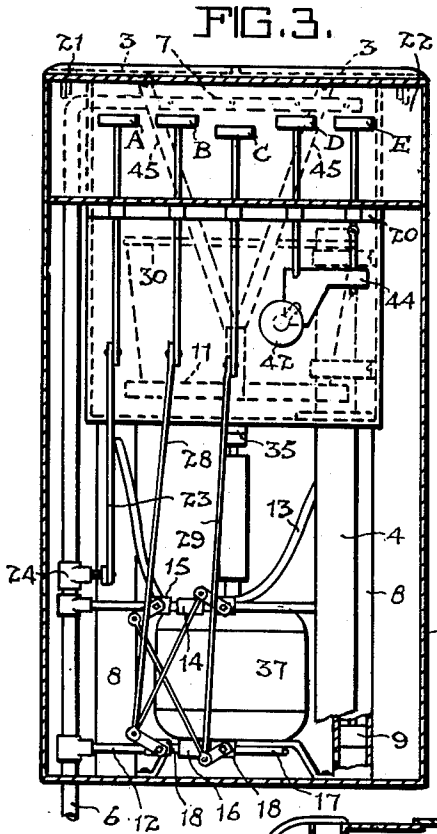
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COMBINATION SPRAY AND AGITATOR DISHWASHING MACHINE WITH ELEVATING RACK

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FIG. 3.



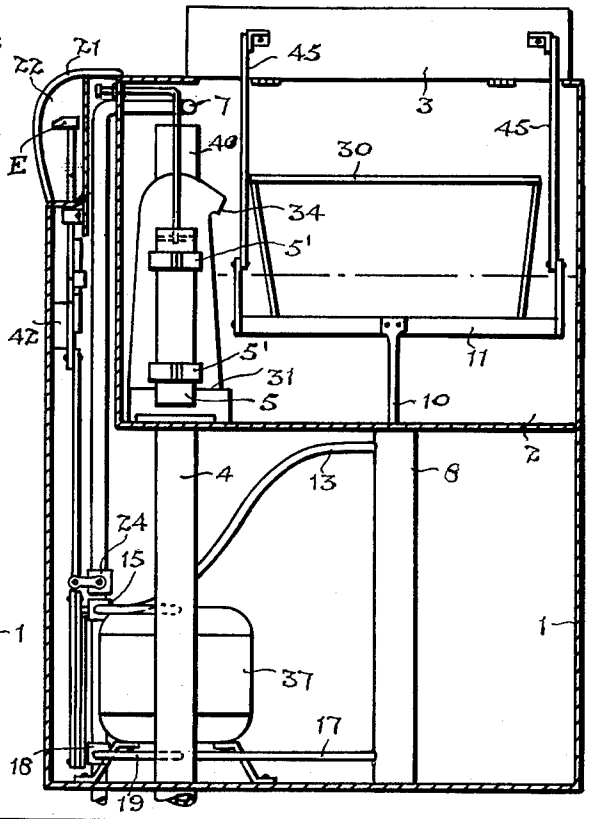


FIG. 1

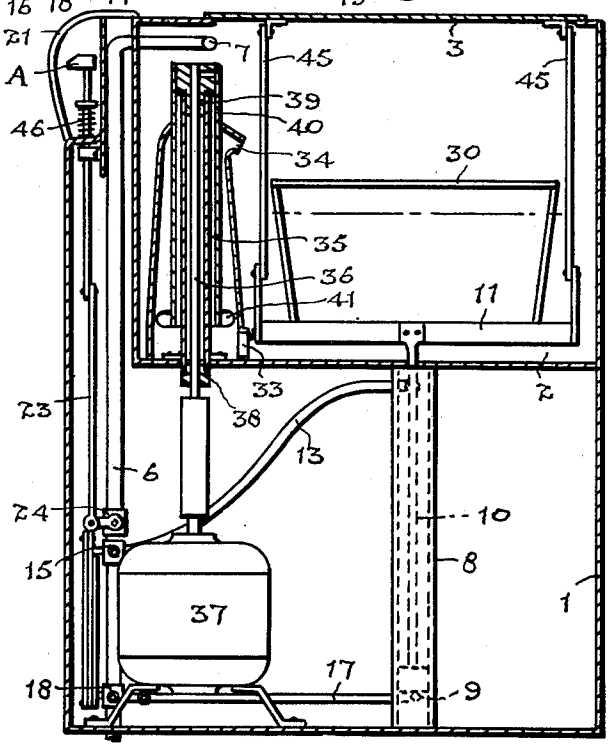


FIG. 2.

