

July 21, 1953

D. W. KORNS
DISHWASHING MACHINE

2,646,056

Filed Jan. 21, 1947

3 Sheets-Sheet 1

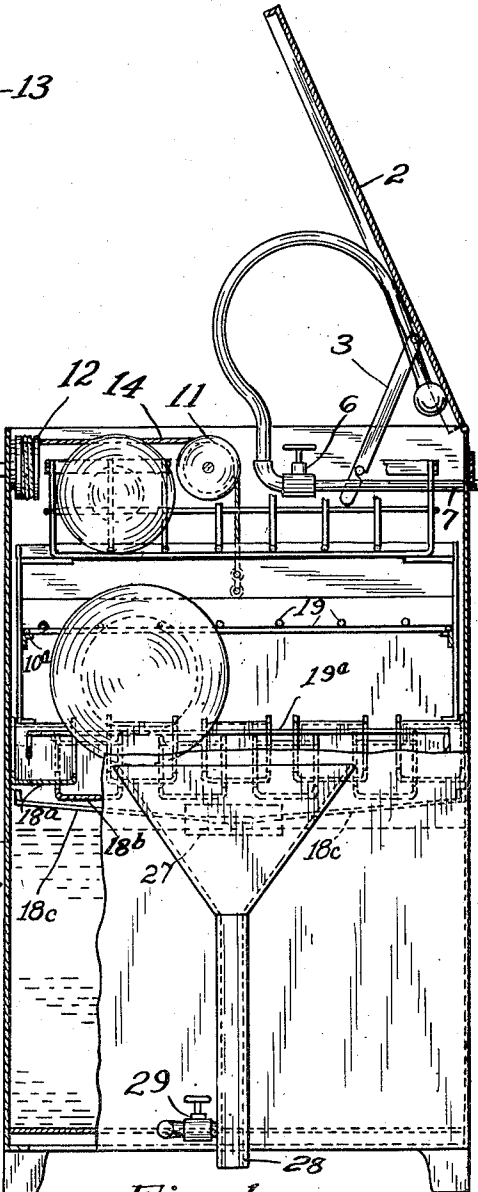
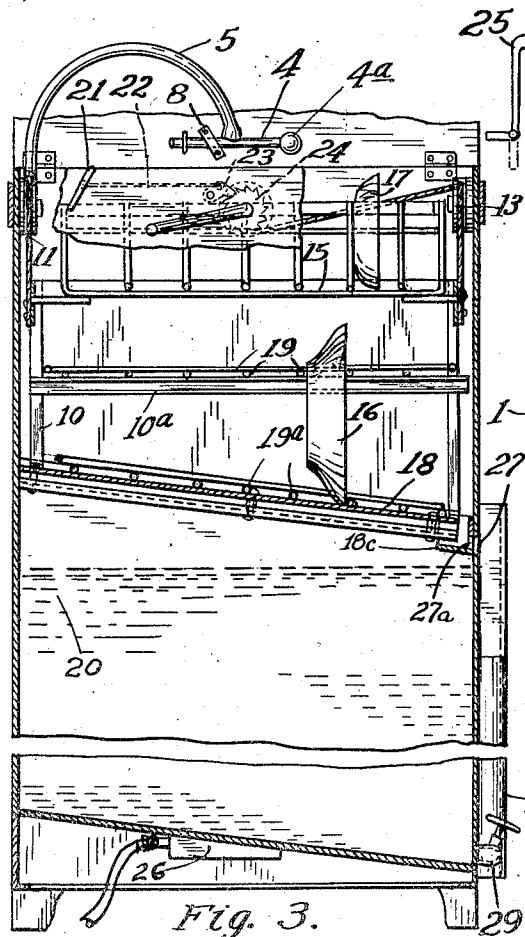
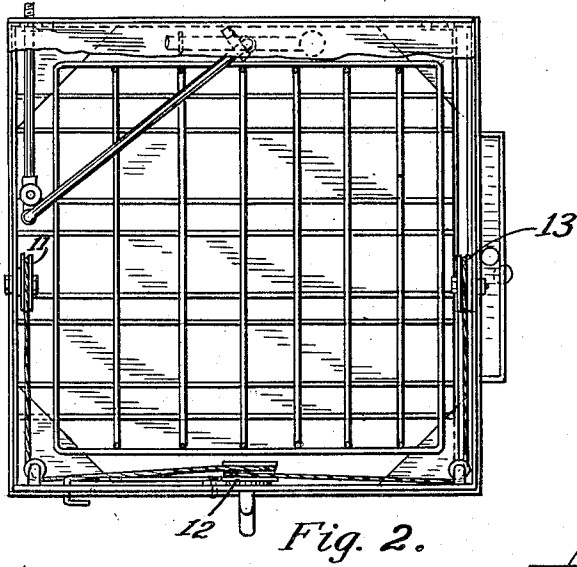


