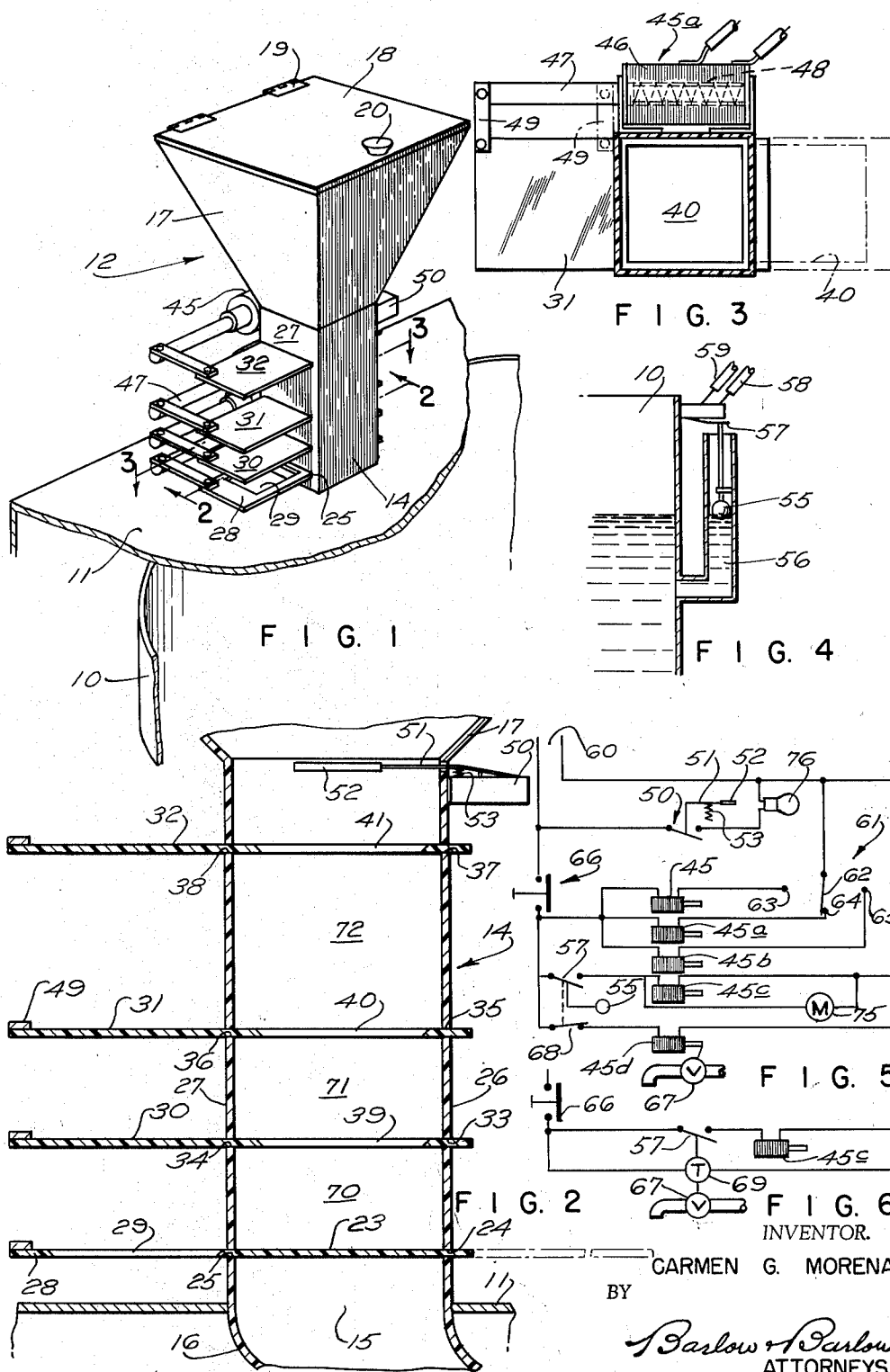


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C. G. MORENA
APPARATUS FOR STORING AND AUTOMATICALLY
DISPENSING FLOWABLE MATERIAL
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INVENTOR.
CARMEN G. MORENA
BY
Barlow & Barlow
ATTORNEYS

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APPARATUS FOR STORING AND AUTOMATICALLY DISPENSING FLOWABLE MATERIAL

Carmen G. Morena, 48 Columbus St., Providence, R.I.
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8 Claims. (Cl. 222—57)

This invention relates to a dispensing apparatus which will store and dispense in measured quantities certain flowable materials such as solid or liquid detergent and which apparatus may be operated in an automatic manner.

Heretofore, in the usual operation of a washing machine, detergent was added by means of pouring the detergent from a package into a cup and then pouring the cup of detergent into the water of the washing machine. This required the storage of the container in which the remaining detergent was originally procured in some place in an open condition and the necessity of finding some sort of a container such as a cup for measuring and adding the detergent to the water of the washing machine.