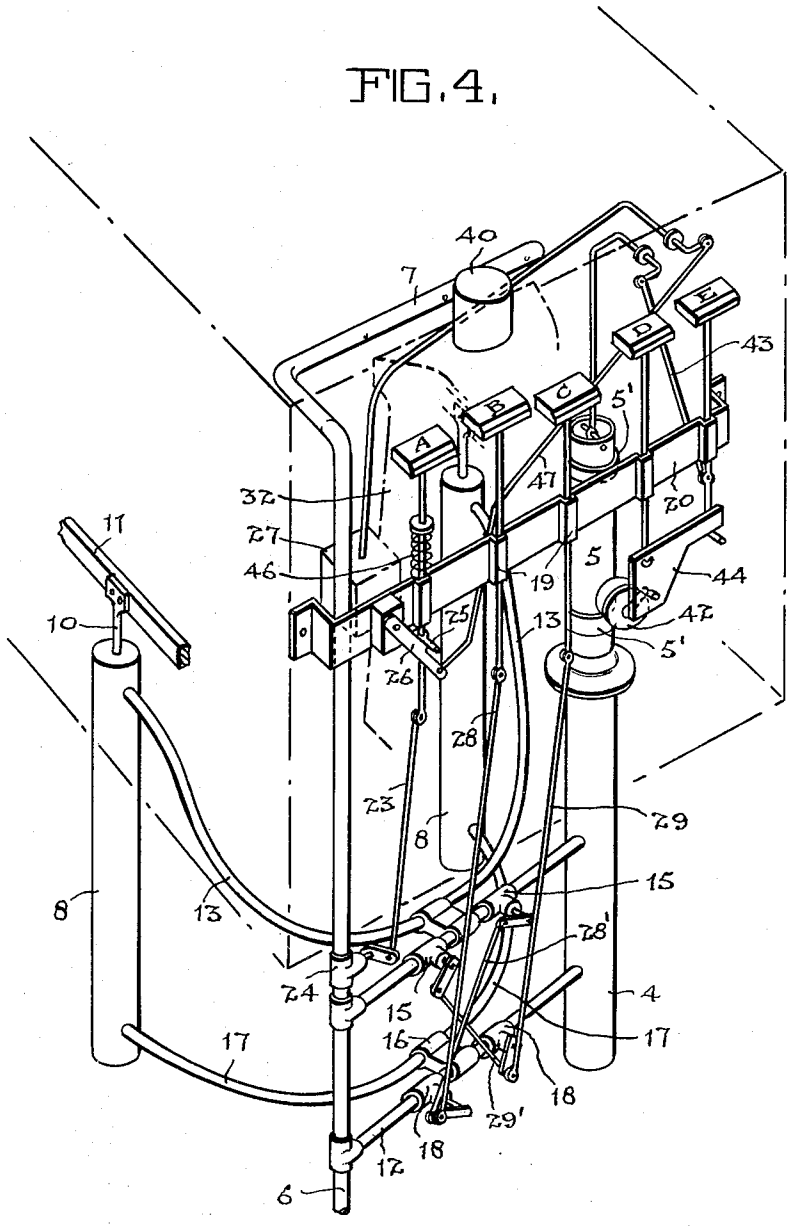
Inventor
Thomas S. Bartlett
by Douglas S. Johnson
Atty.

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COMBINATION SPRAY AND AGITATOR DISHWASHING MACHINE WITH ELEVATING RACK

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FIG. 4.



Inventor
Thomas S. Bartlett
by Douglas S. Johnson
Atty

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COMBINATION SPRAY AND AGITATOR DISHWASHING MACHINE WITH ELEVATING RACK

Thomas S. Bartlett, London, Ontario, Canada

Application December 13, 1949, Serial No. 132,729

6 Claims. (Cl. 134—141)

This invention relates to improvements in dishwashing machines and the principal object of the invention is to provide an attractive and extremely economical and efficient dishwashing machine which will effectively cleanse, and following cleansing will thoroughly rinse all types of dishware including particularly deeply recessed articles such as pots or the like, to leave the dishware clean and free from food soil particles or hard water precipitates.

