Aug. 16, 1938. W. R. WALKER 2,127,017

DISHWASHER

Filed Oct. 17, 1935

FIG. 1.

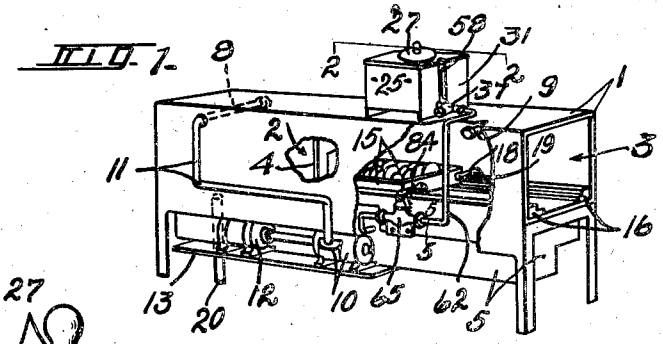


FIG. 2.

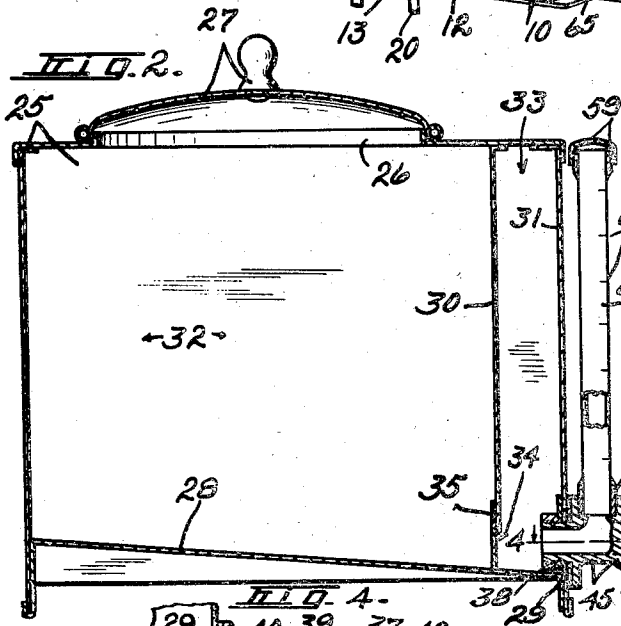


FIG. 3.

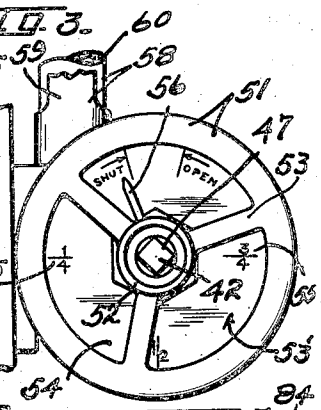


FIG. 4.

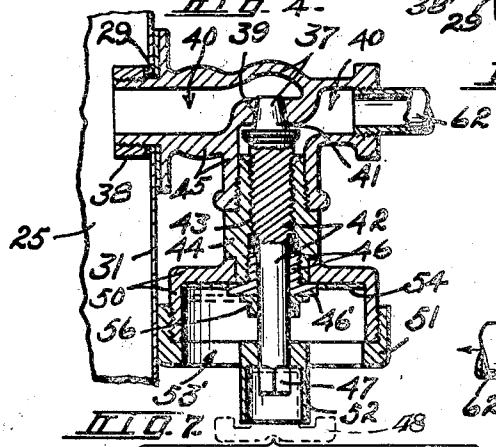


FIG. 5.

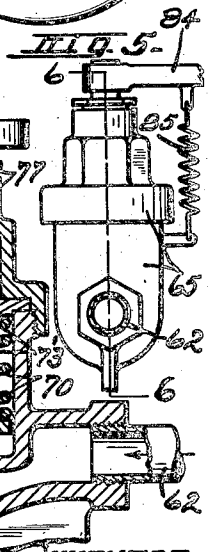
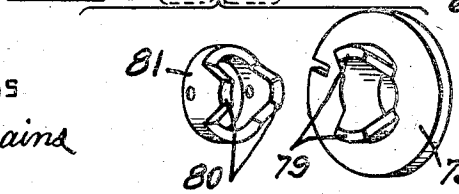


FIG. 6.

FIG. 7.



