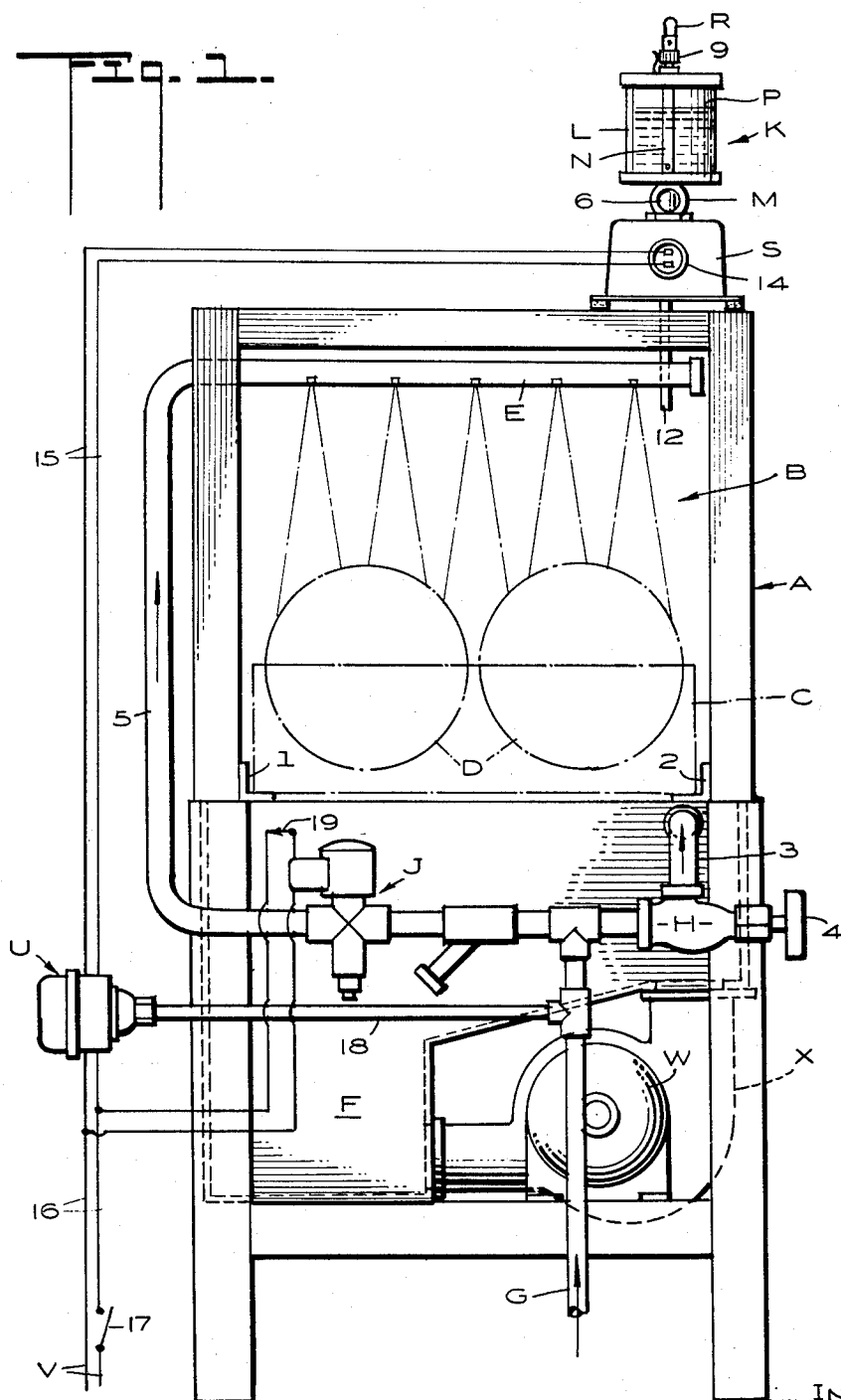
May 13, 1958

G. J. FEDERIGHI ET AL
AUTOMATIC LIQUID SOAP OR DETERGENT DISPENSER
FOR DISH WASHING MACHINES

2,834,364

Filed Oct. 13, 1955

3 Sheets-Sheet 1



