Jan. 2, 1934. C. F. COLLINS 1,941,660

DISH AND LIKE WASHING MACHINE

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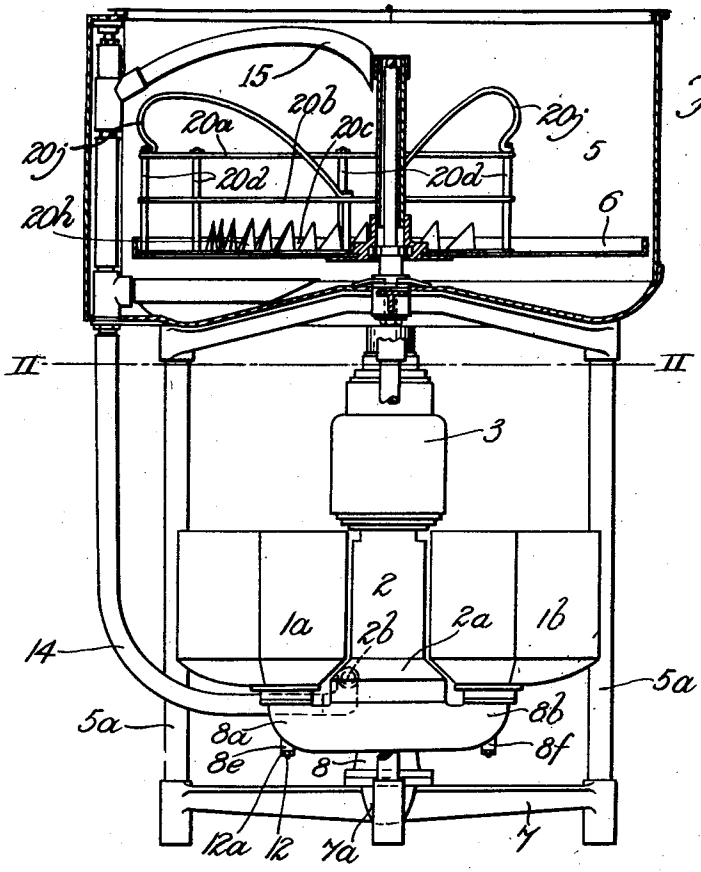



Fig. 1.

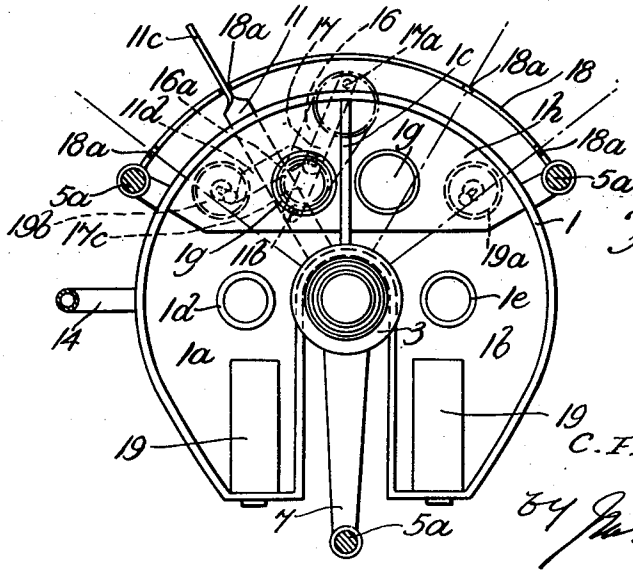



Fig. 2.

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Fig. 3.