A further important object is to provide a dishwashing machine which can be very readily operated and will require a minimum of attention and labor.

A still further and important object is to provide a dishwashing machine in which the attendant will not be required to replace or remove the articles to be washed individually in the machine but in which the operating mechanism of the machine will automatically convey a tray or basket of dishes placed thereon into the washing chamber and will eject the dish basket upon completion of the wash whereby the handling of the dishes will be greatly expedited.

The principal feature of the invention consists in arranging in a dishwashing chamber or compartment an agitating device to agitate a bath of cleansing fluid introduced into the chamber to cleanse dishes partially immersed therein and to circulate a volume of the bath as a heavy divergent spray directed above the level of the bath and scouring the exposed dish surfaces to provide a combined agitated bath and spray washing action.

A further important feature consists in supporting the dishes on an elevatable platform to be lowered into the bath and elevating the platform upon completion of the washing action through the heavy spray above the bath to dislodge any loosened food particles or hard water precipitates adhering to the dishes.

A still further feature consists in hingedly connecting the closure doors of the machine to the elevatable platform whereby the doors are automatically opened upon upward movement of the platform to raise the dishes for removal and are automatically closed upon lowering of the platform to carry the dishes down into the bath.

A still further important feature consists in operating the platform with the hydraulic pressure from the water supply.

A further feature resides in providing a control means to permit the dishwashing chamber to be filled or rinsed at will.

Referring to the accompanying drawings Fig. 1 is a side elevational view of a dishwashing machine constructed in accordance with my invention with the side cover removed and with the elevatable platform and compartment doors in a partially raised position.

Figure 2 is a view similar to Figure 1 but showing the elevatable platform in its lowered position holding the compartment doors closed, the machine being broken away to show the agitator device in section.

Figure 3 is a front elevational view with the part covering removed.

Figure 4 is a perspective view illustrating the hydraulic system of the machine and showing diagrammatically the linkage and controls therefor for operating the various controls.

It has been discovered that for certain types of articles, particularly deeply recessed pots, cups and the like, a bath action is required to effect the removal of the adhering food particles. With plates and other flat dishware a heavy forceful spray is desirable to dislodge food particles which have become hardened or baked to the plate.

Heretofore dishwashing machines have incorporated one or other of these washing actions with the inherent advantages and also the inherent disadvantages. Elaborate control systems have been provided in the washing cycle in an attempt to leave the dishes clean and free of loosened food particles following the washing action. One of the principal difficulties encountered has been to provide a spray action which would effectively reach all parts of the dishes as a bath action is entirely unsuitable for removing loosened food particles as the food merely circulates when removed to adhere to adjacent dish surfaces. Attempts to overcome this disadvantage have led to extremely complicated and expensive machines.

The present invention overcomes all of the above disadvantages by not only providing an extremely economical and simply operated machine, but one which combines in an efficient and effective manner the advantages of both the agitated bath and spray washing principles whereby effective cleansing of all forms of dishware is accomplished.

In addition the present invention provides a rinsing action which has hitherto been impossible as the rinsing action combines not only the utilization of a widely diversified spray but also utilizes a movement of the dishes through the spray so that their entire surfaces are effectively exposed.

Other advantages, including the economy of operation, will be apparent from the following description.

With reference to the drawings, it will be seen that the machine illustrated is incorporated within a substantially rectangular casing **1**, the upper part of which is subdivided to define a dishwashing chamber or compartment **2** open at the top. Hinged to close the open top of the compartment are the door closures **3**.

Leading from the bottom of the chamber or compartment **2** is a drain pipe **4**, closing the drain pipe **4** when seated thereagainst is a stopper in the form of a tube **5** slidably supported by the guider **5'**. The tube **5** is open at the ends and when seated serves as an overflow tube to prevent the water level in the tank from rising above its upper end. Leading into the compartment and connected to a pressure water supply is a water inlet **6** which has a laterally turned upper end **7** in which is preferably mounted a suitable spray nozzle to form a spray head.

