May 29, 1962 J. E. KAMYSZ, JR 3,036,739

GRANULAR SOAP OR DETERGENT DISPENSER AND MIXING APPARATUS

Filed Jan. 29, 1959

Fig. 1.

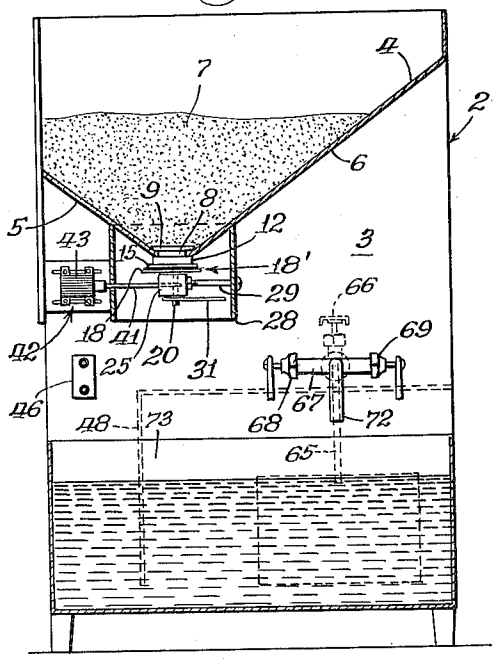


Fig. 2.

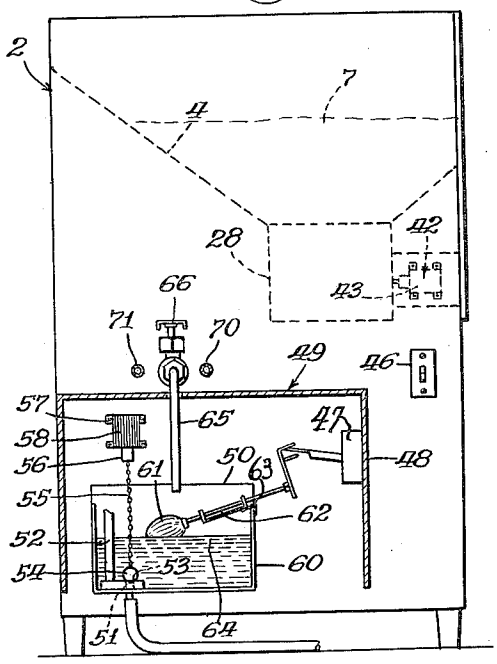
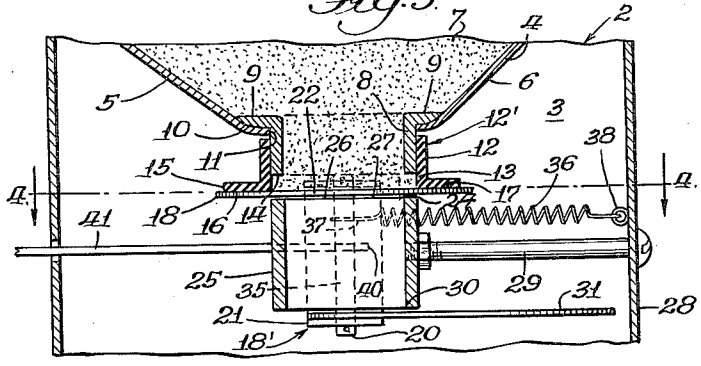


Fig. 3.



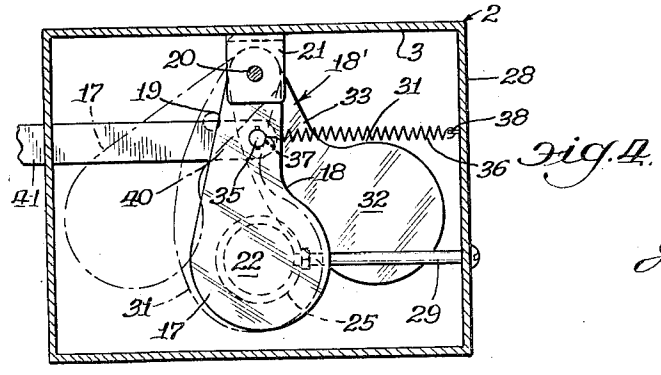


Fig. 4.

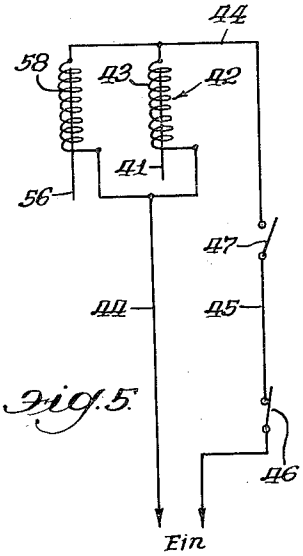


Fig. 5.