Fig. 1.

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3 Sheets-Sheet 2

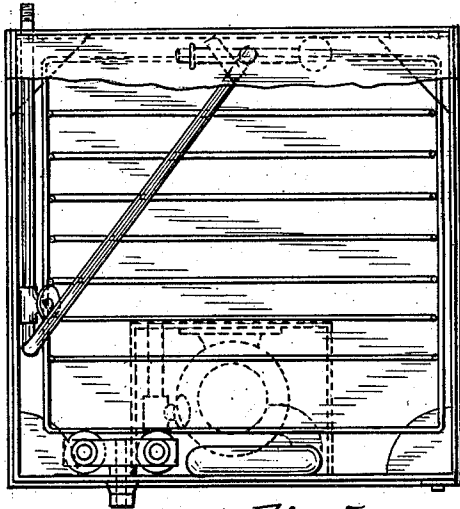


Fig. 5.

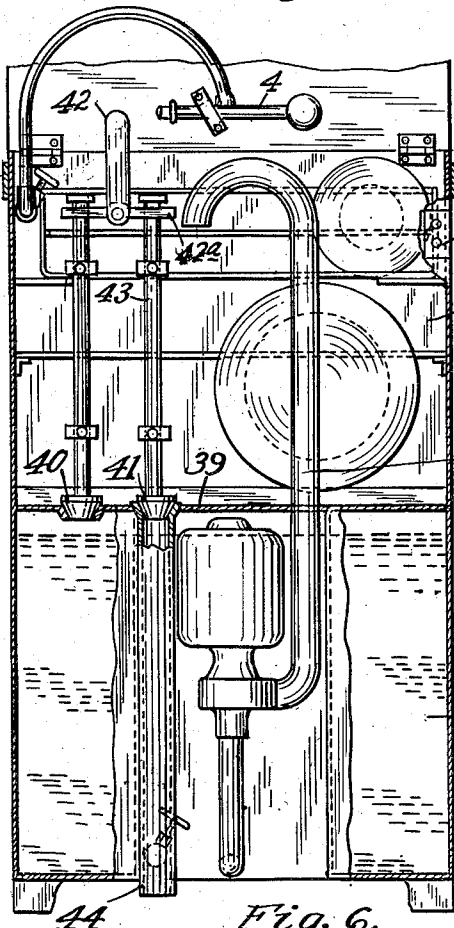


Fig. 6.