WITNESS

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DISHWASHER

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2 Claims. (Cl. 141—9)

This invention relates to certain new and useful improvements in dish washing machines and pertains more particularly to a device for supplying cleansing solution to the washing fluid of the machine and to the control therefor.

In conventional dish washing machines for which my novel cleansing solution supply means is peculiarly adapted to be used there is provided a pair of chambers, one a washing chamber and the other a rinsing chamber, arranged in longitudinal spaced relation over a common vat for the washing fluid. The articles to be cleansed, such as dishes, drinking glasses, silver-ware or the like are stacked in suitable trays and the loaded trays are conveyed through the washing machine from one chamber to the other and subjected to a washing spray in the first chamber and to a rinsing spray in the second chamber to effect the washing or cleansing thereof. The rinsing fluid as water is supplied to the rinsing spray in a pure or clean heated condition. After the rinsing fluid is passed over the articles to be cleansed it is collected in the washing fluid vat which in turn is provided with an over-flow pipe adapted to maintain a predetermined quantity of the fluid therein.

The washing fluid is supplied by a pump or other suitable means from the washing fluid vat to the washing spray and after it passes from the spray over the dishes or other articles, it is again returned to the vat and in order that this washing fluid may be effective a quantity of a suitable solvent or cleansing agent is added at intervals to the washing fluid. The quantity of the cleansing agent and the frequency of the application of the same to the washing fluid has often, heretofore, been dependent upon the judgment or opinion of the operator. When the cleansing agent is thus supplied the application thereof to the washing fluid has been at irregular intervals, the quantity was greatly in excess of the requirements and, therefore, this method has resulted in a very inefficient washing fluid and has proven decidedly wasteful.

The main object of this invention is to provide a dish washing machine having washing and rinsing chambers with means for automatically supplying a solvent or cleansing agent to the washing fluid at predetermined periods of operation.

Another object of the invention is to provide a cleansing agent supply means for the washing fluid of a machine for washing dishes or the like with means whereby a predetermined quantity of the cleansing agent will be supplied.

Further objects reside in providing a device for automatically supplying a cleansing agent to the washing fluid of a dish washing machine or the like which is simple, durable and economical in construction and positive and accurate in operation.

Other objects and advantages pertaining to the structure of the device and to the form and relation of the parts thereof will more fully appear from the following description taken in connection with the accompanying drawing in which:

Figure 1 is a perspective view of a conventional dish washing machine with my novel cleansing agent supply means operatively associated therewith and illustrating a portion of the dish washer broken away to better illustrate the parts contained therein.

Figure 2 is a sectional view on an enlarged scale of the cleansing agent supply tank and the meter valve associated therewith taken substantially in the plane of the line 2—2, Figure 1.

Figure 3 is a fragmentary side elevation of the metering valve and the adjacent portion of the supply tank together with the adjacent portion of the gauge for determining the amount of cleansing agent contained in the supply tank.

Figure 4 is a detail horizontal sectional view taken on line 4—4, Figure 2.

Figure 5 is a sectional view taken substantially on line 5—5, Figure 1, illustrating my novel operating valve in elevation, portions of said valve being broken away.

Figure 6 is a vertical sectional view through the operating valve taken substantially on line 6—6, Figure 5.

Figure 7 is a perspective view of co-acting cam members for effecting the opening and closing of the operating valve.

It will be readily understood that there are numerous different designs of washing machines wherein the articles to be washed are first subjected to the action of the washing fluid after which they are treated by a rinsing fluid and although my novel device for supplying a cleansing agent to the washing fluid is equally adapted to be used in connection with washing machines of different constructions, I have chosen a well-known simply constructed type of dish washing machine for illustrating the application of my device to a washing machine.

The dish washing machine as illustrated in Figure 1 comprises a case 1 open at both ends and having therein a washing chamber 2 and a rinsing chamber 3 which may be divided by a suitable

wall as 4 composed of either metal or of fabric or the like and which extends transversely of the case and is adapted to permit the articles to be cleansed to pass from one chamber to the other. To the lower portion of the case 1 is secured a vat 5 which extends longitudinally of the case beneath the chambers 2 and 3 and has the upper side thereof open and in communication with said chambers.