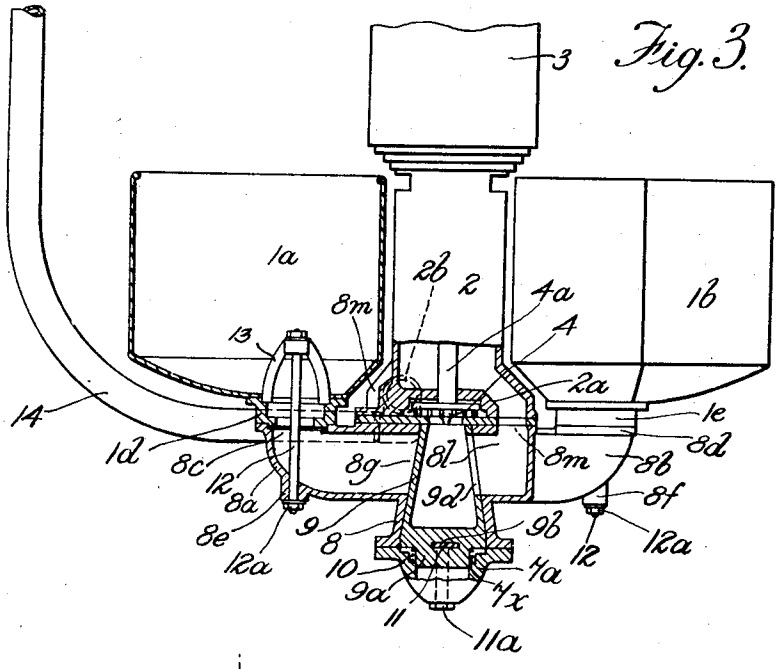
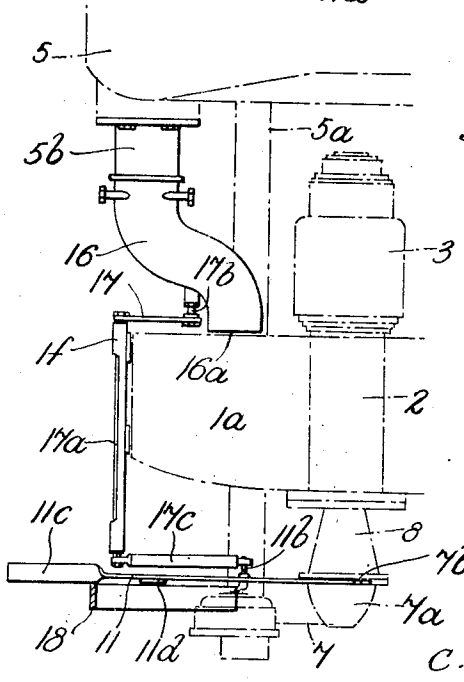



Fig. 4.




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Fig. 5.

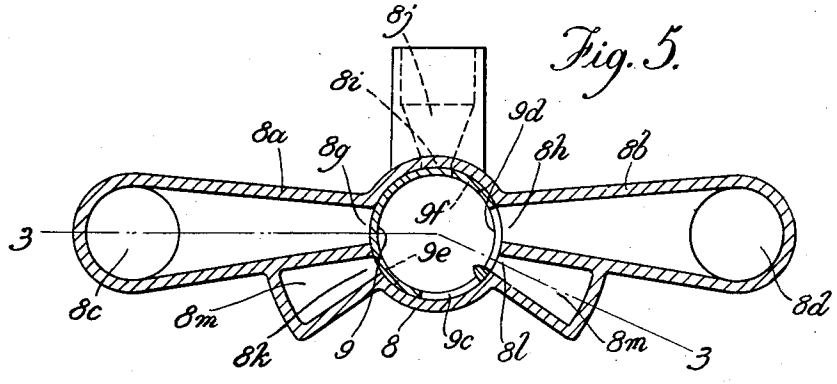



Fig. 6.

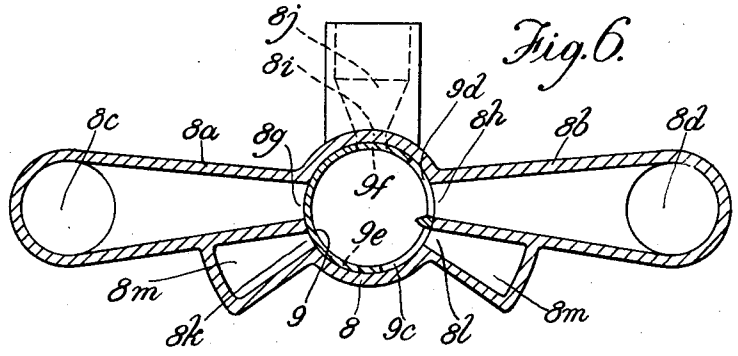



Fig. 8.