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3,036,739 GRANULAR SOAP OR DETERGENT DISPENSER AND MIXING APPARATUS

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6 Claims. (Cl. 222—67)

This invention relates to a novel device for measuring predetermined amounts of soap or detergent for a given volume of water and more specifically is directed to a novel clog-free valve arrangement for granular soap or detergent.

Where a continuous or considerable quantity of solution is required such as in a car wash, for example, to which this invention has particular but not restricted application, it is necessary to provide some means for regulating and measuring and periodically mixing a required amount of soap or the like in a given amount of water. Because of space limitations as well as cost and impracticability it is impossible to mix large quantities at one time, particularly since the solution should be at least warm for immediate use. Suggestions have been previously made to use a liquid-soap solution and to introduce the liquid soap by metering it into the water in the mixing trough. One of the more serious objections to this proposal is to the excessive cost of the liquid soap or detergent as compared to the granular product. Even this has been tolerated heretofore principally because the liquid soap would not cake and clog whereas, to the best of my knowledge, any metering device for granular soap would quickly become inoperative, or as the discharge for the soap would gradually close because of caking of the powder, it would not dispense the required amount. This difficulty is especially experienced in the car wash automats and particularly in the winter when the rooms become quickly saturated with steam.

A general object of my invention is to provide a novel, simple, fool-proof and effective system for providing a substantially continuous amount of cleaning solution wherein a granular or powdered cleanser material is automatically introduced into the liquid at predetermined intervals.

A further object of the invention is to provide a novel mechanism in which liquid is continuously introduced into a mixing trough and wherein a part of the flow of the liquid into the trough is diverted into a gauge tank in which the level of the liquid operates mechanism for opening and closing the metering valve for the soap hopper.

A still further object of the invention is to provide granular soap dispenser incorporating a novel valve which comprises a pair of vertically spaced valve plates, the upper plate serving as a closure for the discharge opening of the hopper and as a cover for a measuring cup and the bottom plate being offset circumferentially of the upper plate about the common vertical axis of pivot of both plates and adapted to be underposed with respect to the bottom discharge opening of the measuring cup when the upper plate is in open position and to be withdrawn from under the measuring cup when the upper plate is in closed position so as to discharge the material into a water trough therebeneath.

These and other object of the invention will become more apparent from the specifications and the drawings, wherein:

FIGURE 1 is a front elevational view partially in vertical section of the novel mixing mechanism;

FIGURE 2 is a rear view partially in vertical section of the mechanism;

FIGURE 3 is a fragmentary enlarged vertical sectional view of the dispenser metering mechanism;

FIGURE 4 is a horizontal sectional view taken essentially on line 4—4 of FIGURE 3, and

FIGURE 5 is a schematic electrical diagram of the operating mechanism.

Describibng the invention in detail and having particular reference to the drawings there is shown a support structure 2 which for purposes of illustration only may comprise a mounting board to the forward side 3 of which may be fastened a hopper 4 with downwardly sloping sides 5 and 6 defining a funnel-like structure which discharges the granular soap or detergent 7 into a vertical tube 8 which is preferably outwardly flanged about its upper end as at 9, the flange 9 complementally seating as at 10 against the interior walls of the hopper and the tubular portion extending through the opening 11 and below the hopper walls being unsleeved by a tubular portion 12 of an elastomer sealing member 12' made of rubber such as neoprene.

The sealing member portion 12 depends at its lower end 13 below the lower edge 14 of the tube 8 and has an annular outturned flange 15 with a substantially flat bottom closure surface 16 which is engaged by the top surface 17 of the upper or top valve plate 18 of a valve assembly 18', plate 18 having an arm 19 pivoted on a vertical axis on a pin 20 mounted on a bracket 21 secured to the support board 3 at one side of the hopper discharge.

The upper or top valve plate 18 in the closed position of the valve has its enlarged distal end portion 22 which is somewhat circular and disposed in closing position to the discharge end of the funnel structure 8 with a slight compression of the member 12 and overlaying the upper open end 24 of a measuring cup 25 which is disposed in vertical alignment with tube 8 and spaced therefrom to provide a passage slot 26 between its upper edge 27 and the bottom 16 of the sealing ring 12 to permit horizontal swinging movement of the top plate from closed position as shown in FIGURE 3 to open position as shown in phantom lines in FIGURE 4.