One of the objects of this invention is to provide an apparatus into which the entire contents of the package of detergent may be poured and from which the detergent may be dispensed into the washing machine by mechanical means after the selected amount to be added is manually set by the operator, thus permitting the original detergent container to be discarded.

A more specific object of this invention is to provide a storage container located adjacent to the washing machine which will have containing areas which may be selected as to the volume of detergent to be added to the washing machine and which, when the water in the washing machine reaches the desired point, will dispense the detergent into the water of the washing machine, all without specific manual operation beyond the setting of the dial to the desired amount.

Another object of this invention is to provide a simple and inexpensive device which may be electrically operated from the usual house current.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

FIG. 1 is a perspective view showing a fragmental portion of washing machine with the detergent container and dispensing apparatus mounted adjacent thereto for discharge into the washing machine;

FIG. 2 is a section on line 2—2 of FIG. 1 of a fragmental portion of the apparatus;

FIG. 3 is a section on line 3—3 of FIG. 1;

FIG. 4 is a fragmental detail showing the switch for operating the electric circuit;

FIG. 5 is a diagrammatic view of the electric circuit; and

FIG. 6 is a modified form of a portion of the electric circuit.

With reference to the drawings, 10 designates a fragmental portion of the tub of a washing machine, while 11 designates a shelf or cover over the tub upon which the apparatus of this invention designated generally 12 is positioned. This apparatus consists essentially of a tube 14 of rectangular cross section which extends through an opening 15 in the shelf 11 and has a chute 16 extending from the shelf 11 to position over the tub 10 so that the contents in the tube may be discharged into the tub 10. At the upper end of this tube 14, there is a hopper 17 which has flaring sides and is of a size sufficient to contain one or more packages of detergent which may be used with the washing machine. A cover 18 hinged as at

19 and having a handle 20 serves as a closure for the hopper.

At a point near the lower portion of the tube 14, I have provided a control gate 23 which is slidably positioned in slots 24 and 25 in the opposite sides 26 and 27 of the tube 14. This control gate 23 may be slid horizontally through the slots in these side walls 26 and 27 so that when in the position shown in FIG. 2, it will completely block off passage through the tube of any material and thus serve as a closure for the tube. However, in the portion 28 of this control gate which extends outwardly from the tube, there is an opening 29 which is of a size nearly that of the interior dimension of the tube 14 so that when the control gate 23 is slide from the position shown in full lines in FIG. 2 to a position with the opening 22 aligned with the tube 24, passage of any material above it will be had and the material will be directed through the chute 16 into the tub 10.

At a series of locations above the control gate, there are additional gates 30, 31 and 32 which are similarly slidable through the opposite walls 26 and 27 of the tube 14 in slots 33 and 34, 35 and 36, 37 and 38, respectively. In each instance, however, the additional gates 30, 31 and 32 are provided with openings 39, 40 and 41 which, when in the position shown in FIG. 2, will permit the passage of detergent material through the tube 14. However, in the portion of each of these gates which is outside of the tube 14 as shown in FIG. 2, the gates are imperforate or provided with no holes so that when any one of the gates 30, 31 and 32 is slid from the position shown in FIG. 2 in full lines to the position inwardly or to the right in FIG. 2, in each instance passage through the tube 14 will be blocked off.

The control gate 23 as well as the additional gates 30, 31 and 32 which are slidable through slots in the walls 26 and 27 of the tube 14 are actuated electrically by solenoids 45, 45a, 45b, 45c, one of which, as shown in FIG. 3, and designated generally 45a is shown in detail. Here a coil 46 has an armature 47 which will be drawn into the coil 46 when energized. A spring 48 which surrounds the armature will force the armature outwardly from the coil when the coil is de-energized so as to move each gate to the position shown in FIG. 2 when de-energized. An arm 49 connects the armature to the gate 31 at its outer end so as to slide the gate into position to the right as shown in FIG. 2 when the armature is energized. Each of the gates is operated by an armature in the same manner, and it will be unnecessary to explain the operation of the other gates which would be a duplication of the operation of gate 31 above described.

In FIG. 2 I have shown a microswitch 50 which has an arm 51 enlarged at its free end 52 located in the path of the detergent material stored in the hopper 17 and tube 14 so that when the weight of any of the detergent is on this arm, the switch 50 will be open as shown in the diagram in FIG. 5. However, when this arm is not weighted by the detergent, then it will move upwardly under influence of a spring 53 and close the electric circuit.

Additional controls are also provided by means of a float 55 which, when water 56 in the tub 10 rises to a certain point, will move arm 57 of a switch to complete the circuit to electrical conduits 58 and 59 for an operation which will be hereinafter described.