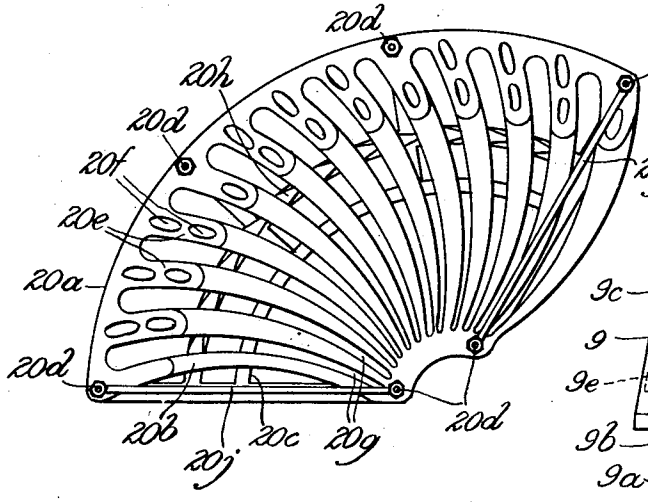
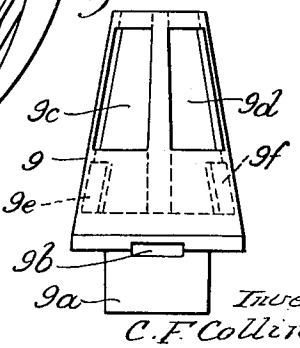



Fig. 7.




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# UNITED STATES PATENT OFFICE

1,941,660

## DISH AND LIKE WASHING MACHINE

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Application September 9, 1931, Serial No. 561,985, and in Great Britain June 5, 1931

2 Claims. (Cl. 141—9)

This invention relates to dish and like washing machines wherein hot water is withdrawn from a tank or reservoir by a pump and sprayed through jets on to the dishes or the like contained in a basket rotatably mounted in a washing chamber, the action of the jets of liquid on the dishes or the like causing the rotating of the basket, and the waste water being returned to the supply tank which is heated by suitable means.

The invention has among its objects to provide an improved construction of washing machine of this kind wherein two tanks or reservoirs are provided for use alternately, the improved machine being constructed to facilitate the washing, rinsing and draining operations under the control of a single lever.

According to the present invention the two tanks or reservoirs, which preferably are arranged side by side and may be constituted by a single reservoir divided into two by means of a partition, are connected by suitable passages to ports in the wall of the body of the plug cock which also is formed with a port or ports leading to a drainage outlet. The rotatable plug of the cock which is caused to engage the corresponding seating in the body by means of a spring or resilient means is of hollow formation and is formed with ports in its wall which are so arranged that in one position one of the tanks or reservoirs is placed in communication with the interior of the plug which communicates with the inlet to the circulating pump, while in another position communication with the first tank or reservoir is shut off and the second tank or reservoir is placed in communication with the pump, while by a further predetermined movement beyond either of these positions the respective tank or reservoir is placed in communication with a drainage outlet. Conveniently, the ports controlling the drainage outlet are displaced axially with respect to the ports for controlling the circulation, and the plug of the cock is operated by means of a lever which may project outwardly through a slot in the valve body or in a boss carrying the valve body and enclosing the projecting part of the plug and the pressure spring therefor.

The liquid in the tanks or reservoirs advantageously is heated by the use of electric immersion heaters, and in order to ensure that these heaters will be switched off before the tanks or reservoirs are drained, the control lever may be fitted with a cam or otherwise adapted so that when moved into each extreme position for the drainage it acts upon a switch to break the circuit of the respective heater.

The washing chamber containing the rotatable basket is arranged above the tanks or reservoirs and for the purpose of permitting the return flow of liquid from the washing chamber into the respective tank or reservoir which is in use, a swivelling pipe fitting is provided of approximately S or equivalent formation, such pipe fitting being connected by levers and links or equivalent means to the control lever so that on movement of the lever into one position or the other for circulation of the liquid in one or other of the tanks or reservoirs, the swivelling pipe connection is moved so that its outlet is over an aperture in the top of the respective tank or reservoir.

The circulating pump advantageously is arranged as heretofore, coaxially with the controlling valve and is directly driven by an electric motor also coaxially arranged.

The controlling valve preferably is arranged with its axis vertical in machines for household use, but in larger machines for use in canteens or the like the controlling valve may be arranged with its axis horizontal, so that the driving motor for the pump may be arranged exterior to the machine and at a remote position if desired.

