March 21, 1961 R. S. PLATT 2,975,627

DISPENSING SYSTEM

Filed July 23, 1956 2 Sheets-Sheet 1

Fig. 1

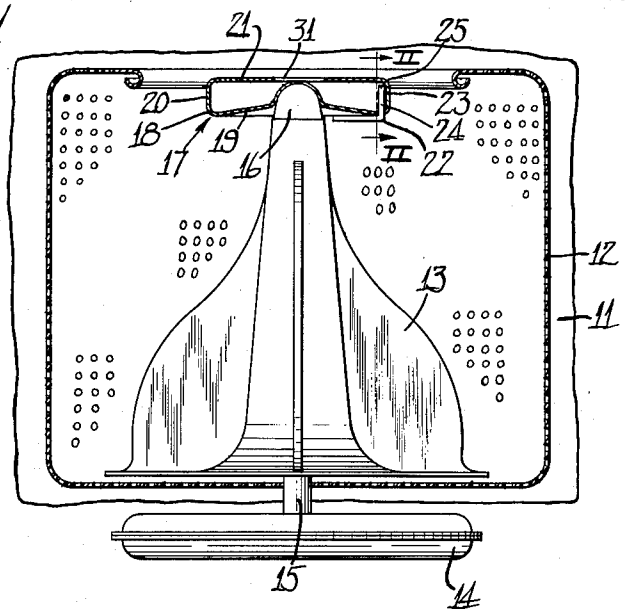
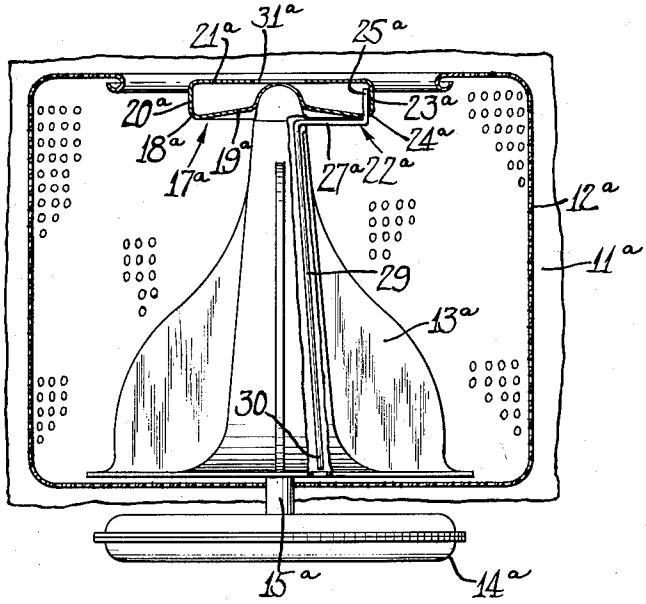