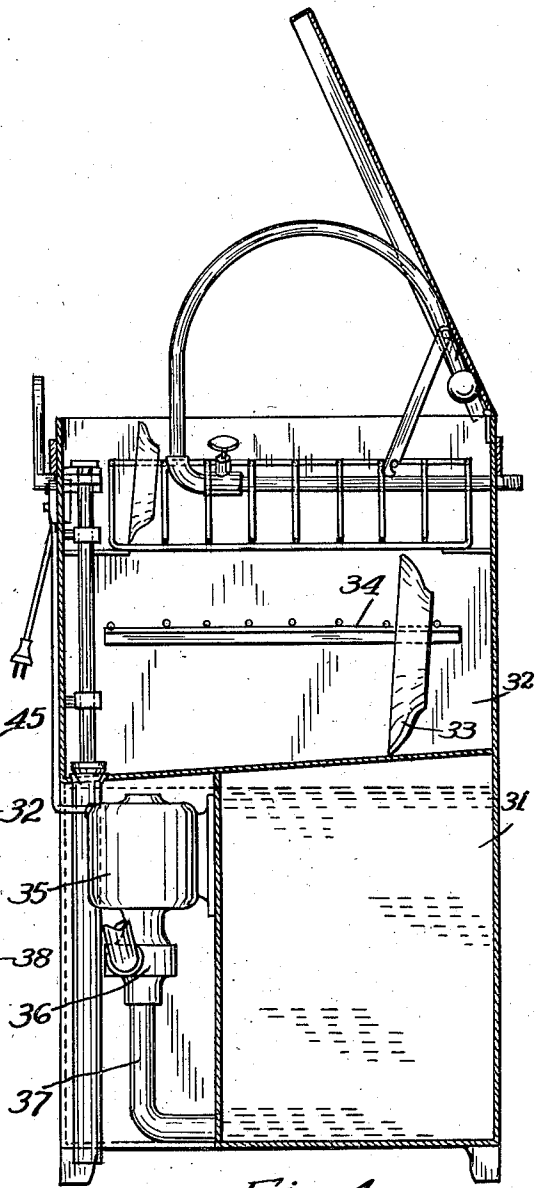


Fig. 4.

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3 Sheets-Sheet 3

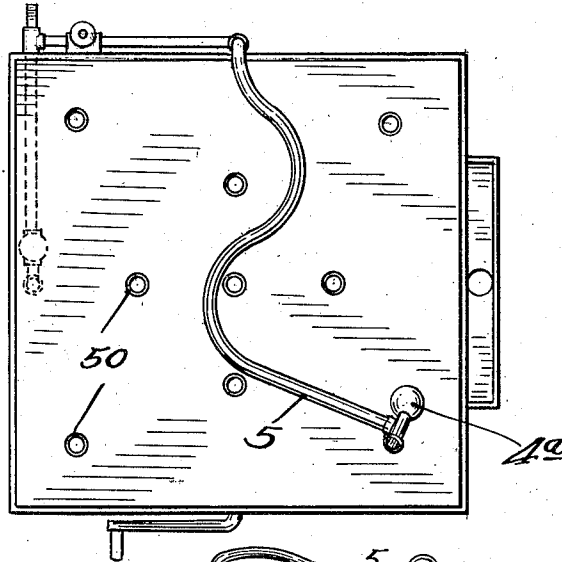


Fig. 7.

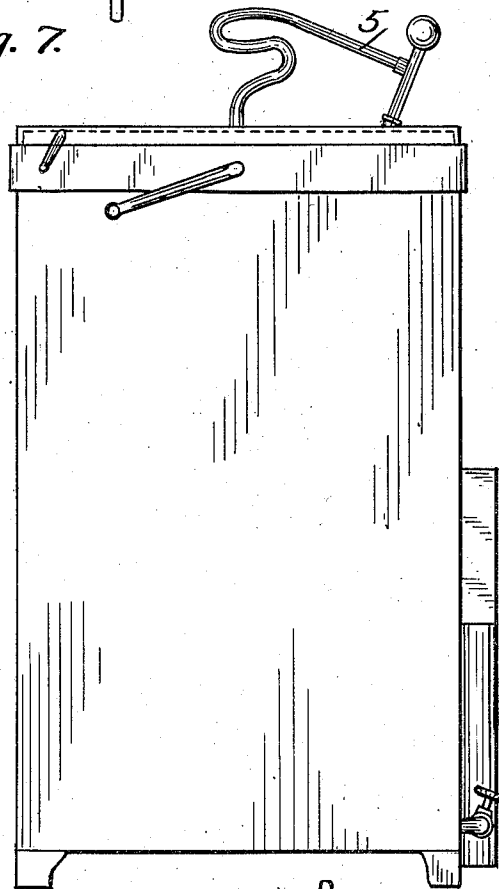


Fig. 8.