In the open position of the plate 18, the cylindrical measuring cup 25, which is connected at one side to a stud 29 mounted upon the enclosure 28 on board 3, is fed granular soap or detergent from the spout structure 8, the cup 25 having an open bottom or discharge 30 which is at the moment (that is open position of 18) closed by the lower or bottom closure plate 31 (phantom lines FIGURE 4) which has an enlarged distal portion 32 of an area large enough to cover opening 30, the portion 32 being connected to an arm 33 which is mounted for pivoting on a vertical axis at its end remote from portion 32 on the lower end of pin 20.

It will be apparent from FIGURE 4 that the sections 32 and 22 are offset angularly with respect to each other at a sufficient distance such that when one is in closing position the other is in open position. Thus the sequence of operation is such that when the upper valve plate closes the nozzle 8, the lower plate opens the cup and lets out the charge measured into the cup.

An important feature of the present invention is in the structure of the flexible flange 15 such that in the open position of the upper valve plate, a portion of the upper plate portion 22 remains under a section of the flange so that when the upper plate returns to its normally closed position it readily slides under the flange flexing it and shearing and crumbling any adherent particles of detergent whereby excess accumulations of the detergent are prevented. This clean-out is caused by a kneading action between the plate portion 22 and the flange 15 and the sweep of portion 22 through the slot from one side through the other.

The upper and lower plates 18 and 31 are interconnected at their arm portions 19 and 33 by a vertical

pin 35 which provides an axis or pivot for a return spring 36 anchored at one end 37 thereto and at its opposite end through an eye 38 to the opposing side of structure 23. Pin provides a pivot for the outer end 40 of a plunger or rod 41 of a solenoid 42 mounted on board 3, the rod operating in a coil 43 which is connected to lines 44 and 45, the lines 44 and 45 being connected to an electrical input diagrammatically indicated E in.

The line 45 is provided with a main switch 46 and a control switch 47. The main switch 46 is of the manual type and the control switch is mounted on a side wall 48 of an enclosure 49 on the back of the board 3.

The enclosure 49 houses a control tank 50 which has a bottom drain structure with opening 51 connected to a vent 52, the drain 51 being provided with a seat 53 which is normally closed by the ball valve member 54 suspended from a chain 55 depending from the rod 56 of a solenoid 57, the coil 58 of which is connected to the lines 44 and 45 in parallel with the coil 43. These coils may be connected in series where sufficient electrical current is available.

The control tank mounts on one of its sides 60 a float valve 61 which includes an arm 62 suitably pivoted at 63 and movable by the float 61. The position of the float 61 is controlled by the level of the water at 64, the water in the control tank being metered through the conduit 65 which is provided with a gate valve 66 downstream of the connection of the conduit 65 to the cross-member 67 of the T which at its opposite ends is provided with valves 68 and 69 which are connected through pipes 70 and 71 to sources of hot and cold water under pressure. The cross-member 67 is provided with a spout 72 which discharges into the washing trough 73 into which the charges of powdered soap or detergent are dropped.

Operation

Assuming that the main switch is turned on, the hot and cold running water supply is adjusted by the valves 68 and 69 to fill the trough 73 through the spout 72. The valve 66 is properly adjusted to proportion the flow of a certain quantity of water into the tank 50. When the level of water in the tank 50 reaches a sufficient height, the switch 47 is closed which simultaneously causes the solenoid 57 to lift and open the valve 54 to drain the tank and also causes the solenoid 42 to pull the plunger 41 to the left, FIGURES 1, 3 and 4 thus swinging the valve plate structure 18' in a clockwise direction opening the hopper outlet and closing the measuring cup bottom outlet. The cup 28 and space 26 quickly fills with the charge. In the meantime the valve 61 has dropped thus opening switch 47. The valve structure 18' is immediately released and returned by the spring 36 which moves the upper plate 18 to closing position slicing through the material in the space 26 and swinging the bottom plate to a position disposing its portion 32 at one side that is in uncovering relation to the bottom or discharge end of the cup so that the charge of detergent drops into the trough therebelow.

It will be understood that the operation of this apparatus is automatic to thus supply a continuous quantity of soapy water of a proper mixture as it is being used up by workers dipping sponges and rags into the trough.

It will be understood that an exemplary form of the invention has been disclosed and that various other forms of the invention will be readily apparent by those skilled in the art within the scope of the appended claims.

It will be understood that member 12' is preferably made of rubber or other deformable elastomer material and that it is movable axially on the spout 8 up and down in order to conform to the position and surface condition of the upper valve plate member. Upon warping, bending or because of manufacturing tolerances the valve plate members are not necessarily absolutely flat so that member 12' which rides upon the upper plate would oscillate up and down during each actuation of the metering valve. This has the advantage of breaking up any encrustations on the member 12' and spout 8.