The case 1 is further provided with a pair of spray nozzles or manifolds as 8 and 9 arranged in the upper portion of a respective chamber for supplying respectively a washing fluid and a rinsing fluid to the articles to be washed. Rinsing fluid may be supplied to one of these spray nozzles as 9 by any suitable means and from any suitable source not shown, in a manner which will be clearly understood by those skilled in the art. The washing fluid is supplied to the other nozzle 8 in this instance by means of a pump 10 having the inlet opening thereof in communication with the interior of the vat 5 while the discharge opening of said pump is connected with the nozzle 8 in any suitable manner as by a conduit 11. The pump 10 is driven by an electric motor 12 operatively connected therewith. The motor 12 and pump 10 are mounted in the usual manner outside the washing and rinsing chambers upon a base 13 which may be supportably connected in any suitable manner to the case 1.

In dish washing machines of this type the articles as china-ware, silver-ware and glass-ware are usually stacked in suitable baskets or trays as 15 and these loaded trays are conveyed through the case 1 from the washing chamber to the rinsing chamber and for this purpose I have shown a pair of opposed guide tracks 16 secured to the case 1. These guide tracks are arranged in parallel spaced relation over the vat 5 and in this instance the trays 15 are manually moved along said tracks from one chamber to the other.

In operation the pump 10 is continuously operated by the motor 12 for pumping the washing fluid from the vat 5 to the spray nozzle 8 where it is discharged over the articles to be washed and the tray containing them and then the washing fluid returns to the vat 5 to be re-circulated. As the loaded tray 15 is moved from the washing chamber 2 into the rinsing chamber 3, said tray comes into contact with an operating lever 18 provided on a control valve 19 connected in the supply line for the spray nozzle 9. As the tray thus engages the lever 18 the valve 19 is opened for automatically supplying the rinsing fluid which preferably consists of clean water heated to a high degree of temperature to the spray nozzle 9. As the rinsing fluid escapes from the nozzle it passes over the contents of the basket and is deposited into the vat 5 for replenishing the washing fluid contained in said vat. A predetermined quantity of washing fluid is contained in the vat by means of an over-flow pipe 20 which is preferably connected with the vat beneath the washing chamber 2, or in other words, in spaced relation to the source of supply for said washing fluid.

It will thus be seen that as fluid, as water, is added to the washing fluid during the rinsing operation, a corresponding quantity of the washing fluid will escape through the over-flow pipe 20, together with any cleansing agent which may be contained therein and, therefore, it becomes necessary to add a certain amount of cleansing agent to the washing fluid to maintain the same at a given standard for efficaciously loosening and removing insoluble refuse and food stuffs carried by the dishes or other articles to be cleansed.

My novel apparatus for supplying a solvent or cleansing agent to the washing fluid contained in the vat 5 in this instance, comprises a supply tank or reservoir 25 which may be mounted in any convenient location as upon the case 1 as shown in Figure 1. This tank is preferably composed of sheet copper or other non-corrosive material and has the upper side thereof provided with an inlet opening 26 which is closed by a cover 27 removably mounted on the tank. The bottom as 28 of the tank preferably slopes from one end thereof toward the other end which is provided with an outlet opening 29 in close proximity to the bottom 28. The supply tank 25 is divided by a partition 30 which extends transversely across the tank parallel with the end 31 of the tank containing the outlet opening 29 to form a relatively large supply chamber 32 and a relatively small outlet chamber 33.

The lower end of the partition 30 terminates a short distance from the bottom 28 to form a passage 34 connecting the supply chamber with the outlet chamber and this passage may as shown, be covered by a suitable screen 35 for preventing undissolved portions of the cleaning agent from passing from the supply chamber.

A metering valve 37 is secured in any suitable manner to the end 31 of the supply tank in communication with the outlet opening 29 as by a nut 38. This metering valve as shown in the drawing comprises a valve seat 39 formed in the passage 40 which extends longitudinally through said valve from the inlet end thereof to the outlet end. A tapered valve 41 is mounted in the case 45 of valve 37 to engage the seat 39 and has the stem as 42 thereof provided with screw threads 43 which engage in a corresponding internally threaded plug or cap 44 mounted in the valve case 45 at one side of the passage 40. The valve stem 42 extends outwardly through the plug and through a stuffing box as 46 provided in the outer end of the plug and has the outer end thereof flattened as at 47 to provide a convenient means by which the valve may be manipulated by a key indicated at 48 Figure 4, which may be removably connected to the valve stem.