Fig. 6



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DISPENSING SYSTEM

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Fig. 3

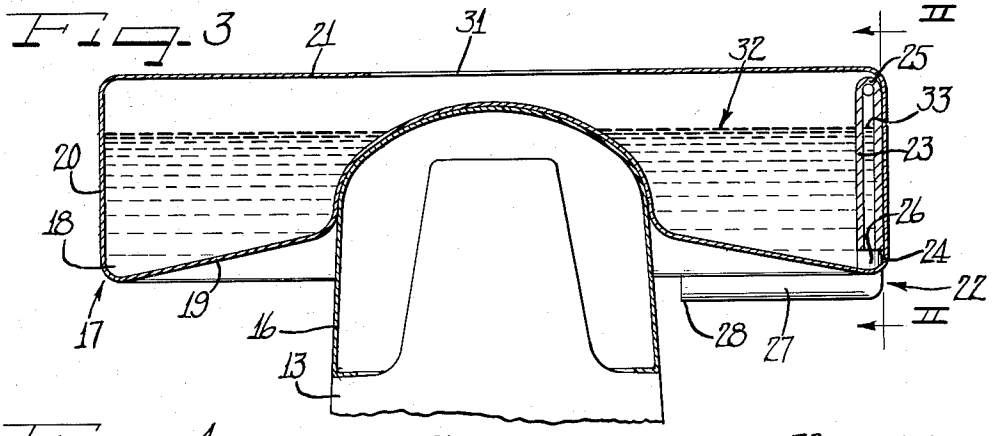


Fig. 4

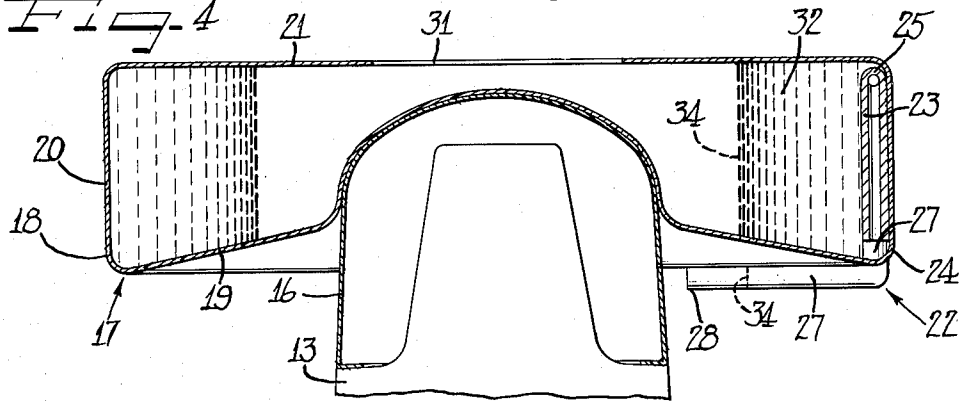


Fig. 5

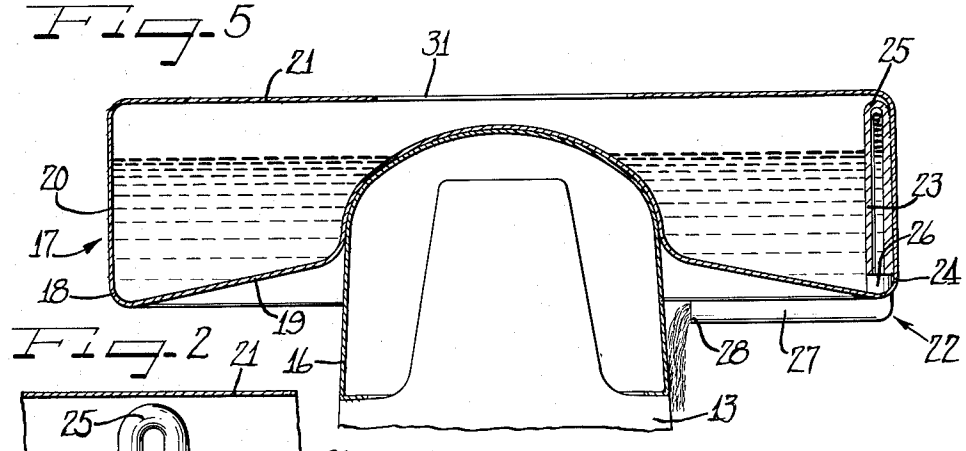
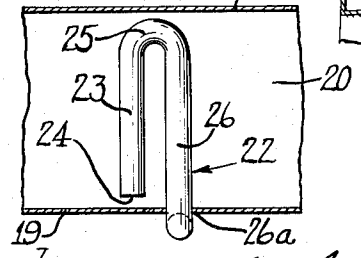


Fig. 2



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United States Patent Office 2,975,627
Patented Mar. 21, 1961

2,975,627

DISPENSING SYSTEM

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Filed July 23, 1956, Ser. No. 599,590

13 Claims. (Cl. 68—207)

The present invention relates to a dispensing system and more particularly to a system for automatically dispensing material at a particular stage of operation of a cyclically or automatically operating mechanism.

