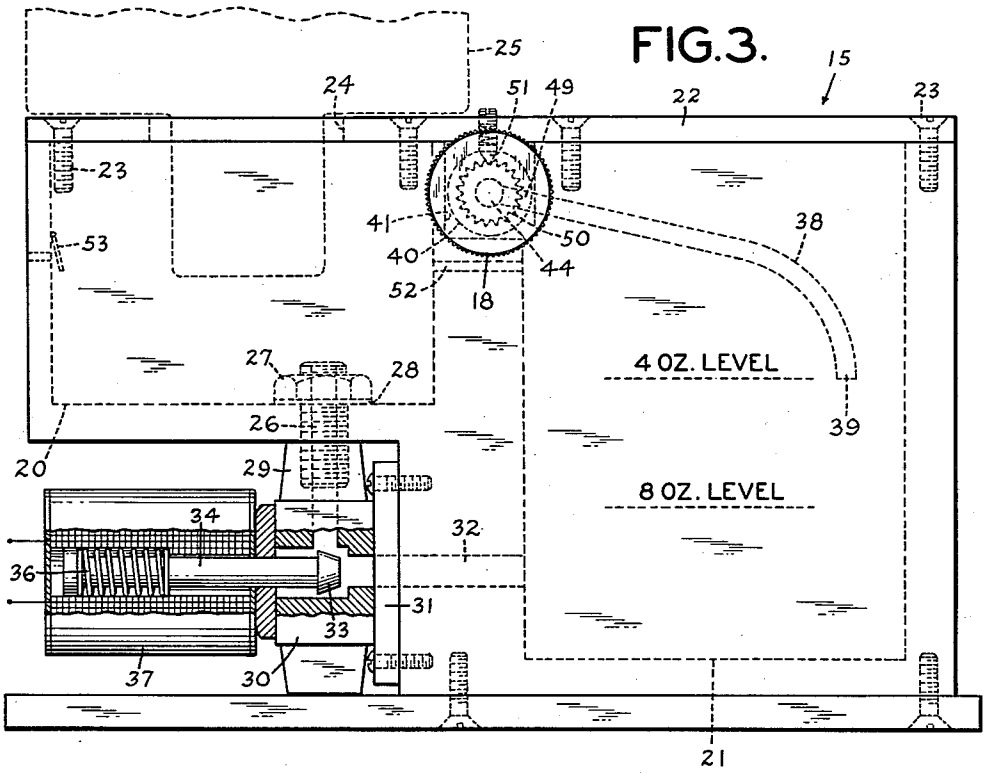
March 5, 1963 J. H. McLAUGHLIN 3,079,944

DISPENSING DEVICE

Filed July 3, 1958 2 Sheets-Sheet 1

FIG.3.



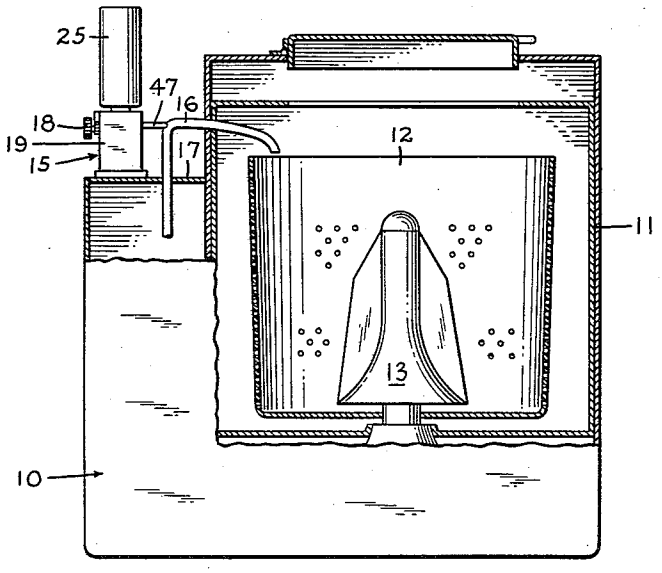


FIG.1.