In the case of machines in which the motor is arranged vertically above the pump, the drive shaft from the motor to the pump is enclosed in a tubular casing and the necessity for stuffing boxes may be eliminated by suitably forming the pump impeller in known manner to maintain a balance between the fluid in the respective tank or reservoir and within the casing enclosing the shaft and thus to avoid any tendency of the liquid to be forced up into the electric motor, more especially if any stoppage should take place in the delivery of the pump. The casing enclosing the driving shaft is connected to additional ports in the valve body which are arranged in relation to the ports controlling the circulation so that when either of the tanks or reservoirs is in circuit with the pump the casing enclosing the shaft is at the same time placed in communication with the pump inlet to permit of or to establish an internal circulation as an additional safeguard to any undue rise in level of the fluid in the shaft enclosing casing.

The invention is hereinafter described by way of example with reference to the accompanying diagrammatic drawings, in which:—

Figure 1 is a part sectional elevation illustrating a construction of washing machine according to the invention;

Figure 2 is a cross-section on the line II—II of Figure 1;

Figure 3 is an elevation of the machine, with the lower part in section, on approximately line 3—3 of Figure 5.

Figure 4 is a diagrammatic part side elevation corresponding to Figures 1 and 2 and illustrating more particularly the arrangement for di-

verting the drainage from the upper chamber to the respective tank or reservoir;

Figure 5 is a diagrammatic sectional plan view on an enlarged scale illustrating the arrangement of the ports in the plug cock, the cock being shown in the position for circulation from one tank or reservoir;

Figure 6 is a view similar to Figure 5 showing the cock in position for drainage from the same tank or reservoir;

Figure 7 is a view in elevation of the plug of the cock likewise drawn to an enlarged scale; and

Figure 8 is a plan view of the basket segment shown in Figure 1.

In carrying the invention into effect according to one construction, the two tanks or reservoirs 1*a*, 1*b* may be constituted by a suitable tank or reservoir 1 of approximately U formation which is divided into two by a partition 1*c* at the bend, the space between the two tanks or reservoirs 1*a*, 1*b* serving for the accommodation of the casing 2 enclosing the drive shaft, the electric motor 3 being mounted upon the top of such casing 2 and driving a rotary impeller pump 4 arranged in a chamber 2*a* at the lower part of the casing 2.