Hereinbelow there is described in detail an embodiment of the present invention in conjunction with an automatic or semiautomatic washing machine such as a domestic clothes washing machine. These machines have become a fairly standard household appliance and their uses have been multiplied a great many times so that today they are operable and utilized not only as merely washing and rinsing machines but also to effect dyeing, bleaching and starching operations. In addition, new products for utilization in conjunction with washing machines, such as fluffifiers for addition to the clothes and other articles washed in the machine are on sale.

In view of these many uses it has been found highly desirable to have means or mechanism in the washing machine to automatically add or supply the additive into the machine. Because of the nature of most of the elements to be added into the machine in the washing and/or rinsing fluid therein, such as a starch or dye or bleach or fluffifier, it is most highly desirable to automatically add or supply the additive during the first rinsing cycle and after the washing operation.

According to the present invention there is provided a dispensing system which is operable to retain the fluid or other additives contained therein during the washing cycle and during the cycle of extraction of the washing fluid and thence after the extraction to add the fluid to the rinse water as the rinse water is supplied into the washing machine.

Thus, it is an important feature of this invention to provide a dispensing system operable to retain material therein during oscillation and rotation of the system and thence to dispense the material at the conclusion of rotation of the system.

In accordance with the principles of this invention a container is provided with a passage at the outer wall thereof with a more or less inverted U-shaped configuration and with the inlet end of the passage within the container and the outlet end of the passage disposed externally of the container and inwardly from the inlet end towards the axis of rotation. By such a construction no fluid or other additive in the container will be discharged through the passage during mere oscillation or agitation thereof, and during rotation of the container centrifugal force will retain the fluid within the container and also fill the tubular passage excepting for the innermost end or the terminal portion of the outlet end of the passage. At the conclusion of rotation centrifugal force will be removed and the passage will operate through syphon action to discharge the material in the container therefrom.

In the exemplary embodiment of the invention described in detail hereinbelow the container is mounted on the agitator of an agitator type automatic or semiautomatic washing machine for convenience to the operator of the machine and to provide a balanced system. This is, it should be understood, an exemplary embodiment of the invention and it should be recognized that the invention is one of general utility and is not restricted to the particular embodiment described herein. In this embodiment, however, the additive such as the bleach or dye or starch or softener or fluffifier will not be discharged from the agitator top mounted container during agitation since the agitator will merely oscillate and will not cause the additive, such as a liquid, in the container to fill the syphon passage. During extraction, however, the agitator is rotated at a relatively high speed and centrifugal force will force the additive liquid radially outwardly to fill the syphon passage or tube. Thereafter, with the centrifugal force removed, the additive liquid will be syphoned from the container and added to the liquid such as rinse liquid being injected into the washing machine.

Thus, it is another important feature of this invention to provide a new and improved automatic dispensing system for an automatic washing machine and in combination therewith to automatically dispense an additive material such as a liquid following a first high speed rotation of the machine.

From the foregoing discussion as well as the following detailed description of the present invention and embodiments thereof, numerous other features and advantages of the present invention will readily present themselves to those skilled in the art and others. These features and advantages will also become readily apparent from the accompanying drawings which form a part of this specification, in which each and every detail shown is fully and completely disclosed as a part hereof, in which like reference numerals refer to like parts, and in which:

Figure 1 is a fragmental partly sectional illustration of an automatic washing machine with a dispensing system therein in accordance with the principles of this invention;

Figure 2 is a fragmental sectional view of the automatic dispensing system in the washing machine of Figure 1 and is viewed as taken substantially along the line II—II of Figure 1;

Figure 3 is an enlarged sectional view of the dispensing system and agitator top of the washing machine of Figure 1 showing the additive material in the container during agitation or steady state condition;

Figure 4 is a view like Figure 3 but showing the additive material in the container during a centrifuging stage or cycle of operation;

Figure 5 is a view like Figures 3 and 4 but showing the additive material being discharged from the container as it would following the centrifuging cycle of Figure 4; and

Figure 6 is a view like Figure 1 but illustrating another form of dispensing system within the principles of this invention.