INVENTOR
JAMES H. McLAUGHLIN
BY
Brumbaugh, Free, Graves & Donohue
HIS ATTORNEYS

March 5, 1963 J. H. McLAUGHLIN 3,079,944

DISPENSING DEVICE

Filed July 3, 1958 2 Sheets-Sheet 2

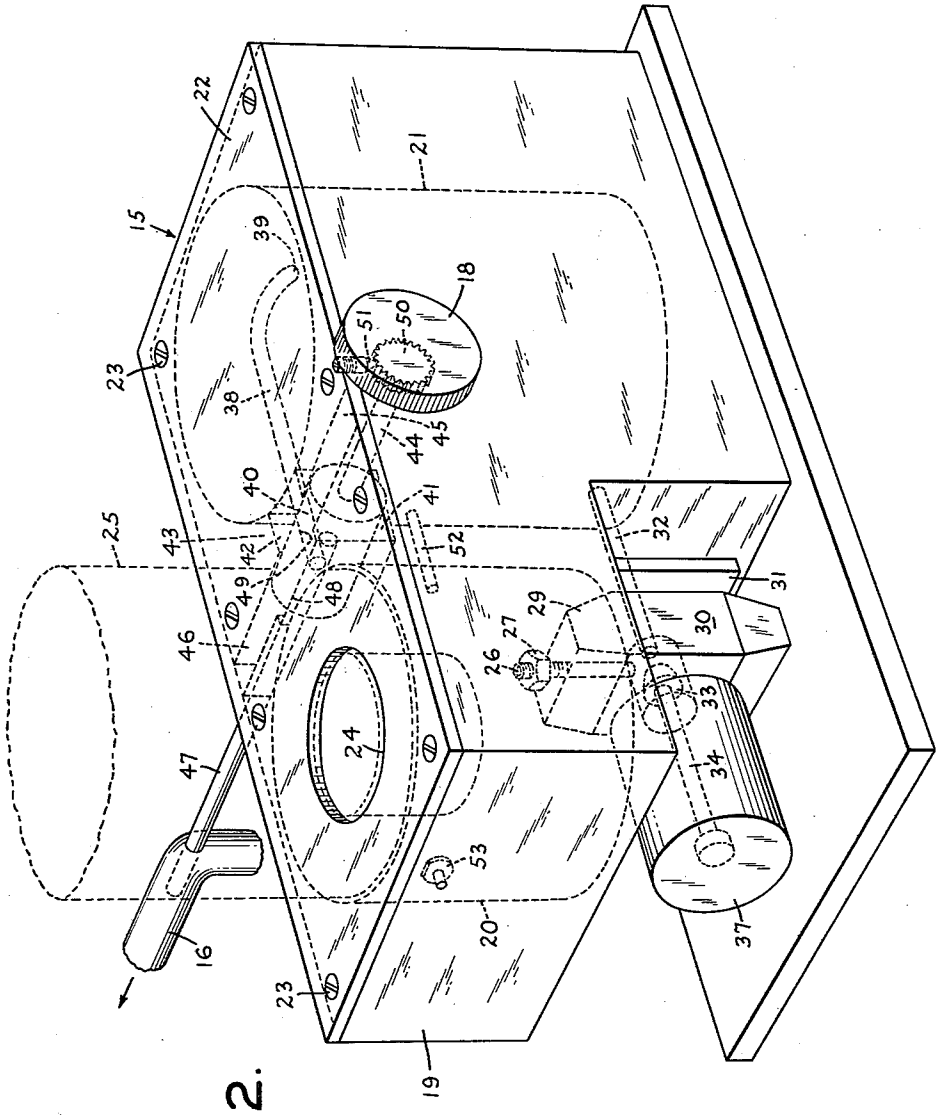


FIG. 2.

INVENTOR
JAMES H. McLAUGHLIN
BY
Brumbaugh, Free, Graves & Donohue
HIS ATTORNEYS

United States Patent Office 3,079,944 Patented Mar. 5, 1963

3,079,944

DISPENSING DEVICE

James H. McLaughlin, Ridgefield, N.J., assignor to Lever Brothers Company, New York, N.Y., a corporation of Maine

Filed July 3, 1958, Ser. No. 746,527
9 Claims. (Cl. 137—453)

This invention relates to improvements in washing machines and it relates more particularly to a dispenser for supplying a detergent automatically to the washing machine during its washing cycle.

Many of the presently available clothes and dish washing machines are automatic in their washing, rinsing and drying operations. Many of such automatic washers have a container for receiving a charge of powdered or liquid detergent to be discharged into the wash water at the beginning of the washing cycle. In these devices the detergent container must be filled prior to each washing operation.

In accordance with the present invention, an automatic dispenser is provided which is adapted to receive a body or source of liquid detergent from which successive measured charges can be withdrawn and introduced into a washing machine for successive washing operations without attention on the part of the operator. The source of the detergent may be a bottle, can or other container which is placed in the dispenser and from which the measured charges of the detergent are withdrawn.

