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MIXING DEVICE

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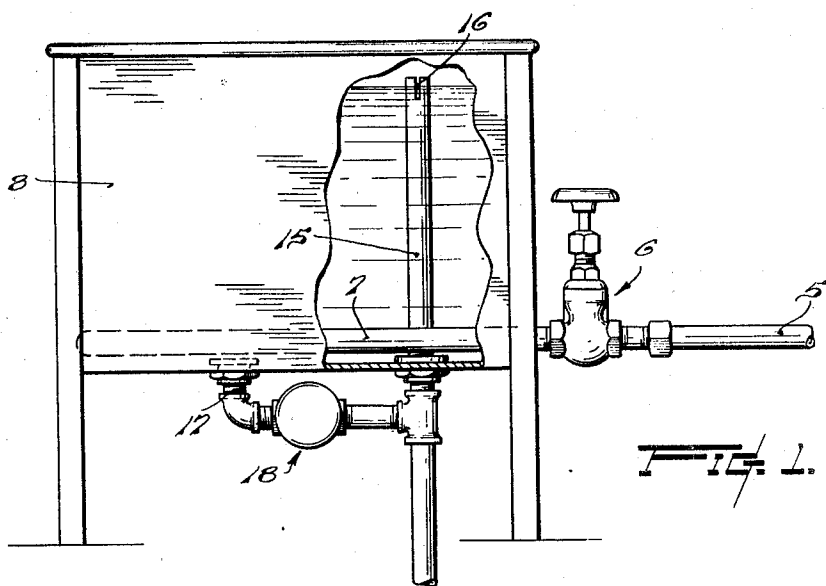


FIG. 1.

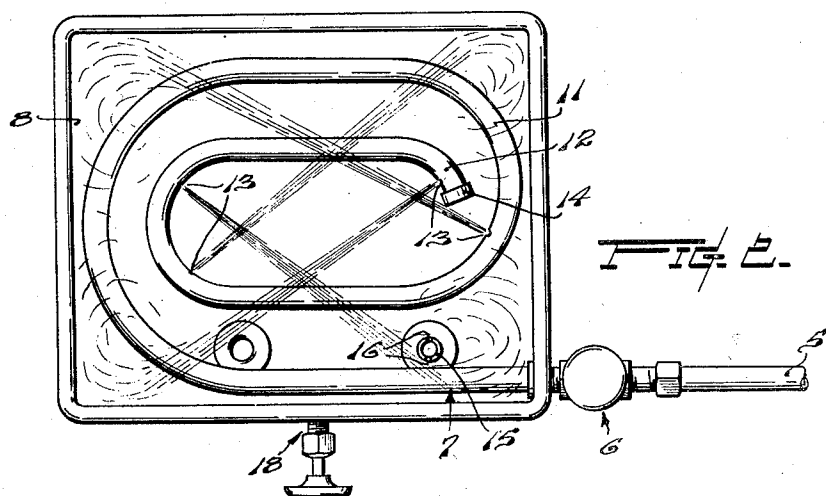


FIG. 2.

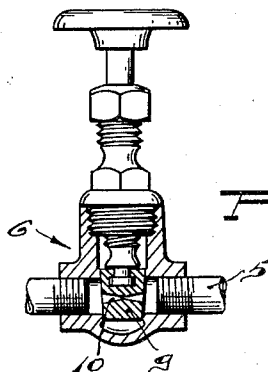


FIG. 3.

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MIXING DEVICE

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5 Claims. (Cl. 299—83)

My invention relates to mechanism for most effectively dissolving the chemical cleaning compound which is used in the dish washing machines of restaurants and other commercial establishments and in conjunction therewith most efficient mechanism for predetermining quantitative delivery of the resulting solution to the machine.

As regards the former, it is an especial object to provide, in a mixing tank disposed auxiliary to the washing machine and within which the compound which is introduced in a powder form is dissolved at a rate determined by the saturation point of the water, a plurality of minute jets of hot water under pressure so disposed as to accommodate admission of relatively large quantities of the powder due to the ability of the jets to maintain the powder in suspension, said maintenance of the powder in suspension acting to assure a continuously saturated solution. A further and particular object directed to the same end, which is to say, more effectively dissolving the powder to maintain a saturated solution, is the provision of a pipe acting as a source of pressure supply to the jets arranged within the tank and having a high degree of heat conductivity for imparting the heat from the water therein to the solution in the tank.