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UNITED STATES PATENT OFFICE

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DISHWASHING MACHINE

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2 Claims. (Cl. 134-144)

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This invention relates to a dish washing machine and, more particularly, to one that depends upon chemical action of a liquid detergent and disinfectant, instead of mechanical agitation, for cleansing the dishes.

Common types of dish washing machines generally depend upon mechanical agitation, therefore require complicated apparatus, such as motors, driving mechanisms, and the like.

An object of the present invention is to provide a dish washing machine that is devoid of the above named disadvantages and which is relatively simple and inexpensive in construction.

A more specific object of the present invention is to provide a dish washing machine that cleanses by chemical action, that is, by immersion of dishes in a detergent and disinfectant liquid.

Other objects and advantages of my invention will become apparent from a study of the following specification taken with the accompanying drawings wherein:

Fig. 1 is a side elevational view, partly in cross section, of one embodiment of dish washing machine involving the principles of the present invention;

Fig. 2 is a plan view of the structure shown in Fig. 1 but wherein the lid portion is shown broken away;

Fig. 3 is a front view of the structure shown in Figs. 1 and 2 wherein the front portion of the cabinet is shown broken away;

Fig. 4 is a longitudinal cross sectional view of a modified form of dish washing machine wherein separate permanent compartments are provided;

Fig. 5 is a top view of the structure shown in Fig. 4 wherein the lid portion of the cabinet is shown broken away;

Fig. 6 is a front view of the structure shown in Fig. 4 wherein the front portion of the cabinet is shown broken away;

Fig. 7 is a top view of a dish washing machine, such as shown in the previous figures, wherein a modified form of lid or cover having a plurality of apertures is provided, and

Fig. 8 is a side view of the dish washing cabinet or casing shown in Fig. 7.

Referring more particularly to Figs. 1, 2 and 3, numeral 1 denotes a cabinet or casing having an open top, on one edge of which is pivotally mounted a lid or cover 2. The lid may be held in a raised position by a top support or bracket 3.

At the top of the casing there is provided apparatus for spraying soiled dishes with hot water, including a nozzle 4 connected to one end of a flexible hose 5, the other end being connected to a valve 6 leading to a permanent supply of hot water which includes supply pipe 7. The nozzle

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4 is normally supported by a nozzle support 8. The hot water valve 6 is contained inside the cabinet, as are hose 5 and nozzle 4. Spraying must be done by passing the elongated nozzle back and forth among the dishes, with the top open. This is the quickest and most effective method of spraying because the spray can be directed squarely on any matter to be removed. It is the best method to apply the spray to all surfaces, in the quickest manner with minimum of spray water.

Elongated nozzle 4 permits manual grasping of the ball-shaped grip to permit the operator to remain at a distance from the range of the spray and splashed rinse water so as to not soil his clothing.

A vertically movable tray or dish holding receptacle 10 of basket-like construction is suspended inside the top portion of casing 1 by means of pulleys 11, 12 and 13 entrained by straps or ropes, such as 14, connected to the top of the dish holding receptacle 10. A removable wire dish basket 15 may be supported on the top of receptacle 10 to provide a second stand of dishes so that more than one tier of dishes may be washed at a given time. Dishes, such as 16, may be supported in the dish holding receptacle 10 in the manner indicated while dishes, such as 17, may be supported in the basket. The dishes, such as 16, rest on the inclined louvered bottom 18 of receptacle 10 and are supported in a vertical position by cross-rods or grids, such as 19, of a framework lightly resting on flange supports 19a secured to the receptacle 10 and by cross-rods or grids 19a at intervals of about one inch, for example, which form part of a second framework resting directly on the louvered bottom 18. These grids are securely fastened to a wire framework, the whole of which is removable and rests lightly on the louvered bottom. Dishes, such as 17, are supported vertically by wire basket 15.