More particularly, in accordance with the present invention, the dispenser includes an aspirating device activated by introduction of water into the washing machine for withdrawing detergent from a sump which is supplied with detergent from a container or reservoir of larger capacity than the sump. Means are provided for terminating the feeding of the detergent when a predetermined amount has been introduced into the washing machine so that equal amounts of detergent are introduced into the washing machine in successive washing operations without adjustment of the dispenser or attention on the part of the operator.

For a better understanding of the present invention, reference may be had to the accompanying drawing in which:

FIGURE 1 is a view in front elevation and partially broken away of a washing machine having a dispenser of the type embodying the present invenion installed therein;

FIGURE 2 is a perspective view of the dispenser embodying the present invention; and

FIGURE 3 is a view in longitudinal section through the dispenser shown in FIGURE 2.

Dispensers of the type embodying the present invention are usable in substantially any of the presently available automatic dish washers or automatic clothes washing machines. For purposes of illustration, a typical dispenser embodying the invention is described as used with an exemplary clothes washing machine which includes a cabinet 10 containing a tub 11 in which water is received for the washing operation. A basket 12 is mounted rotatably within the tub 11, the basket being rotated by a motor, not shown, and having perforated walls to enable water to be centrifuged from clothes therein. Mounted centrally of the basket 12 and oscillatable relative thereto by the drive motor is an agitator 13 of conventional type having agitating vanes thereon. It will be understood that the washing machine includes an automatic timing device by means of which a washing cycle is initiated and controlled. A typical washing cycle may include (1) introducing water into the tub 11, (2) operation of the agitator 13 to wash the clothes, (3) draining the tub, (4) rotating the basket 12 to remove water from the clothes, and (5) alternately spraying the clothing with water and drying by rotation of the basket 12 to rinse and damp dry the wash.

Referring now to FIGURES 2 and 3, a dispenser 15 embodying the invention is positioned in or on the cabinet 10 adjacent the water inlet pipe 16 through which water is introduced into the tub 11 of the washing machine. As illustrated in FIGURE 1, the dispenser 15 is mounted on a shelf 17 at one side of the washing machine so that the control knob 18 for regulating the amount of detergent to be introduced into the tub 11 is disposed in a convenient location at one side of the cabinet 10. The dispenser 15 illustrated includes a block 19 of plastic or other material in which two compartments or sumps 20 and 21 are formed. The upper ends of the sumps are covered by means of a cover plate 22 which may be secured as, for example, by means of screws 23 or the like to the top of the block 19. An opening 24 is formed near one end of the cover plate 22 overlying the sump 20 so that a can or container 25 of a liquid detergent can be disposed with its neck in the opening and in an inverted position so that the contents of the container are discharged into the sump 20. The liquid detergent in the sump 20 will rise to the level of the open mouth of the container and as the liquid is discharged from the sump 20, additional liquid is discharged into the sump from the container 25. Liquid flows from the sump 20 into the sump 21 through a threaded tube 26 which is secured in leakproof relation in a hole in the bottom of the sump 20 by means of a nut 27 and washer 28. The tube 26 is threaded into a coupling 29 in the upper side of a valve block 30 which also has a flanged coupling 31 communicating with a horizontal passage 32 in the block 19 which communicates with the sump 21. Flow of liquid from the sump 20 to the sump 21 is controlled by means of a poppet valve 33 on a valve stem 34 which is normally biased to an open position by means of a spring 36 disposed within the core of a solenoid coil 37. When the solenoid coil 37 is energized, the valve stem 34 is moved to the right as viewed in FIGURE 3 to close the coupling 31 and prevent the liquid detergent from flowing from the sump 20 into the sump 21.

In order to regulate the amount of liquid detergent to be supplied to the washing machine, the dispenser includes a hollow dispensing tube 38 having a downwardly curved end 39 and having an opposite end mounted in a hub 40 of generally cylindrical shape which is rotatably mounted in a recess 41 formed in the block 19 between the upper ends of the sumps 20 and 21. The hub 40 is retained in the recess by means of the cover plate 22. Inasmuch as the hub 40 can rotate, the end 39 of the tube 38 can be raised or lowered in the sump 21. A slot 42 in the wall 43 between the recess 41 and the sump 21 enables the dispensing tube 38 to be moved up and down in counterclockwise and clockwise directions by means of the control knob 18 which is mounted on a shaft 44 nonrotatably connected with the hub 40 and received in a transverse groove 45 in the block 19.