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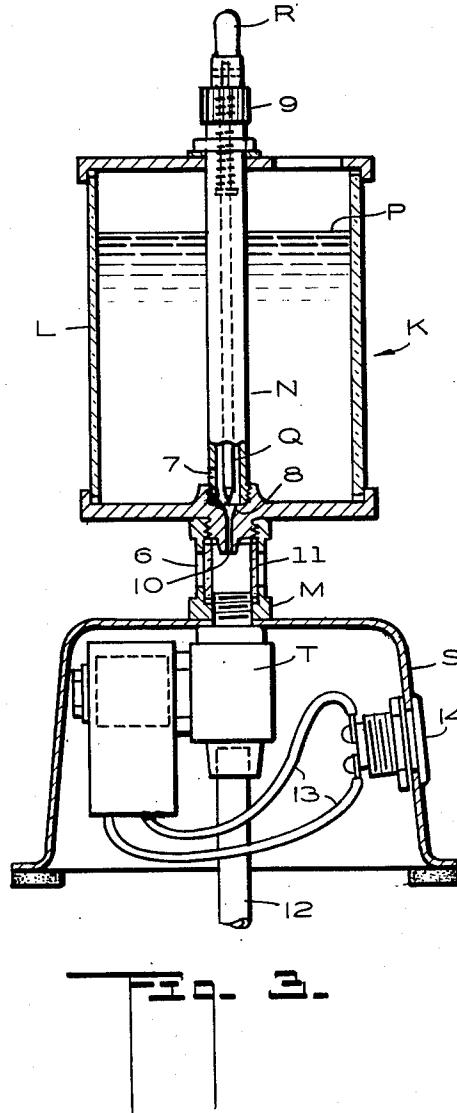
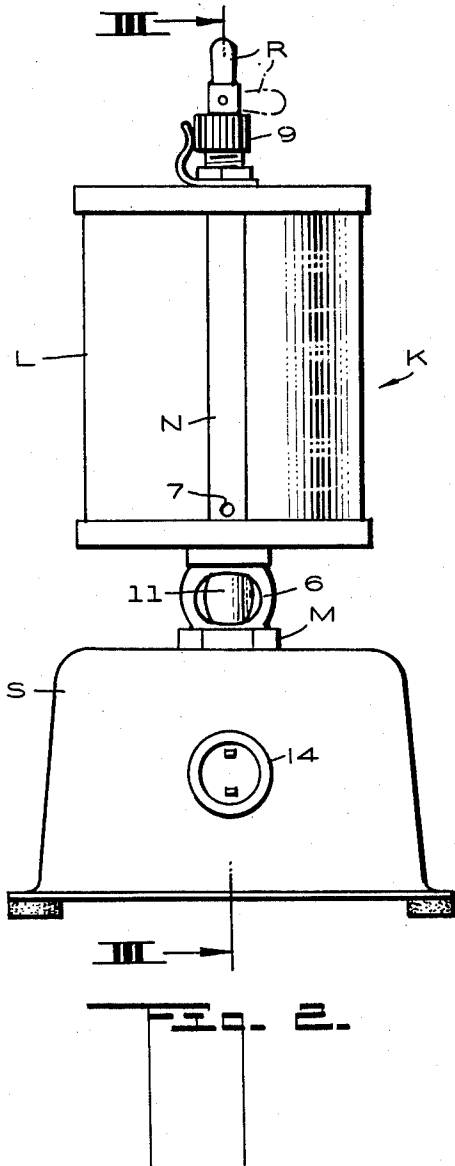
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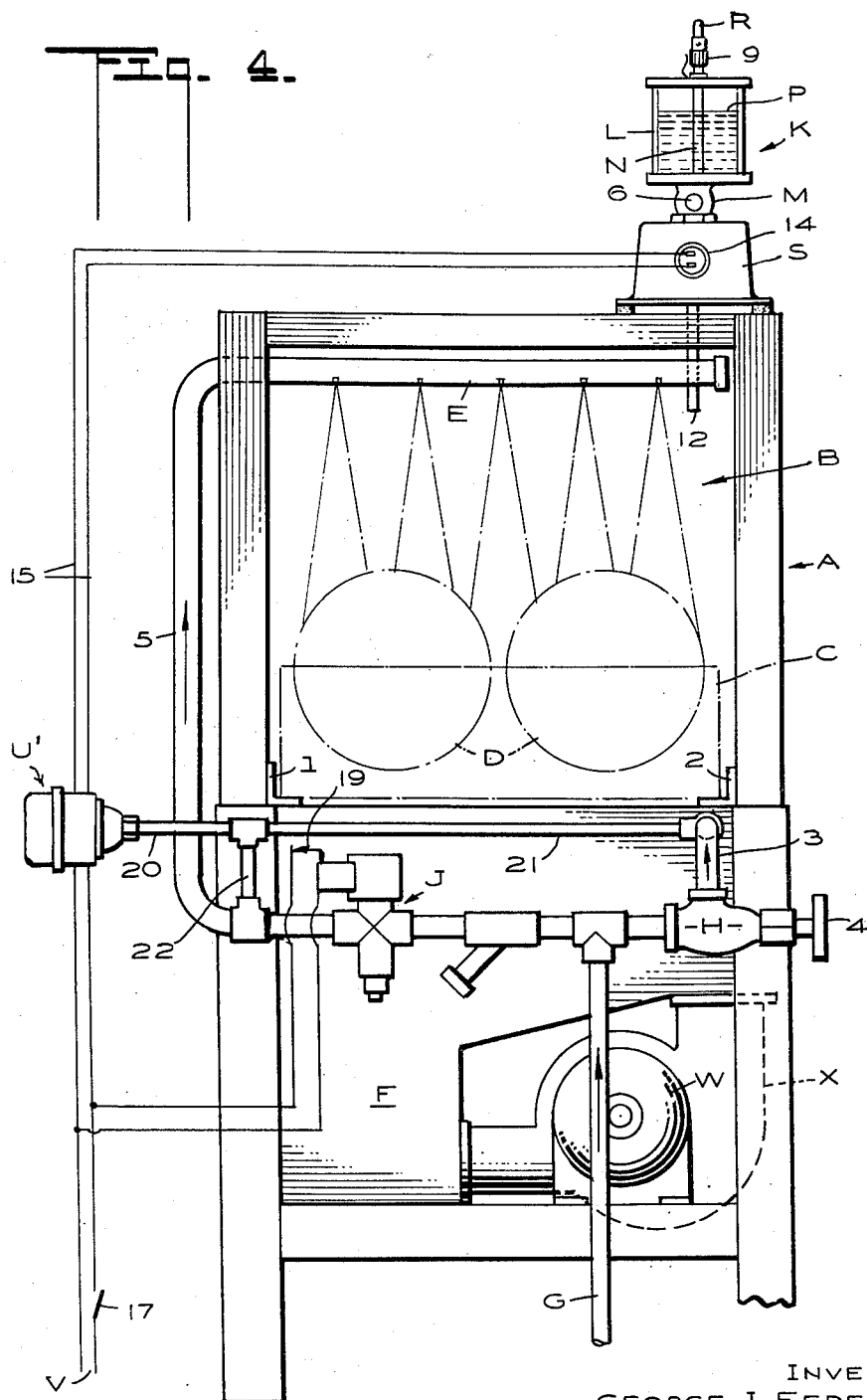
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AUTOMATIC LIQUID SOAP OR DETERGENT DISPENSER FOR DISH WASHING MACHINES**George Joseph Federighi and Tore H. Noren,
San Francisco, Calif.****Application October 13, 1955, Serial No. 540,194****3 Claims. (Cl. 137—88)**