Mounted beneath the compartment **2** adjacent each side of the machine are cylinders **8** in which operate the pistons **9**, the stems **10** of which extend through the bottom of the compartment and support a framework or platform **11**.

As will be seen in Figure 4, pipes **12** are connected at spaced points between the water inlet pipe **6** and the drain pipe **4** leading to the top portions of the cylinders **8** are feed pipes **13** which are in communication at **14** with the upper pipe **12**.

Arranged either side of the point of connection **14** between the feed pipes **13** and pipe **12** are control valves **15**.

Connected to the lower pipe **12** at **16** are similar feed pipes **17** which may be in the form of flexible hose which communicate with the lower ends of the cylinders **8**.

Either side of the point of communication **16** between the feed pipes **17** and pipe **12** are control valves **18** of any suitable type.

The front of the machine is preferably for the sake of appearance of a waterfall design having a rounded contour at **21** adjacent each side to define a recess **22** in which the operating controls A, B, C, D and E are located. The controls are shown diagrammatically at Figure 4 as push rods, operating in guider **19** formed in the retaining bar **20**.

As shown in the schematic diagram of Figure 4 the control A operates against the spring **46** through the linkage system **23** an inlet control valve **24** of any conventional design arranged in the water inlet pipe **6**. The depressing of the control A is arranged to open the valve **24** through the linkage **23** and the arm **25** carried by the linkage **23** is arranged to be engaged by the latch **26** which is operated by the float **27** through the linkage **47**, the latch normally blocking upward movement of control A under urging of the spring **46** until the rise of water in the compartment raises the float to a point to clear the latch from the arm **25**.

The control B is arranged to operate through the linkage **28** and **28'** the control valve **18** on the pressure side of the connection **16** with the lower pipe **12** and to simultaneously operate the control valve **15** on the side of the connection **14** adjacent the drain pipe **4** respectively.

Downward movement of the control B opens the specified valve **18** and also the specified valve **15** whereby the hydraulic pressure of the pressure supply forces the water into the lower ends of the cylinders **8** to raise the pistons **9** and hence the framework **11** connected to the stems thereof, while the opening of the valve **15** allows the water from the upper end of the cylinders **8** to discharge into the drain pipe **4**.

The control C operates the other corresponding valves **18** and **15** to effect lowering of the pistons **9** through the linkage **29** and **29'** respectively as will be clearly understood from an inspection of Figure 4.

With the operation of the control A water will be introduced through the inlet **6** into the dishwashing compartment to fill the compartment assuming the tube **5** is seated in the drain **4**, or if the tube is raised to open the drain, to rinse the compartment with a rinsing spray.

With the drain closed the level of the water will rise until the float **27** operates the latch **26** to clear the arm **25** whereby the compartment is filled with hot water to about half its depth, the water supply being connected with the hot water system of the house or building.

With the control C operated to lower the frame or platform **11** the wire frame basket **30** in which dishes or dishware are supported is partially submerged as illustrated in Figure 1.

The washing action is accomplished through the agitator device, generally designated at **31**, now to be described.

The device includes an upright casing **32** which opens at the bottom at **33** into the dishwashing compartment and which is provided with a wide discharge head **34** arranged at some distance above the top of the wire frame basket **30**.

Extending up through the bottom of the compartment **2** within a standpipe **35** is a drive shaft **36** driven by the motor **37** mounted in the bottom of the casing **1** below the dishwashing compartment.

Mounted at the extremities of the standpipe **35** are internally-lubricated bearings **38** and **39**, and surrounding the standpipe **35** and revolving about the bearings **38** and **39** is a cylindrical housing **40** operatively connected with the drive shaft **36**.

Secured to the base of the housing **40** are transversely dished impeller blades **41** whose action is to direct the water or cleansing liquid upwardly in the casing **32**.

The action of the agitating device through the rapid rotation of the impeller blades **41** is to effect firstly, the agitation of the bath or water within the compartment **2** to which any suitable detergent may be added and to draw a large volume of such bath in through the opening **33** in the casing **32** and to direct same upwardly to the spray head **34** from where it is directed outwardly in a diverging broad spray of considerable force and heavy volume on to the portions of the dishes exposed above the surface of the bath and extending above the basket **30**.