The washing chamber 5 in which the rotatable carrier 6 is mounted upon a vertical pivot is preferably disposed immediately above and coaxial with the driving motor 3 and is supported upon three symmetrically disposed legs 5*a* which adjacent their lower ends are fixed into or connected by a three-armed spider 7 having a central boss 7*a* suitably flanged for the seating thereon of the valve body 8 of a vertically and centrally arranged plug cock of tapering formation having its smaller end uppermost. The plug 9 of the cock is formed at the lower end with a cylindrical portion 9*a* extending and fitting rotatably into a corresponding recess in the central boss 7*a* of the spider 7, the plug 9 being pressed resiliently upwards by means of a helical spring 10 surrounding such cylindrical extension 9*a* of the plug 9 and engaging against an internal shoulder 7*x* in the boss 7*a*. The lower portion of the plug 9 is formed with a transverse slot 9*b* for the reception of a flat or other bar 11 which is clamped in the slot by means of a central bolt 11*a*, the head of which projects beneath the boss 7*a*, such bar 11 projecting laterally through a slot 7*b* in the boss 7*a* and providing an operating lever by which the plug 9 may be turned from one position to the other. The upper part of the valve body 8 is flanged for connection to the casing 2 which encloses the pump 4 and the drive shaft 4*a* and supports the electric driving motor 3 at its upper end, while the valve body 8 also is formed with diametrically opposite hollow extensions 8*a*, 8*b* which at their outer ends curve upwardly and terminate in flanged openings 8*c*, 8*d* adapted to cooperate with bosses 1*d*, 1*e* or other connecting means in the bases of the respective tanks or reservoirs 1*a*, 1*b* which latter are preferably held in position upon such extensions 8*a*, 8*b* by means of vertical bolts 12 extending centrally through the openings in the bases of the tanks or reservoirs 1*a*, 1*b* and engaging at their upper ends with cages or spiders 13 which co-operate with the bosses 1*d*, 1*e* or the like upon the tanks or reservoirs 1*a*, 1*b*, and at their lower ends extending through bosses 8*e*, 8*f* at the underside of the extensions 8*a*, 8*b* of the valve body 8 for the application of nuts 12*a* by which the structure is held together. The passages formed in the extensions 8*a*, 8*b* of the valve body 8 communicate directly with ports 8*g*, 8*h* at the valve seating, and the plug 9 of the cock is formed with two ports 9*c*, 9*d* in its wall disposed close together and separated by a comparatively narrow portion of the wall of the plug, the arrangement being such that in one position (Figure 5) one of the ports 9*d* in the plug 9 is in register with the port 8*h* communicating with the extending passage 8*b* leading from the tank or reservoir 1*b*, while in another position the other port 9*c* in the plug is brought into register with the port 8*g* communicating with the other extending passage 8*a* leading from the other tank or reservoir 1*a*. The plug 9 is of hollow formation and is open at its upper end for direct communication with the inlet to the rotary pump 4, so that according to the position of the plug cock 9 one or the other of the tanks or reservoirs 1*a*, 1*b* is placed in communication with the inlet of the pump 4. The pump draws liquid from the respective tank or reservoir 1*a*, 1*b* and forces the same through an outlet 2*b* and pipe connection 14 to the spray pipe 15 or pipes in the washing chamber 5. From the washing chamber 5 the liquid is drained back into the respective tank or reservoir 1*a*, 1*b* by means of a swivelling pipe fitting 16 of approximately S or equivalent formation which is mounted upon a downwardly projecting boss 5*b* or the like upon the washing chamber 5 and is arranged to extend inwardly towards the centre of the machine. By moving the swivelling pipe fitting 16 through a suitable angle its outlet 16*a* may be brought alternatively over the respective tanks or reservoirs 1*a*, 1*b*, filters 1*g* of cylindrical formation preferably being arranged at these positions and being supported by a plate 1*h* having apertures therein for the reception of the filters 1*g*. The swivelling pipe connection 16 may be operated by means of a lever arm 17 mounted upon the upper end of a vertical rod 17*a* rotatably mounted in a tubular bearing member 1*f* fixed to the tanks or reservoirs, such lever arm 17 engaging the swivelling pipe fitting 16 by means of a pin and slot or equivalent connection 17*b*, the lower end of the vertical rod 17*a* being fitted with a lever arm 17*c* of telescopic formation which at its outer end engages an upwardly projecting pin 11*b* or the like fixed to the controlling lever 11, the parts being so arranged that when the controlling lever 11 is moved to one or other of the circulating positions, the swivelling pipe fitting 16 is moved to bring its outlet 16*a* over the respective tank or reservoir 1*a*, 1*b*. The lever 11 is located in the respective positions by engagement of its outer vertical part 11*c* in slots 18*a* in an arcuate member 18 extending between the two respective supporting legs 5*a*.

The plug cock 9 is of sufficient depth to accommodate additional ports 9*e*, 9*f* at a lower level than the ports 9*c*, 9*d* controlling the circulation, such additional ports 9*e*, 9*f* being adapted when the controlling lever 11 is moved to a certain extent beyond either of the circulating positions to register with a corresponding port 8*i* in the body 8 of the cock communicating with a drainage outlet 8*j* or discharge pipe, the respective ports being so arranged that in the draining position the liquid may flow from the respective tank or reservoir, for instance 1*b*, through the circulating ports 8*h*, 9*d* and thence through the drainage ports 9*f*, 8*i* to the outlet 8*j*, the port 8*g* of the other tank or reservoir 1*a* remaining closed (Figure 6.)

Additional ports 8*k*, 8*l* are provided in the valve body respectively adjacent each of the circulating ports 8*g*, 8*h*, such additional ports 8*k*, 8*l* communicating with vertical passages 8*m* leading from the casing 2 enclosing the driving shaft 4*a*, and the ports 9*c*, 9*d* in the plug 9 are so arranged that when one circulating port, for instance 8*h*, is open the adjacent auxiliary port 8*l* is also open so as to permit of internal circulation of the fluid by the pump 4 from the aforesaid casing 2 for the purpose of avoiding undue rise in the level of fluid in such casing. The pump impeller advantageously is formed on its upper side with suitably arranged blades adapted to maintain a balance of pressure for preventing the forcing of fluid up into the drive shaft casing 2 under normal conditions.

An immersion heater 19 is provided for each tank or reservoir 1*a*, 1*b*, and such immersion heaters 19 are controlled by separate switches 19*a*, 19*b* which may be of the usual tumbler type or of any other convenient construction, such switches being mounted upon suitable seatings on the valve supporting spider 7 in such manner that when the control lever 11 is moved to one or other of the extreme positions for drainage a cam member 11*d* on the lever 11 engages the switch button in such manner as to operate the respective switch to break the circuit of the respective heater.