In the commercial washing of dishes, a tank is used for holding dish-washing water and a pump draws water from the tank and forces it through dish-washing nozzles for washing the dishes, whereupon the water drains from the dishes and flows back into the tank. Powdered soap or detergent is added to the tank water as needed. Where smaller commercial dish washers are used, the rinse nozzles are placed in the same compartment with the dish-washing nozzles. Fresh hot water flows through the rinse nozzles during the rinsing of the washed dishes and this water flows into the tank and dilutes the dish washing properties of the tank water. More powdered soap or detergent may be added by the operator, but he does not know how much to add and the consequence is that either too much or too little powdered soap or detergent is added. There is a waste of powdered soap or detergent if too much is added and on the other hand, if too little is added, the dishes will not be sufficiently cleaned.

The principal object of our invention is to provide an automatic dispenser that will handle liquid soap or detergents and will deliver a predetermined quantity to the wash water in the tank in direct ratio to the fresh hot water being added. For example, when the tank is filled with wash water at the start of the dish washing operation, the automatic dispenser will deliver the liquid soap or detergent to the tank as the latter is filling up with water so the correct ratio of liquid soap or detergent will be maintained at all times. As soon as the hot water to the tank is shut off, the dispenser will cease functioning. Again, when the washing operation is finished and the dishes are to be rinsed, the flow of fresh rinse water through the rinsing nozzles will immediately start the dispenser operating. Liquid soap or detergent will therefore be added to the tank of water in strict ratio to the amount of fresh water added to the tank by the rinse nozzles. Then as soon as the rinsing operation is completed and the hot water stops flowing from the nozzles, the automatic dispenser will immediately shut off.

The device is simple in construction and can be applied to a standard commercial dish washing machine with very slight alterations being necessary to make in the machine.

Other objects and advantages will appear as the specification continues, and the novel features of the device will be particularly pointed out in the appended claims.

Our invention is illustrated in the accompanying drawings forming a part of this application in which:

Figure 1 is a rear elevation of a commercial dish washing machine and shows our liquid soap or detergent dispenser operatively applied thereto;

Figure 2 is a view on a large scale, of the liquid soap or detergent dispenser shown in Figure 1;

Figure 3 is a vertical transverse section taken along the line III—III of Figure 2; and

Figure 4 is a rear elevation of a commercial dish washing machine and shows our liquid soap or detergent dispenser operatively connected thereto in a different manner from that shown in Figure 1.

While we have shown only the preferred forms of our invention, it should be understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit and scope of the invention.

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In carrying out our invention we make use of a commercial dish washing machine shown generally at A in Figures 1 and 4. Only those parts on the machine will be mentioned that form a part of our invention. The dish washing machine has a compartment B in which a basket C containing dishes D is adapted to be received. The basket slides on guide rails 1 and 2, see Figures 1 and 4.

A small commercial dish washing machine is illustrated in Figures 1 and 4, and the single compartment B houses both the dish washing nozzles, not shown, and the hot water spray nozzles, indicated generally at E. Both Figures 1 and 4 show the exit end or rear of the dish washing machine A and the rear door for the compartment B has been removed so that the interior of the compartment may be viewed. The front of the machine has a door, not shown, and this is opened when the operator moves a basket C of dishes D into the compartment B, after which the front door is closed. The rear door, not shown, is already closed and the dish washing machine is now ready for operation.

A water holding tank F is positioned under the compartment B and receives dish washing water as well as rinse water after it has washed or rinsed the dishes and drained back into the tank. A hot water feed pipe G communicates with a fill valve H, and a pipe 3 leads from the valve H and delivers hot water to the tank F when the operator turns the handle 4 on the fill valve H into open position. The water tank holds about eighteen gallons of water although we do not wish to be confined to any particular quantity of water.