A source of power is indicated at 60 in FIG. 5, while the solenoids for each of the gates are designated as 45, 45a, 45b and 45c with an additional solenoid 45d also illustrated. A selector switch designated generally 61 is provided with an arm 62 which may engage contact 63, 64 or 65 for selectively directing current to coils 45, 45a or 45b. The circuit from these three coils back to the

source is through a push-pull switch designated 66 which is manually controlled.

The arrangement of these armatures is such that armature 45 will control gate 32, armature 45a will control gate 31, armature 45b will control gate 30, and armature 45c will control gate 23.

Armature 45c is connected to one side of the source of power and connected through switch 57 and through hand switch 66 to the other side of the source of power.

An armature 45d may be utilized for controlling the flow of water into the tub 10 through a valve 67, and this armature is connected to one side of the source of power and thence through a switch 68 and through the manual control switch 66 to the other side of the source of power.

It might be at this point explained that the volume in the area between the gates 23 and 30 and which will be designated as 70 could be one quarter of a cup of detergent, while the volume in the area 71 between gates 30 and 31 would be another quarter of a cup of detergent, while the volume in the area 72 between gates 31 and 32 would be a half cup of detergent. Assuming the gates in the position shown in FIG. 2, the entire tube 14 would be filled with the detergent and would be blocked off by control gate 23 from entering the tub. If it was desired to put into the tub one half of a cup of detergent, the selector switch 62 would be moved to the position shown in FIG. 5 on contact 64 which would direct one side of the source of current to the solenoid 45a which would be connected to the gate 31. Assuming everything to be ready to start operations, the manual switch 66 would be closed, thus energizing the solenoid 45a which would slide the gate 31 to close off the tube 14 above the gate 31 while leaving open the gate 30 below it. Of course, the control gate 23 would be closed. The closure of the manual switch 66 would cause the solenoid 45d also to start water entering the tub by reason of its opening the valve 67 which controls the water, it being noted that the solenoid 45d is at the same time put in circuit by the closure of the manual switch 68. As water reaches a predetermined level, the float 55 will cause the switch 68 to open and the switch 57 to close, thus shutting off the water and at the same time energizing solenoid 45c which controls gate 23. Thus, this gate 23 will slide from the position shown in FIG. 2 to the right into dotted line position opening the passage at 29 for the discharge of detergent between the gate 23 and gate 31 into the tub through the chute 16. At the same time this switch 57 may also control the agitator in the washing machine to start it operating, which may be indicated at 75.

A light designated 76 and in a circuit controlled by the arm 51 will remain extinguished until the detergent gets sufficiently low so as to permit the spring 53 to close the circuit and energize this bulb.

An alternate circuit (FIG. 6) may be by use of a spring actuated timer 69 tripped by electrical means to control the turning on of the water and the shutting off thereof and closing switch 57 after a predetermined length of time to discharge the detergent in the amount selected into the tub.

I claim:

1. In combination with a washing machine having a tub and a source of water to supply the same, a valve to control said water source, a detergent dispenser positioned to discharge detergent into said tube and comprising a hopper, a generally vertical tubular conduit extending therefrom, a control gate for said circuit, additional gates above said control gate to confine different amounts of material between the control gate and one of said additional gates, means to actuate each of said gates, and means responsive to the amount of water in said tub to actuate the control gate.

2. The combination of claim 1 wherein solenoid means in an electric circuit actuates said gates.

3. The combination of claim 1 wherein the means to actuate the control gate also actuates the valve to control the source of water.

4. The combination of claim 1 wherein the means to actuate the control gate also actuates the valve to control the source of water and the agitator of the washing machine.

5. The combination with a washing machine having a tub and a source of water to supply the same, a valve to control said water source, a detergent dispenser positioned to discharge detergent into said tub and comprising a hopper, a generally vertical tubular conduit extending therefrom, a control gate for said conduit, additional gates above said control gate to confine different amounts of material between the control gate and one of said additional gates, means to actuate each of said gates, a switch, means for closing the switch when the water in the tub is at a given level, and means responsive to the closing of the switch to actuate the control gate.

6. The combination of claim 5 wherein solenoid means in an electric circuit actuates said gates.

7. A dispenser having a source of material to be dispensed comprising a generally vertically disposed tubular conduit having a lower discharge gate movable to open or closed position, a plurality of upper regulating gates above said discharge gate each movable to open or close the passage through said conduit, a circuit including a selector means and operating means for the upper regulating gates each controlled by said selector means and a separate operating means for the lower discharge gate, whereby the volume dispensed may be selected by said selector means and discharged by said separate operating means.

8. A dispenser as in claim 7 wherein said circuit is an electric circuit, said selector means and operating means being electric switches.

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LOUIS J. DEMBO, *Primary Examiner*.

60 HADD S. LANE, *Examiner*.