Respecting delivery of the solution to the dish washing machine, auxiliary tanks as heretofore used have provided a valved inlet and a valved outlet to and from the same with conventional practice being to introduce only that amount of powder to the tank as can be dissolved by the water therein which is subsequently admitted through the inlet valve until the tank is filled. The solution is withdrawn from the tank at intervals in quantities estimated by the operator as being necessary to obtain required concentration in the washing machine. In some instances operators have attempted to gauge a continuous flow from the tank to the mixing machine by setting the outlet valve. In either manner, however, with the necessity of relying on the operator, the result has been either that the solution introduced is in excess of the amount required or insufficient to perform its intended function.

As distinguished from the foregoing, I introduce the powder in sufficiently large quantities to allow attention on the part of a dependable member of the establishment at relatively protracted intervals of time to eliminate any necessity for attention on the part of the washing machine operators who, generally speaking, are of limited intelligence and relatively undependable. Conditioned by the rate of discharge which accords with the size and speed of operation of the washing machine, one cup of the powder chemical where held in suspension and with fresh water being continuously fed to the tank will continuously dissolve and serve to maintain a saturated

solution over a period of from three to five hours. It is an especial object of my invention to provide mechanism serving to obtain a predetermined consistently uniform flow of fresh water into the tank with a discharge resulting from and controlled by said introduction. In obtaining the same, I provide an admission valve so formed that the supply of water fed therethrough to the mixing tank will be continuous and uniform with discharge of the solution occurring from the upper portion of the tank through an unrestricted overflow pipe provided with a bleed opening.

Stated consecutively with the operation of the invention, the particular objects are the provision of an auxiliary mixing tank wherein a solution of uniform density will be positively maintained over a relatively prolonged period of time without attention, into which tank a supply of fresh water quantitatively predetermined from the capacity of the washing machine with which the tank is used will be constantly fed, and from which the concentrated or saturate solution will continuously be discharged to the machine at a rate of flow determined by the fresh water admission.

Further objects and advantages, together with the foregoing, will become apparent throughout the course of the following detailed description and claims, the invention consisting in the novel construction, adaptation, and combination of parts hereinafter described and claimed.

In the drawing:—

Figure 1 is a side elevation of the mixing tank with a portion of the same shown in section to illustrate the discharge pipe, the feed end of which as with the supply pipe leading from a master valve (not shown) being broken away.

Fig. 2 is a top plan view of the same; and

Fig. 3 is a detail enlarged longitudinal vertical section through the supply valve represented in the preceding views.

Reference being had to the drawing, the numeral 5 indicates a supply pipe leading through a master valve from a suitable source of hot water under pressure to a secondary control valve 6, which latter valve is of the wedge gate character controlling the flow of water to an admission pipe 7 for mixing tank 8. More especially as regards said secondary valve, while allowing free flow in response to retraction of the wedge gate for initially filling the mixing tank, said gate being represented at 9, a continuous trickle flow is obtained by providing a reduced opening 10 drilled through the gate, the capacity of which opening is determined by the capacity of the washing machine with which the mixing tank is adapted for use. Said gate may be readily replaced by a gate of greater or less trickle capacity where required.

Leading from said valve, the admission pipe 7 which is of copper or other readily heat-con-

ductive material enters through a side wall of the tank in proximity of the floor of the same and within the tank is spirally looped, the loops preferably consisting in an outer loop 11 and an inner loop 12 from the latter of which a plurality of minute jet openings 13 are located to discharge horizontally or approximately so in the direction of the respective tank corners. Said disposition of the jets, the inner end 14 of the delivery pipe being closed, effects through the back pressure obtaining a projection of fine sprays of water in accelerated jets, which serve to develop eddies in the discharge stream to collectively agitate substantially the entire floor area of the tank. The heat conductivity of the pipe 7 acts to maintain the solution in a heated state.

In delivering the solution to the washing machine which is gravity-fed from the tank, an unrestricted pipe 15 projects through the floor of the tank to the washing machine, said pipe being provided at its upper end with a pair of bleed openings 16 disposed at diametrically opposite sides of the pipe. Said bleed openings act to prevent formation of water blisters at the point of discharge into the pipe. A drain 17 communicates with pipe 15 through suitable fittings, the control valve therefor being indicated at 18. The tank may, if desired, be provided with a gauge for determining the initial water fill.