The hot water feed pipe G also communicates with a solenoid operated valve J, and a spray pipe line 5 leads from the valve J to the spray nozzles E. At the present time it is customary to add powdered soap to the water in the tank F before the first dish washing operation in order to provide a proper dish-washing solution. Then after the spray nozzles E have been used a few times and the water from these nozzles has added to the tank water and diluted the cleansing properties thereof, additional powdered soap is added to the tank water by the operator. At best, all the operator can do is to add what he thinks is the proper amount of soap to bring the wash water up to a point where it will wash dishes effectively. He may add too much in which event there is a waste of soap, or he may add too little in which event the wash water will lack its full cleaning power.

We have designed an automatic dispenser which will add liquid soap or detergent to the wash water as the hot water is added to the tank. The proper ratio of soap or detergent to hot water can be adjusted by the operator and thereafter this ratio is automatically maintained whenever any additional hot water is added to the tank. The dispenser is indicated generally at K in Figures 1 and 4, and is shown on a larger scale and in section in Figures 2 and 3 respectively. The dispenser K comprises a glass container or reservoir L, for holding the liquid soap or detergent. The reservoir is mounted on a tubular support M that has openings 6 therein constituting windows.

The reservoir L has a central outlet tube N, provided with openings 7 for receiving liquid soap or detergent P from the reservoir L. A needle valve Q is mounted in the tube N and may be moved toward or away from a valve seat 8 by adjusting a knurled nut 9. A handle R is operatively connected to the needle valve Q and when the handle is extending vertically, as in the full line position in Figure 2, the needle valve is open. When the handle is rocked into the dot dash line position shown in the same figure, the needle valve will be closed.

A fluid passage 10 leads from the valve seat 8 and communicates with the upper end of a glass inspection tube 11 that is housed within the tubular support M. An

operator can check the flow of fluid through the glass tube 11 when he opens the needle valve Q and looks through one of the windows 6. The glass tube 11 communicates with an outlet tube 12 and both Figures 1 and 4 show this tube delivering fluid where it will drop directly into the wash water contained in the tank F.

The tubular support M is mounted on a hollow base S, see Figure 3, and the base in turn rests on the top of the washing machine A. An electrically controlled valve T is housed within the base S and is in communication with the glass tube 11 and the outlet tube 12. Wires 13 connect the electric valve T with an electric socket 14 that is carried by the side of the base S.

Reference to Figure 1 shows wires 15 leading from the terminals in the socket 14 to a two pole pressure switch indicated generally at U. The pressure switch U is of standard construction and a switch that is used is manufactured by Penn Controls, Inc., Goshen, Indiana. When the pressure switch U is actuated in a manner now to be described, it will connect the electric valve T to a source of current V by wires 16. A manually controlled switch 17 may be closed so that the pressure switch U can operate.

A pressure pipe line 18 communicates with the hot water feed pipe G and the pressure switch U. The pressure switch can be adjusted to close when there is a drop in the water pressure in the hot water feed pipe G. There will be a pressure drop in the pipe line 18 when the valve handle 4 is opened to permit hot water to enter the tank F through the pipe 3. The pressure switch U will close and the electric valve T will open. The needle valve Q has already been opened and adjusted so just the right quantity of liquid soap or detergent will flow into the water tank when the electric valve T is opened. Therefore the hot water initially entering the tank F will have the proper proportion of liquid soap or detergent mixed therewith. The operator closes the valve H when the tank F is filled with hot water to the proper level. The fluid pressure will immediately build up in the pipe line 18 and the pressure valve U will open and break the circuit to the electric valve T, which will immediately close. No further flow of fluid from the dispenser K will take place until the valve H is again opened or the spray valve J is opened.