An outstanding feature of the construction of dish holding receptacle 10 is the louvered bottom 18 which, as shown more clearly in Fig. 1, comprises a plurality of channel-shaped members 18a arranged in one horizontal row and a second plurality of channel-shaped members 18b arranged in a parallel row underneath in staggered relationship to the first row. The flanges of the channel-shaped members of both rows extend vertically upwardly. The channels 18a and 18b are inclined downwardly, to the right as viewed in Fig. 3, so that water gravitating there-against after being sprayed against the dishes on the wire supports above will flow downwardly to the lower ends of such channels. A collector channel 18c extends transversely of the lower

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ends of the channels 18a and 18b and is adapted to receive water flowing from the channels 18a and 18b. The channel 18c is provided with an opening 27a which aligns with a drain opening 27 in the cabinet 1 when the receptacle 10 is in its upper position for draining water from the receptacle 1 in a manner to be described. The collector channel 18c constitutes a part of the receptacle 10 and is moved vertically therewith so that the drain openings 27 and 27a align only when the receptacle 10 is in its upper position.

The bottom of casing 1 serves as a reservoir for a liquid detergent and disinfectant 20 of any well known type capable of removing grease and dirt from dishes and of disinfecting them. Inasmuch as spaces are provided between the two rows as well as between adjacent channels through which liquid may flow, it will be readily apparent that by lowering the receptacle 10 into the liquid detergent and disinfectant body 20, the liquid will flow through the openings and allow the bottom 18, as well as the remainder of the receptacle 10, to slowly become immersed therein. In other words, the resistance to liquid flow provided by the restricted openings cushions the dropping movement of the receptacle.

The receptacle 10 may be lowered by manually operating lever 21 which by means of a cord or rod 22 transmits motion to pawl 23 to unseat it from engagement with the teeth of the ratchet 24 so as to allow the dish holding receptacle to fall downwardly by gravity and thus become immersed in the liquid detergent. To raise the receptacle 10 from such lower or immersed position, it is necessary merely to wind a handle or crank 25 aided by the one-way action of the pawl and ratchet to prevent reverse movement and accidental dropping of the receptacle upon release of the handle.

A heater 26 of any well known type which may be suitably controlled by a thermostat (not shown) may be provided adjacent or within the body of detergent so as to maintain a predetermined temperature of liquid. It may, for example, be desirable to maintain the detergent in a warm condition when used. In some instances, the detergent may be sufficiently effective at room temperature.

The operation of the device is as follows: Assume that the receptacle 10 is in its raised position, as indicated in Figs. 1 and 2, and that dirty dishes have been placed in both receptacle 10 and basket 15. Hot water is then sprayed onto the soiled dishes through nozzle 4 until most of the dirt particles have been removed therefrom. The downward slope of the louvered bottom 18 effects a cascading of the dirty rinse water and flow thereof through a discharge opening 27 which empties into an overflow and drain which empties into a drain or may be permanently connected to a soil pipe connected to a sewer. Most of the rinse water will flow along the channel portions of bottom 18, although a small part of it will find its way through the openings provided between adjacent channels and between rows 18a and 18b. In other words, only a small portion of the dirty rinse water will leak through and flow into the reservoir containing the detergent to effect dilution thereof. Thus the special staggered relationship and flange construction of the louvers 18 provides an effective barrier against flow of dirty rinse water into the lower part of casing 1.