The rotatable cage is constructed in segments for example three, adapted to be dropped into the supporting frame 6 which is in the form of a ring having an upward peripheral flange and symmetrically disposed radial members of T cross-section. Each cage segment preferably is constituted by separate castings 20*a*, 20*b*, 20*c* spaced apart by means of bolts 20*d* or other convenient means. The upper member 20*a* may be in the form of a grid having inwardly extending fingers 20*e* formed with slots 20*f* for the reception of knives, forks, spoons and the like. The member 20*b* may be in the form of a grid having radially extending curved slots 20*g* therein for the accommodation of plates and dishes or the like of all kinds, and having additional slots in alignment with the slots 20*f* for the reception of the lower portions of the knives, forks, spoons or the like. The lower member 20*c* may comprise one or more concentrically arranged supporting bars 20*h* which may be of toothed or stepped formation for the location of the plates, dishes or the like. Handles 20*j* may be provided as shown for convenience in inserting and removing the basket segments.

In operating the machine, the tanks 1*a* and 1*b* are filled with washing liquid and water respectively, and the switches 19*a* and 19*b* are moved to their inward or "on" positions. The plates and other articles to be washed are placed in the usual way and the cage is arranged for their reception within the washing chamber 5. The lever 11 is disposed in the position shown in Figure 2 and the motor 3 is started for circulating the washing liquid, which latter, after leaving the plates and dishes, is returned to the tank 1*a* by means of the pipe connection 16. For rinsing, the lever 11 is moved across to its opposite position adjacent the switch 19*a*, thus causing the heated water from the tank 1*b* to be sprayed on the plates and dishes. When it is required to drain the tank 1*a*, the lever 11 is moved to its corresponding extreme position in which the cam member 11*d* automatically moves the switch 19*b* to its "off" position, thus preventing the corresponding heating element 19 from being burnt out as the contents of the tank 1*a* are drained by way of the auxiliary port 9*e* in the plug cock 9 to the drainage outlet 8*a*. The same operation can be effected for draining the tank 1*b*, the switch 19*a* being automatically turned off.

It will be understood that the invention is not limited to the particular construction hereinbefore described. For example, in the case of large machines for use in canteens or the like the valve body may be modified so that while it may be connected directly to the respective tank or reservoir by the extensions referred to, the axis of the cock may be horizontal and in this case the pump and driving motor also are horizontally arranged, preferably coaxially with the plug cock so that if desired the motor may be arranged in a remote position, for example in a corner of the room.

What I claim is:—

1. A dish or like washing machine including a washing chamber, two independent compartments arranged below the chamber, said compartments including a casing of U-form in plan, an upright partition dividing the casing into independent compartments, a vertical sleeve casing arranged in the opening of the U-form casing, a drive shaft in said sleeve casing, a pump at the lower end of the casing and having its outlet communicating with the washing chamber, a motor at the opposite end of the casing, said motor operating the pump through the drive shaft, a valve body in open communication with the inlet side of the pump, tank conduits leading from the respective tanks to the valve body, a conduit leading from the sleeve casing to the valve body a valve plug operative in the body and formed with openings and a passage to establish communication between the inlet side of the pump and either of the tank conduits, said openings and passage also establishing communication with the sleeve casing above the pump to avoid undue rise of the level of fluid in the sleeve casing.

2. A dish or like washing machine including a washing chamber, two receptacles arranged below the chamber, a driven pump arranged below the receptacles, the outlet side of the pump being in open communication with the chamber, a valve body in open communication with the inlet side of the pump, conduits in open communication with the valve body and respectively communicating with the receptacles, a drainage outlet in open communication with the valve body below said receptacle conduits, a valve plug operative in the valve body and formed with circulating ports opening into a passage therein for communication with either of said conduits and said pump, said valve plug being formed with drainage ports, said drainage ports communicating with said passage and operative to establish communication between either receptacle conduit and the drainage outlet at will, means for operating the valve plug, electric heating elements for the liquid in the receptacles, switches controlling the energization of said elements, and means operatively connected to said valve plug operating means for operatively controlling said switches in accordance with the movement of the valve plug.

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