At the opposite side of the block 19 and coaxial with the hub 40 is another groove 46 for receiving a hollow pipe 47 which extends from the hub and is connected with the inner end of the dispensing tube 38 by means of an axial bore 48 and a radial bore 49 in the hub 40. As shown in FIGURES 1 and 2, the pipe 47 extends into the water inlet pipe 16 of the washing machine so that flow of water through the pipe 16 aspirates liquid detergent from the sump 21 through the dispensing tube 38, the passages in the hub 40 and the pipe 47, mixes the detergent with the wash water and introduces the mixture into the tub 11.

The amount of liquid detergent to be supplied with the wash water is controlled by the position of the inlet end 39 of the tube 38 in the sump 21. Regulation of the

depth of the dispensing tube **38** is accomplished by means of the knob **18** which, if desired, may have a ratchet **50** thereon cooperating with a resilient detent **51** carried by the block **19** enabling the knob **18** and the dispensing tube to be adjusted into and retained in any of a series of positions with respect to the sump **21**.

Flow of air between the two sumps to prevent air from blocking the flow of the liquid is permitted by the air passage **52** through the wall **42** between the sumps above the level of the liquid. Also, an air check valve **53** may be provided in the wall of the sump **20** above the level of the liquid enabling air to enter the sumps **20** and **21** but reducing evaporation and loss of detergent to a minimum.

Operation of the dispenser is as follows: A container **25** holding a liquid detergent is inverted and inserted in the opening **24** in the cover of the dispensing device. The detergent will run into and fill the sump **20** to the level of the mouth of the container and also will flow through the tube **26**, the valve casing **30**, coupling **31** and passage **32** to fill the sump **21** to the level of the liquid in the sump **20**. The dispensing tube **38** is then adjusted so that its end **39** is immersed in the liquid in the sump **21** to a depth corresponding to the volume of the detergent to be supplied to the washing machine. The solenoid coil **37** is connected into the cycle control circuit of the washing machine so that the solenoid coil **37** is deenergized and the valve **33** is in open position when the washing machine is not operating. When the washing cycle of the washing machine is initiated, the first operation is, of course, the filling of the tub with water. Upon opening of the water inlet valve (not shown) through which water flows to the water inlet pipe **16**, the solenoid coil **37** is energized, also, thereby seating the valve **33** and preventing flow of detergent from sump **20** to sump **21**. As the water rushes through the line **16**, it creates a reduced pressure in the tube **38**, with the result that the detergent flows from the sump **21** through the tube **38**, the hub **40**, and the pipe **47**, and is mixed with the incoming wash water. As the water continues to flow, the level of the liquid in the sump **21** drops and is not replenished inasmuch as the valve **33** is closed during filling of the tub. When the detergent is drawn off to a point where the dispensing tube **39** is no longer in contact with or immersed in the detergent, feeding of the detergent stops. The valve **33** remains closed during the washing, rinsing and drying cycles so that the detergent level in the sump remains below the end **39** of the dispensing tube. Accordingly, during the rinsing and drying cycles of the washing machine, additional detergent is not introduced into the washing machine. At the conclusion of the washing cycle the solenoid coil **37** is deenergized and the valve **33** opens so that liquid can again flow from the sump **20** into the sump **21** filling it to the level determined by the level of the liquid in the sump **20**.

The above-described dispensing device has the advantage that it dispenses accurately predetermined quantities of the liquid detergent under all conditions of operation. Changes in the viscosity of the detergent due to changes in temperature have no effect upon the amount of detergent introduced into the washing machine. Moreover, the amount of detergent present in the container has no effect upon the amount of the detergent discharged into the washing machine so long as the sumps **20** and **21** are full at the beginning of the dispensing operation. The only effect produced by changing the size of the container **25** is to enable a greater or lesser number of washings to be done before the container is replaced or refilled.

It will be understood that the dispensing apparatus can be used to supply detergents to dish washing machines and to supply measured quantities of other kinds of liquid materials to machines other than dish or clothes washing machines.

Moreover, while the dispenser has been described as being formed of plastic, it will be understood that the sumps may be metallic or other containers suitably connected by pipes, and that the arrangement of the solenoid valve, the mounting of the dispensing tube and its supporting hub may be suitably modified without departing from the invention. Accordingly, the invention is not to be limited save as by the following claims.