After the dishes are thoroughly rinsed, the rinse water is turned off and crank 21 is operated

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so as to unlatch pawl 23 and allow the receptacle 10 to drop to the bottom of the casing 1 so as to immerse all the dishes in the liquid detergent 20. The downward motion of the receptacle, as explained above, is cushioned by means of the resistance to flow offered by the louvered arrangement of bottom 18. Such downward movement of the receptacle also creates a swirl by causing the detergent to flow against the surface of the dishes. If desired, the receptacle may be lowered and raised a number of times during the washing cycle to aid the detergent in dissolving soiled matter more effectively. The detergent may be of such high concentration as to eliminate the necessity for this and may be effective even though cold or at room temperature. The grease which clings to the dishes will be removed by the detergent and will tend to float to the top where it will be carried through the discharge opening 27 into the overflow and drain 28 with the dirty rinse water, thus effecting a continuous filtration of the solution. To use the solution at lower temperatures higher concentration must be maintained, however, this is true of most detergents. Very little detergent will flow out of the overflow with each operation. However, some water will leak through the louvered bottom 18 and spray into the detergent and help maintain its level, that is, a level slightly below that of discharge opening 27. After being immersed for several minutes in the detergent, receptacle 10, together with basket 15 supported thereon, is raised by cranking of the handle 25 to the initial position where the dishes are again all clear of the detergent, as shown in Figs. 1 and 3. The louvered bottom 18 is so designed and sloped that a minimum amount of detergent is elevated when the bottom of the rack is above the level of the detergent to avoid unnecessary waste through the outlet pipe.

When the dishes are thus elevated, they may be again sprayed with hot water so as to rinse off the detergent liquid. Hand operation of nozzle 4 may be employed to give a more effective spray to the dishes and to thoroughly rinse them of the detergent. Thereafter, the dishes are allowed to dry.

An outstanding feature of the above described chemical action dish washing machine is that the liquid detergent and disinfectant is a more or less permanent body and may be used over and over, perhaps for a week or so, before discarding through drain valve 29 and replacing by a fresh body of detergent. The solution may be recharged daily or occasionally as necessary to maintain its required strength. It may be kept longer than a week or so if recharged regularly and not used too much. Even after repeated use, such detergent is very effective in removing grease and other particles from dishes so as to insure their cleanliness after immersion.

Other apparatus may be used for effecting the immersion of dishes in a detergent. For example, the modified apparatus shown in Figs. 4, 5 and 6 may be employed wherein the casing is subdivided into a pair of permanent compartments, a lower compartment 31 and an upper compartment 32, the former acting as a reservoir for the liquid detergent and disinfectant and the latter serving as the compartment for holding soiled dishes, such as 33, in vertical position, aided by a rack 34 mounted therein with suitably spaced cross-rods.

An electric motor 35 is provided for driving a centrifugal pump 36 having a pump intake pipe

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37 and a pump delivery pipe 38. The liquid detergent containing compartment 31 is permanently sealed from the upper compartment 32 by means of the permanent partition 39, all with the exception of two valve openings which may be respectively closed by valves 40 and 41.

The operation of the device is as follows: Assume that the parts are in the position shown in Figs. 4 and 5 with valves 40 and 41 closed and that soiled dishes have been placed in rack 34 in upper compartment 32. The dishes may now be sprayed with hot water from the nozzle 4, which nozzle may be of the same construction as described hereinbefore. During the spraying period the dirty rinse hot water may be drained from compartment 32 by moving lever 42 counterclockwise so that arm 42a integral therewith will lift the push rod 43 and thus open valve 41 and allow the dirty rinse water to drain through the drainpipe 44. Valve 41 should be kept open during the whole of the spraying periods before and after immersion, so as to facilitate unhampered flow of rinse water to drain as spraying continues.

After the first spraying with rinse water, valves 40 and 41 should both be closed so as to retain the detergent solution to be pumped into the upper compartment, as will be explained hereinafter.