In operation, a suitable quantity of the washing powder is deposited in the tank and the latter filled by opening both the master and trickle valves. Subsequent to filling, the wedge gate of valve 6 is closed whereby a predetermined flow continues through the trickle opening, a similar quantity of the solution being simultaneously admitted through bleed openings 16 to the discharge pipe 15. Such powder in the tank as is in excess of the saturation point of the water is effectively held in suspension and dissolved at the rate of admission of the diluting fresh water. No difficulty is encountered by reason of a settling of the powder where operation of the washing machine is suspended over night as the accelerated jets immediately stir the same, as the master valve is opened, to bring the powder grains into suspension. The heat conductivity of the pipe coils 11 and 12 rapidly reheats the solution with a minimum of delay in commencing operation of the machine.

What I claim, is:—

1. Structure including a tank for dissolving a water-soluble compound such as a washing powder and feeding the saturated solution therefrom at a predetermined constant rate of flow, said tank being adapted to receive a quantity of the compound in excess of the dissolving capacity of the water therein, the structure comprising, in combination with the tank, a source of water supply under pressure, a supply pipe from said source of supply leading to the tank and providing an admission opening thereto, a valve member in said supply pipe comprising a pipe-closing partition providing a constant-capacity trickle opening through which a predetermined flow of water to the admission opening is obtained, and a gravity-flow outlet pipe from the upper portion of the tank for delivering the saturated solution at a constant rate of flow predetermined from the speed of admission of the water through the trickle opening, said valve member being provided with a handle for withdrawing the partition from its pipe-closing position to enlarge the flow capacity of the supply

pipe in accelerating the flow of water through the admission opening for speeding the initial operation of filling the tank to the level of the outlet pipe.

2. In structure including a tank for dissolving a water-soluble compound such as a washing powder and feeding the solution therefrom in a saturated state and at a predetermined constant rate of flow, said tank being adapted to receive a quantity of the compound in excess of the dissolving capacity of the same, a source of water supply under pressure, a supply pipe from said source of supply leading to the tank and providing an admission opening thereto disposed in close proximity of the floor of the tank, said opening being formed to project a plurality of eddy-forming jets of water over the floor of the tank in maintaining the powder in excess of that sufficient to saturate the water in the tank in suspension above the floor of the tank, a valve member in said supply pipe comprising a pipe-closing partition providing a constant-capacity trickle opening through which a predetermined flow of water to the admission opening is obtained, and a gravity-flow overflow pipe from the upper portion of the tank, said overflow pipe operating to deliver the saturated solution of the compound at a constant rate of flow corresponding to the speed of admission of the water through the trickle opening.

3. The structure according to claim 2 in which the valve member is provided with a handle for withdrawing the partition from its pipe-closing position to enlarge the flow capacity of the supply pipe in accelerating the initial speed of filling of the tank.

4. Structure for dissolving a water-soluble compound such as a washing powder and feeding the solution in a saturated state and at a predetermined uniform and constant rate of flow comprising a tank adapted to receive a quantity of the compound in excess of the dissolving capacity of a body of water in the tank, a source of water supply under pressure, a supply pipe from said source of supply leading to the tank and providing an admission opening thereto, a valve member in said supply pipe formed with a pipe-closing partition providing a constant-capacity trickle opening through which water, at a predetermined limited rate of flow, is delivered to the admission opening, and an overflow pipe from the upper portion of the tank for delivering the saturated solution at a constant rate of flow predetermined from the speed of admission of the water through the trickle opening.

5. Structure for dissolving a water-soluble compound such as a washing powder and feeding the solution to the work in a saturated state at a predetermined uniform and constant rate of flow comprising a tank adapted to receive a quantity of the compound in excess of the dissolving capacity of a body of water in the tank, a source of water supply under pressure, a pipe from said source of supply leading to the tank and providing an admission opening thereto, means in said pipe operating to limit the passage of water therethrough to a uniform and constant predetermined trickle feed, and an overflow outlet located at the liquid level of the solution within the tank for delivering the saturated solution to the work at a constant rate of flow predetermined from the speed of admission of water through the trickle opening.

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