To the outer end of the plug 44 is secured in any suitable manner as by the stuffing box nut 46' a cup-shaped housing 50 which in this instance has the outer end portion thereof open and provided with a cap 51 screw threaded thereon, said cap being provided with a hollow boss 52 adapted to receive the outer end of the valve stem 42 thereon as shown in Figure 4 and connected with the marginal portion of the cap 51 by a plurality of, in this instance, three radially disposed arms 53 which provide a corresponding number of sight openings 53' through which the interior of the housing 50 may be observed.

Within the housing 50, as shown in Figure 4, is mounted an index plate or disk 54 composed of thin sheet metal, paper or the like. The index plate 54 may be secured in any suitable manner as by glue to the inner end wall of the housing and is provided with a plurality of circumferentially spaced indicia 55 by which the position of the valve 41 may be determined, said valve being provided with a pointer 56 secured in any suitable manner to the valve stem 42 adjacent the nut 46' for co-acting with the indicia on the index plate 54.

As shown in the drawing the metering valve 37

has connected thereto a contents gauge 58 which in this instance, comprises a tubular metal case 59 secured to the valve case and which contains a glass tube 60 which has the lower end thereof in communication with the passage 40 of the valve between the inlet opening thereof and the valve seat 39. The tubular case 59 is provided with a longitudinal slot in one side thereof for exposing the adjacent portion of the glass tube 60, and said tube is provided with the usual marks or indicia 60' arranged in longitudinal spaced relation to be observed through the slot. It will thus be understood that the solution contained in the supply tank may flow upwardly into the tube 60 and the contents of the tank be readily determined without the necessity of removing the cover 27.

The outlet of the passage 40 of the metering valve 37 is connected with the interior of the vat 5 by means of a pipe or conduit 62 which extends downwardly through the upper wall of the case 1 through the rinsing chamber 3 at one side thereof and has the lower end extended through the vat 5 in communication with the interior thereof in a plane preferably above the upper end of the overflow pipe 20 and, therefore, above the level of the washing fluid contained in the vat.

Mounted in the conduit 62 and positioned within the chamber 3 is an operating valve 65. This valve is provided with a valve seat 66 arranged in the passage 67 extending lengthwise therethrough. A disk valve 68 is mounted in an upwardly projecting hollow boss 69 formed integral with the valve case for axial movement into and out of engagement with the valve seat 66. The valve 68 is normally urged into engagement with the seat 66 by a spring 70 also mounted in the boss 69 between a washer 71 secured to the lower end of the valve stem 72 adjacent the valve 68 and guide member 73 mounted at the upper end of the boss 69. This guide 73 has the lower portion thereof provided with a stuffing box 73' and is secured to the boss 69 by a cap 74 which is screw threaded at its lower end to the boss 69 as shown in Figure 6. The guide member 73 is maintained against rotation by a pin 75 mounted in the boss 69 and extending upwardly through a slot provided in the member 73. The cap 74 extends some distance above the boss 69 and has the upper end thereof provided with a stuffing box 77 through which the valve stem 72 extends.

The upper face of the guide member 73 is provided with a pair of upwardly extending diametrically opposed cam members or teeth 79 as shown more clearly in Figure 7 and which are adapted to be engaged by a pair of correspondingly constructed cam faces or teeth 80 provided on a cam collar 81 secured to the valve stem 72 adjacent the teeth 79 so that when the valve 68 engages the valve seat 66 the teeth 80 will register in the spaces between the teeth 79. It will now be observed that the valve 68 may be raised from the valve seat 66 by rotating the valve stem 72 in either direction for bringing the cam teeth 80 into engagement with the teeth 79 and thereby produce an upward axial movement of the valve stem and valve disk.

In order that this rotary movement of the valve stem may be readily accomplished, the upper end thereof has secured thereto one end of a radially extending arm 84 which has secured to the underside thereof a spring 85. This spring 85 extends downwardly in a vertical plane from the arm 84 when the cam teeth 80 are in a position intermediate the cam teeth 79 and the disk valve 68 is in engagement with the seat 66 and has the lower end thereof connected with the case of the valve 65 as shown in Figure 5. It will thus be seen that when the arm 84 is rocked in either direction for lifting the disk valve 68 from the seat 66 the spring 85 will be tensioned thereby and as soon as the arm 84 is released will function to return said arm to its normal position and thereby return the disk valve 68 to the closed position in engagement with the seat 66. The valve 65 as shown more clearly in Figure 1 is secured to one side of the vat 5 with the arm 84 thereof extending over the adjacent guide tracks 16 opposite the arm 18 for the valve 19, in the path of movement of a tray 15 moving along said track.