Although I have shown member 12' of rubber, it may also be metallic or of plastic. However, I have found rubber to be the best.

I claim:

1. A granular soap or detergent material dispenser comprising a hopper with a downwardly discharging tubular member having a bottom opening, a measuring cup disposed in vertical registry with said member and spaced therefrom for receiving a charge of said material, and valve means operatively associated with said cup and member and comprising upper and lower elements spaced to pass over and under said cup respectively, said upper element enterable into said space between said cup and member in its closed position for closing said bottom opening, said elements being interconnected and pivoted on a common axis and angularly offset with respect to each other such that when said upper member is in closing position and said lower member is in open position and vice versa, and a sealing element of elastomer material disposed about said tubular member and depending therefrom and deformable transversely and having an annular flange in constant contact with said upper member in all positions thereof, said sealing element movable axially of said tubular member and reciprocal by said upper member upon movement thereof between open and closed positions.

2. In a mixing apparatus, the combination of a support, a hopper for granular soap material carried thereby having a bottom discharge portion with an open end, a measuring member having top and bottom open ends and disposed in receiving relation to said portion, metering valve means pivoted on the support and having upper and lower portions formed and arranged to sequentially close said open end of said portion and open said bottom end of said member and vice versa, actuating means for the valve means operatively connected thereto and comprising a solenoid mounted on the support, a trough disposed beneath said measuring member for receiving a charge of said granular material therefrom, a source of water disposed in filling relation to the trough and including piping and valve means for controlling the rate of flow, a conduit connected to said piping, a control tank for receiving water from the conduit, a float mounted in the tank, switch means connected to the float for operation thereby to open position when the water in the tank is below a predetermined level and closing thereby when such level is reached, a discharge valve in the tank, a second solenoid operable to open and close the discharge valve, lines connected to the solenoids, and said switch connected in series in said line and operative upon closing to actuate both solenoids to drain the tank and move said metering valve means to a position discharging a charge from said measuring member to said trough.

3. A granular soap dispenser comprising a hopper with a bottom tubular discharge portion terminating in a bottom open end, a tubular measuring cup supported beneath said portion in vertical alignment therewith and having upper and lower open ends and spaced below said discharge portion, a sealing element mounted on said portion and depending therefrom and having a relatively wide annular outturned flange and defining a narrow space with said cup, said element reciprocal on said portion, valve means operatively associated with said cup and said portion and comprising a pair of relatively thin vertically spaced upper and lower plate-like members spaced to pass over and beneath said cup respectively, said plate members being offset horizontally on the order such that when said upper member is in closing position within said space between said bottom open end and the upper open end of said portion and cup respectively said lower member is in open position at one side of said element and vice versa, means operatively interconnecting said members, and actuating means

connected to said interconnecting means, said flange, and said sealing element being deformable and engaging said upper member for flexing thereby as it enters and withdraws with respect to said space said upper member being formed and arranged to oscillate said element as said upper member enters and withdraws with respect to said space.

4. A system for mixing a granular soap product or the like with water, the combination of a mixing receptacle, water conduit means communicating with said receptacle, means connected to said conduit means for diverting a portion of the water, a tank in receiving relation to said last-mentioned means, float means in the tank, a switch connected to the float means for actuation thereby to closed and open positions upon the level of the water in the tank reaching or falling below a certain level respectively, a discharge valve for the tank, a source of said granular product including a bottom discharge tube, and a metering valve having upper and lower portions, said upper portion movable in a plane immediately below said tube to a position in vertical alignment and to one side of said tube into closing and opening positions respectively, a measuring cup disposed between said portions of the valve in vertical alignment with said tube and said receptacle for dropping a charge received from said source into the receptacle, solenoid means operatively connected to said switch and to said discharge valve and metering valve and operative to simultaneously open said discharge valve while moving said metering valve to a position disposing said upper portion of the metering valve in open position and the lower portion in closed position and upon the tank draining said float means moving said switch to open position whereupon said discharge valve means is moved to closed position and the metering valve moved to a position closing said upper portion and opening said lower portion.

5. In a valve assembly, a granular soap gravity discharge structure having a tubular spout, an extension member telescoped thereover and having a bottom terminal discharge opening, a plate element swingable transversely of said spout and member and having a first position in closing relation to said opening and a second position in opening relationship thereto, said plate element having an undulant surface engaging under said member and operative upon said member moving from closed to open positions and vice versa to oscillate said member axially of said spout to break up encrustations thereon and on the spout.

6. The invention according to claim 5 and said member being formed of rubber-like material and deformable to conforming contour against said surface.

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