Before the spray valve J is opened, the operator closes a switch, not shown, that connects an electric motor W to the source of current. The motor W operates a centrifugal pump X, see Figure 1, that draws water from the lower portion of the wash tank F and delivers it to the washing nozzles, not shown. This operation continues until the dishes are thoroughly washed. No liquid soap or detergent is added to the wash water during the dish washing operation.

The operator is now ready to rinse the washed dishes. He closes a switch 19 that opens the rinse valve J and hot water will flow from the hot water feed pipe G, through the valve J, the spray pipe 5, and out the spray nozzles E. Again the water pressure will drop in the pipe G and pipe line 18 and the pressure switch U will be closed and cause an electric current to flow to the electric valve T for opening it. The dispenser K will now feed the proper amount of liquid soap or detergent to the water in the tank F so long as the rinse valve J remains open. Therefore the tank water will continue to have the same ratio of liquid soap or detergent to water as it had when the washing operation started. The tank F has an overflow pipe, not shown, so that the water level will not rise above a certain point.

In Figure 4 we show the same dish washing machine A and the same dispenser K. However the pressure switch U' has a pressure line 20 leading therefrom with a first branch pressure pipe line 21 communicating with the pipe 3, and a second branch pressure pipe line 22 communicating with the spray pipe 5. The pressure switch U' will close an electric circuit to open the electric valve

T when there is an increase in pressure in the branch pipe lines 21, 20 or 22, 20. The branch pipe line 21 will have an increase in pressure when the valve H is opened for filling the water tank F with hot water. The branch pipe line 22 will have an increase in pressure when the rinse valve J is opened and rinse water flows to the rinse nozzles E. In all other respects, the operation of this form of the invention is identical to the form shown in Figure 1. The principal difference between the two forms is that in Figure 1, the pressure switch will close when there is a reduction in water pressure, whereas in Figure 4, the pressure switch will close when there is an increase in water pressure.

In some larger commercial dish washers, the dish carrying baskets or endless conveyors carry the dishes first through a dish washing compartment and then through a dish rinsing compartment. If the water from the rinsing compartment finds its way to the tank of water that is used for washing the dishes, then our dispenser can be used for adding liquid soap or detergent to the water whether the fill valve is opened for filling the tank or whether the rinse valve is opened.

We claim:

1. In combination: a dishwashing machine having a dish-receiving compartment and a tank disposed below the compartment for holding dish-washing water; a liquid soap or detergent dispenser mounted above the tank and having an outlet tube leading downwardly from the dispenser for delivering liquid from the dispenser into the tank by gravity; a hot water feed pipe; hot water spray nozzles mounted in the compartment and communicating through a spray pipe line with the hot water feed pipe; a first valve for controlling the flow of hot water from the feed pipe to the spray pipe line; a branch pipe leading from the hot water feed pipe to the tank for delivering hot water to the tank; a second valve in the branch pipe for controlling the flow of hot water therethrough to the tank; a pressure switch operable by a change in pressure of water flowing from the feed pipe to the nozzles or tank, and being automatically closed when either valve is opened; and an electric valve mounted in the liquid-delivering outlet tube of the dispenser and being electrically connected to the pressure switch; said electric valve being normally closed but being opened when the pressure switch closes due to either the first or second-named valves being opened; the opening of the electric valve permitting liquid to flow from the dispenser to the tank.

2. The combination as set forth in claim 1; and in which a pressure pipe line extends directly from the hot water feed pipe to the pressure switch so as to deliver water, under pressure, to the switch to normally hold the switch open; the switch being made to close when there is a reduction of pressure in this pressure pipe line due to opening of the first or second valves.

3. The combination as set forth in claim 1; and in which a first branch pressure pipe line extends between the branch pipe between the second valve and the tank to the pressure switch; and a second branch pressure pipe line extending from the spray line to the first branch pressure pipe line; said first valve being disposed between the hot water feed pipe and said second branch pressure pipe line; said pressure switch normally being opened, and being made to close by increase of water pressure due to opening of the first or second valves.

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