Thus a very thorough washing action is provided, the agitated bath action effecting a thorough cleansing of deeply recessed dishware articles, such as deep pots, bowls and the like which cannot be effectively and thoroughly cleansed by the spray action, while the heavy spray from the agitator device provides the forceful impingement cleaning action associated with the spray.

To operate the motor control D is provided and this control is arranged to operate the switch **42** for applying power to the motor **37**. Control E is arranged to operate through the linkage **43** the drain stopper in the form of the tube **5**. Associated with control D is an extended arm **44** arranged to be engaged by control E to effect the stopping of the motor **37** with the opening of the drain as a safety feature.

Connected with the frame or platform **11** through the pivotal links **45** are the door closures **3**, and, as will be seen on reference to Figures 1 and 2, the operation of the platform **11** effects through the links **45** the opening and closing of the doors.

It is extremely important to note that, in elevating the platform from Figure 2 to Figure 1 and to the full upward extent of the piston movements, the dishes and basket **30** are carried upwardly through the heavy diverging spray from the discharge **34** of the agitating device **31**. This not only means that the dishes as they are cleared above the surface of the bath are subjected to a thorough rinsing action from the heavy spray discharge from the agitating device, but further, the relative movement of the dishware and the spray, which is arranged to give broad coverage in at least a limited portion of the tank or compartment **2**, ensures that the maximum effectiveness of the spray is utilized while permitting the spray device to assume a very simple and economical form.

In operation, with the platform **11** elevated and the door closures **3** opened by operation of the control B, the dishes are readily placed in the wire frame basket **30** of any suitable design without requiring that the attendant place the dishes individually into the dishwashing compartment.

Operation of control C lowers the dishes and closes the doors **3**. Operation of control A then effects introduction of the hot water as a spray into the compartment to form the bath, control E having been operated to close the stopper **5**. Control D is operated to begin the motor action which may be delayed if desired until the tank has become filled to the desired level, the inlet valve being then permitted to close under spring action by the float **27**.

The impeller **41** then provides an agitated bath action to the immersed dishes or immersed portions of the dishes and at the same time provides the heavy large volume spray to effect a thorough cleansing of the exposed dish portions.

Upon completion of the washing action control B may be operated to elevate the dishes to carry them through the spray from the discharge head **34** of the agitator so that any loose adhering food particles or hard water precipitates will be thoroughly rinsed therefrom.

The continued upward movement of the platform opens the closure doors **3** and elevates the dishes where they may be removed as a unit by transferring the basket **30** without requiring that the attendant individually remove the dishes from the machine. Control E may be manually operated then to allow the water to drain, automatically effecting the cutting off of power to the motor **37** through the arm **44**.

Upon completion of the wash it may be desirable to

rinse the compartment 2 and this may be accomplished by again operating the control A to open the water inlet valve 24.

With the controls provided any cycle of operation to suit the requirements or desires of the attendant is possible and the washing cycle may be repeated as often as required depending upon the length of time the dishes have been standing or depending upon the water conditions encountered.

Not only is the operation extremely flexible and efficient but it will be readily appreciated that my machine will be extremely important from the standpoint of economical manufacture.

It will also be appreciated that in addition to the extremely efficient washing action provided the functioning of my machine, which provides a thorough spraying of the dishes as they are automatically elevated through the use of the hydraulic pressure of the water supply system, requires no additional large volume of water to effect the rinsing of the dishes. Thus the amount of water required to carry out the washing is kept to a minimum presenting an important factor in the advantages of the present washing and rinsing operation, particularly where large supplies of hot water are either not available or are available at relatively heavy cost.

What I claim as my invention is:

1. In a dishwashing machine, the combination with a dishwashing compartment having a water inlet to be connected to a water pressure supply and a drain outlet, means for controlling the flow of water through said inlet and outlet and a dish-holding basket to fit within said compartment, of means disposed at one side of said compartment for agitating a bath of cleansing liquid introduced into said compartment and for circulating a volume of said bath as a heavy spray curtain directed downwardly from above said bath, control means for controlling the period of operation of said agitating and circulating means, reciprocable means independent and clear of and operating past said agitating and circulating means for lowering said basket into the bath and for elevating said basket to carry dishes contained therein up from said bath against and through said spray curtain to remove food soil particles loosened under the scouring action of said agitated bath and spray, and means for controlling said reciprocable means to elevate said basket out of the bath while said agitating and circulating means is discharging said heavy spray directly above the bath.