After the water has been completely drained, then by closing switch 45, a circuit may be completed to the motor 35 so as to start operation of the pump and thus pump liquid detergent from the lower compartment 31 to the upper compartment 32. The pump may be continuously operated until the entire body, or substantially the entire body, of liquid detergent is transferred to the upper compartment 32 so as to completely immerse the soiled dishes.

After the dishes have soaked in the liquid detergent for a predetermined time, lever 42 may be rotated clockwise so as to open valve 40 and allow the liquid to flow therethrough and return to the lower compartment 31. When the liquid detergent has completely drained by gravity to the lower compartment, the lever 42 may be again moved to its counterclockwise position to close valve 40 and open valve 41 to prepare the machine for the second spraying.

Valve 41 is open at all times while spraying is being done, or any time except while the solution is in the upper compartment.

Either of the above described apparatus may be equipped with the modified form of lid construction, such as shown in Figs. 7 and 8, wherein the lid includes a single hole or, preferably, a plurality of holes 50 placed at different spaced points thereof so that the ball-shaped end 4a of nozzle 4 may be selectively inserted in any hole and the rounded handle may be moved about in any direction with a motion similar to that of operation of a gear shift lever so as to squirt the hot rinse water emerging from the opening in end 4a at different angles onto the dishes. The water pipe connected to hose 5 is externally rather than internally of the cabinet. In this manner a more complete coverage and thorough spraying and rinsing of all the dishes is insured since this method allows placement of the nozzle in close proximity thereof so that the dishes will receive a very high pressure stream of water that will effectively dislodge dirty particles therefrom.

While a specific mechanism for raising the dish holding receptacle has been illustrated by way of example, lifts may be substituted there-

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for such as hydraulic lifts, connected to household water lines, or perhaps well counterbalanced suspensions to facilitate lifting by hand—also; instead of using an electric pump, a hand operated pump may be used, instead, to raise the detergent body from a lower to an upper compartment.

While the lower compartment has been described as being a reservoir for a liquid detergent and disinfectant, it will be apparent that other similar liquid solutions, such as soap solutions or other grease removing solutions, may be substituted therefor.

Thus it will be seen that I have provided a relatively simple and inexpensive dish washing machine which depends upon chemical action rather than upon mechanical agitation for cleansing the dishes; more specifically, it depends upon the immersion of dishes in a detergent solution for removal of grease and other particles therefrom, which solution may be used over many times without replacement. It will be apparent that as a further modification, the liquid detergent may be sprayed or squirted on the rinsed dishes, instead, if so desired.

While I have illustrated and described certain specific embodiments of my invention, it will be understood that this is by way of illustration only and that various modifications and changes may be made within the contemplation of my invention and within the scope of the following claims.

I claim:

1. In dish washing apparatus, the combination comprising a casing adapted to contain a quantity of liquid detergent, a support for dishes mounted for vertical movement in said casing from an upper position above the detergent to a lower position to immerse the support in the detergent, said support having a base including baffle structure operable to allow the liquid detergent to rise therethrough to submerge dishes on said support when said support is in said lower position, but effective to prevent water sprayed on said dishes when said support is in said upper position from gravitating into said detergent, and drain means for receiving liquid from said baffle structure only when said support is in said upper position.

2. In dish washing apparatus, the combination comprising a casing adapted to contain a quantity of liquid detergent, a support for dishes mounted for vertical movement in said casing from an upper position above the detergent to a lower position to immerse the support in the detergent, spray means for subjecting dishes on said support to the cleaning action of a water spray when said support is in said upper position, said support having a base including baffle structure operable to allow the liquid detergent to rise therethrough to submerge dishes on said support when said support is in said lower position, said baffle structure comprising a plurality of alternate upper and lower overlapping channels having upstanding flanges along their edges, said channels all being inclined in a common endwise direction for delivering liquid gravitating thereagainst to a common side of said support, and drain means cooperating with said support to drain spray water from said channels only when said support is in said upper position.

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