In operation the cleansing agent as an alkali cleaning material is placed in the supply tank 25 in a liquid state or is mixed with a liquid as water so as to be in a liquid state and will obviously pass from the tank to the metering valve 37. This valve is maintained in a partial open position by the manipulation of the valve stem 42 depending upon the degree of discharge of the cleansing agent which is wished to be maintained. The cleansing agent passes from the metering valve 37 through the conduit 62 to the operating valve 65. This valve 65 is opened by the engagement of a tray 15 with the arm 84 each time a tray is moved into the rinsing chamber 3 and in the arrangement shown in the drawing this valve 65 will be opened simultaneously with the opening of the control valve 19 so that as washing fluid is supplied to the tank 5 from the spray nozzle 9 the cleansing agent will be supplied to the washing fluid in the vat 5. As soon as the tray in the rinsing chamber is moved outwardly therefrom beyond the valve arms 19 and 84 the supply of fresh washing fluid and cleansing agent to the vat 5 will be discontinued.

It will thus be seen that I have produced a simple, economically constructed mechanism whereby a cleansing agent may be automatically supplied to a washing fluid simultaneously with the replenishment of said washing fluid with a fresh supply and that the quantity of the cleansing agent may be readily controlled by the manipulation of metering valve 37 so as to produce and maintain a washing fluid having a given percentage of cleansing agent therein irrespective of any variation in the amount of washing fluid used.

Although I have shown the valves 19 and 65 for controlling the supply of rising water and the cleansing agent respectively to the vat 5 mounted within the rinsing chamber 3 and as being manually manipulated simultaneously in this instance through the medium of the tray 15, it is to be understood that one or both of these valves may be mounted at any other convenient position either inside or outside of the rinsing chamber or of the case 1 and that they may be manually operated simultaneously for adding a fresh supply of water and a cleansing agent to the vat by any suitable lever or linkage mechanism operatively connecting said valves. Therefore, I do not wish to be limited to the exact construction shown as various changes may be readily made in the form and relation of the parts of the device without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. In a dish washing machine having a vat for washing fluid, a casing arranged over said vat

forming a washing chamber in communication therewith, track means for trays for the articles to be cleansed connected with the casing to extend through the chamber over said vat and a washing apparatus connected with the casing for subjecting the articles in the trays to the action of the fluid in said vat to wash said articles, said washing machine being characterized by a rinsing apparatus connected with the casing in spaced relation to the washing apparatus for sprinkling the articles with fresh water and adding said water to the contents of the vat, said rinsing apparatus including a spray nozzle mounted in said chamber and a valve mounted adjacent the track, a supply tank for a cleansing solution, a conduit connecting the tank with the vat, an operating valve in said conduit positioned adjacent the track independently of the first mentioned valve, separate operating means for each valve, each of said operating means being arranged to extend into the path of a tray in its movement along said track to be directly engaged by said tray for simultaneously opening said valves and maintaining the valves in the open position during the passage of the tray beneath the spray nozzle, and a metering device for the cleansing solution mounted in said conduit.

2. In a dish washing machine having a vat for washing fluid, a casing arranged over said vat forming a washing chamber in communication therewith, track means for trays for the articles to be cleansed connected with the casing to extend through the chamber over said vat and a washing apparatus connected with the casing for subjecting the articles in the trays to the action of the fluid in said vat to wash said articles, said washing machine being characterized by a rinsing apparatus connected with the casing in spaced relation to the washing apparatus for sprinkling the articles with fresh water and adding said water to the contents of the vat, said rinsing apparatus including a spray nozzle mounted in said chamber and a valve mounted adjacent the track, a supply tank for a cleansing solution, a conduit connecting the tank with the vat, an operating valve in said conduit positioned adjacent the track independently of the first mentioned valve, separate operating means for each valve, each of said operating means being arranged to extend into the path of a tray in its movement along said track to be directly engaged by said tray for simultaneously opening said valves and maintaining the valves in the open position during the passage of the tray beneath the spray nozzle, and a metering device for the cleansing solution mounted in said conduit, including a body member having a valve seat, a valve movable toward and from said seat, and operating means connected with the valve whereby said valve may be manually adjusted.

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