2. In a dishwashing machine, the combination with a dishwashing compartment having a water inlet to be connected to a pressure water supply and a drain outlet communicating with the interior of said compartment, and means for controlling the flow of water through said inlet and said outlet, of impeller means disposed at one side of said compartment for agitating water introduced within said compartment to form an agitated cleansing bath to receive dishes to be washed and for circulating a volume of said bath as a heavy spray directed downwardly from above the surface of said bath, control means for controlling the period of operation of said impeller, hydraulic cylinder means arranged below said compartment and connected with said pressure water supply and said chain outlet, piston means operating in said cylinder means and extending into said compartment clear of said impeller means, dish-supporting means arranged within said compartment and operatively connected to said piston means for reciprocable movement beside and clear of said impeller means, and valve means independent of said impeller and control therefor to control the water pressure in said cylinder means to lower said dish-supporting means into said bath and to raise said dish-supporting means during operation of said impeller means upwardly through said heavy spray directed downwardly from above said bath.

3. In a dishwashing machine, the combination with a dishwashing compartment open at the top and having a water inlet to be connected to a pressure water supply and a drain outlet leading from the interior of said compartment, and means for controlling the flow of water through said inlet and said outlet, of impeller means arranged at one side of said compartment for agitating water introduced within said compartment to form an agitated cleansing bath and for circulating a volume of said bath as a heavy spray curtain directed to cascade downwardly from above the surface of said bath, a control for controlling the period of operation of said impeller means, closure means hinged at the top of said compartment for closing the compartment during washing action, hydraulic cylinder means arranged below said compartment and having vertically reciprocating piston means operating clear of said impeller means, dish-supporting means within said compartment vertically reciprocated at one side of said impeller means by said piston means, conduit means adapted to connect a pressure water supply to opposite ends of said hydraulic cylinder means, conduit means connecting opposite ends of said hydraulic cylinder means to said drain outlet, and valve means selectively connecting either of the ends of said hydraulic cylinder means with a pressure water supply while connecting the other end to said outlet to hydraulically draw said dish-supporting means into said bath and to hydraulically elevate said dish-supporting means against and through said spray curtain.

4. A device as claimed in claim 3 in which said closure means comprises doors hinged to close and open said compartment, and link means connecting said doors and dish-supporting means to open and close said doors under hydraulic pressure.

5. In a dishwashing machine, the combination with a dishwashing compartment, a water inlet therefor, a water outlet therefrom, and means to control the flow of water through said water inlet and outlet, of impeller means disposed at one side of said compartment to circulate water introduced into said compartment and to provide an agitated bath in said compartment, a dishware supporting platform reciprocally supported in said compartment to operate past and clear of said impeller means into and out of said agitated bath, and hydraulic means for elevating and depressing said platform under full pressure of a water supply system independent of the circulation of water introduced into said compartment, said hydraulic means comprising at least one hydraulic cylinder, a piston operating in said cylinder and operatively connected to said platform, conduit means adapted to connect each end of said cylinder to a water pressure source, conduit means adapted to connect each end of said cylinder to a drain, and valve means to selectively connect either end of said cylinder to a high pressure water source while connecting the other cylinder end to a drain.

6. In a dishwashing machine, the combination with a dishwashing compartment, a water inlet thereto and a drain outlet therefrom and a dish-supporting basket fitting within said compartment, of hydraulically operated reciprocable means arranged below said compartment and operating through the bottom of said compartment to elevate and lower said basket, impeller means at one side of the path of movement of said basket to circulate and agitate a body of water in said compartment to provide an agitated bath and to which said basket is adapted to be lowered, means operatively connected with said impeller means to direct a portion of the water circulated by said impeller means above said agitated bath as a heavy spray curtain directed to cascade downwardly from above the surface of said bath, and means controlling said reciprocable means to operate said basket through said spray curtain.

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