I claim:

1. A liquid dispenser comprising a first sump for receiving a liquid, means to maintain a substantially constant level of the liquid in said first sump, a second sump, a passage for liquid connecting said first sump to said second sump for flow of said liquid from said first sump to said second sump to fill said second sump to the same level as the liquid in said first sump, a normally open valve in said passage, electrically energized means for closing said valve, a tube extending downwardly into said second sump and having an open end to be immersed in the liquid in said second sump, means for adjusting the open end of said tube up and down in said second sump, means for withdrawing liquid from said second sump through said open end of and upwardly through said tube until the liquid level in said second sump is lowered sufficiently to uncover said opening in said tube and terminate withdrawal of liquid from said second sump and means for energizing said electrically energized means for closing said valve to prevent introduction of liquid into said second sump while liquid is being withdrawn therefrom.

2. A detergent dispenser for washing machines comprising a first sump for receiving at least the lower portion of an inverted container for liquid detergent, said container having a discharge opening in said sump and being otherwise closed thereby to fill said first sump to about the level of said discharge opening, a second sump, a passage for detergent from said container to said second sump for flow of detergent therethrough to fill said second sump to the same level as the detergent level in said first sump, a normally open valve in said passage, electrically energized means for closing said valve, a tube extending downwardly into said second sump and having an open end to be immersed in the detergent in said second sump, means for adjusting the open end of said tube up and down in said second sump, means for withdrawing liquid from said second sump through said open end of and upwardly through said tube until the liquid level in said second sump is lowered sufficiently to uncover said opening in said tube and terminate withdrawal of liquid from said second sump, and means for energizing said means for closing said valve to prevent introduction of detergent into said second sump while detergent is being withdrawn therefrom.

3. The dispenser set forth in claim 2 in which the means for discharging liquid comprises an aspirator connected with said tube.

4. A detergent dispenser for washing machines comprising a first sump for receiving at least the lower portion of an inverted container for a liquid detergent, said container having a discharge opening in said sump and being otherwise closed thereby to fill said first sump to about the level of said discharge opening, a second sump, a passage connecting the second sump with the bottom of said first sump for flow of detergent therethrough to fill said second sump to the same level as the detergent level in said first sump, a normally open valve in said passage, means for closing said valve, a hollow hub mounted for rotation around a substantially horizontal axis adjacent to the top of said second sump, a dispensing tube fixed at one end to said hub and having its opposite end extending downwardly into said second sump, said opposite end having an opening therein, a passage in said tube connecting said opening with the interior of said hollow hub, means connected with said hollow hub for withdrawing detergent from said second sump through said opening, said passage and said hub until the level of the detergent in said second sump is lowered below said open end and withdrawal of said detergent is terminated,

and means to rotate said hub to raise and lower said other end of said tube in said second sump to control the amount of detergent withdrawn from said second sump.

5. The dispenser set forth in claim 4 in which the means for withdrawing detergent comprises an aspirator.

6. The dispenser set forth in claim 4 in which the means for closing said valve is an electrically energized solenoid.

7. A washing machcine comprising a tub for receiving articles to be washed, a pipe for supplying water to said tub, a detergent dispenser comprising a sump, a source of detergent of greater volume than said sump for supplying detergent to said sump, means for filling said sump to a predetermined level from said source, means for shutting off the supply of detergent from said source to said sump while water is being supplied by said pipe to said tub, and means responsive to flow of water through said pipe to said tub for withdrawing detergent from said sump and mixing it with the water supplied to said tub.

8. The washing machine set forth in claim 7 in which the means for withdrawing detergent from said sump comprises a tube extending downwardly into said sump and having an inlet at its lower end.

9. The washing machine set forth in claim 7 in which the means for withdrawing detergent from said sump comprises a tube extending downwardly into said sump and having an inlet at its lower end, and means for adjusting the tube up and down in said sump to control the amount of detergent withdrawn therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

561,718	Martindale	June 9, 1896
719,325	Gray	Jan. 27, 1903
1,329,074	Fehan	Jan. 27, 1920
1,433,939	Cordley	Oct. 31, 1922
1,442,973	Russell	Jan. 23, 1923
1,521,817	Jerdone	Jan. 6, 1925
1,626,782	Brooks	May 3, 1927
1,635,873	Woolson	July 12, 1927
1,649,900	Holdsworth	Nov. 27, 1927
2,042,928	Da Costa	June 2, 1936
2,053,236	Conant	Sept. 1, 1936
2,387,922	McBrien	Oct. 30, 1945
2,490,319	Palsgrove	Dec. 6, 1949
2,511,637	Johannes	June 13, 1950
2,587,060	Meyer	Feb. 26, 1952
2,638,222	Roach	May 12, 1953
2,709,448	Rudnick	May 31, 1955
2,761,595	Vergers	Sept. 4, 1956