As shown on the drawings:

In the fragmental illustration of Figure 1 there is shown a portion of an automatic washing machine as an exemplary utilization of a dispensing system embodying the principles of this invention. The washing machine which is partly illustrated in Figure 1 is controllable for automatic sequential operation to follow washing and rinsing cycles with centrifugal extraction cycles between the washing and rinsing cycles to fully wash and rinse and extraction or spin dry the clothes or other materials therein.

To effect these operations the washing machine is provided with a tub 11 in which a perforated basket 12 is mounted for rotation. Within the basket 12 there is

provided an agitator 13 operable to be oscillated to agitate the washing and rinsing fluids in the tub and basket to wash and rinse clothes or other materials placed within the basket. For convenience of operation of the drive transmission 14 disposed outside of the tub and having its shafts 15 extending through the tub 11 to the basket 12 and agitator 13, the agitator 13 is corotated with the basket 12 during high speed spin extraction and drying of the materials of clothes within the basket.

In the washing machine of Figure 1, there is illustrated as mounted on and secured to the top or cap 16 of the agitator 13 a dispensing arrangement 17 within the principles of this invention operable to retain additive material therein during the first agitation cycle and during the first centrifuging and extraction cycle and to thereafter automatically dispense the additive material in the container into the tub and basket for a mixing with rinsing fluid etc. then added into the tub and basket after removal of the centrifugal forces and stoppage of rotation of the agitator and basket. The additive dispenser and dispensing arrangement 17 includes a substantially cylindrical container 18 having a bottom wall 19, a substantially cylindrical side wall 20 and a centrally apertured partial top wall 21. The bottom wall 19 is sloped generally downwardly progressively outwardly thereof to have its lowermost portion at the junction thereof with the side wall 20 so that shallow depth of additive material in the container 18 will flow towards the outer periphery of the bottom wall 19 for purposes hereinafter explained in detail.

In the central region of the bottom of the container 18, it is more or less inverted cup shaped for mounting on the cap 16 of the agitator 13. In this particular embodiment of the invention the container may be screwed or welded or otherwise secured onto the cap 16. This, however, is not critical to the invention inasmuch as the container may be secured coaxially with the agitator by providing the container bottom with an appropriate aperture for being secured to the agitator between the agitator 13 and the cap 16 as the cap is fixed down onto the agitator.

Within the container and against the outer wall 20 thereof a syphon tube arrangement 22 is secured thereto. The syphon tube may be formed as a separate tube and then secured to the container or the container may be formed of a double wall structure with a passage therein in accordance with the principles of this invention. In either event, the passage member or tube 22 is provided with an inverted U-shaped passage within the container adjacent the outside wall 20 thereof as best seen in Figure 2. One leg 23 of the tubular passage terminates in an inlet 24 against the outer wall 20 of the container and adjacent to the bottom wall 19 and the junction between the bottom wall 19 and the outer wall 20.

On the other side of the bight portion 25 of the tube and tubular passage 22, the long arm or leg 26 extends downwardly through an appropriate sealed aperture 26*a* in the bottom wall 19 of the container at the junction between the bottom wall 19 and the outer wall 20. There, the longer leg extends inwardly as at 27 toward the center or center of rotation of the dispenser 17. In the embodiment of the invention illustrated in Figures 1 through 5, the inwardly extending portion 27 of the longer leg 26 terminates adjacent to the agitator and agitator cap in an outlet or discharge end 28. In the embodiment of the invention illustrated in Figure 6, like reference numerals with the suffix "*a*" are used and it will be noted that, the tube 22*a* is further extended to a position within the agitator 13 and then extends downwardly to discharge within the agitator by way of an extension 29. The extension 29 extends all the way to the bottom of the agitator as at 30 and discharges outwardly through the bottom of the agitator. Thus, in the embodiment of the invention illustrated in Figures 1 through 5 the additive from the container 18 is discharged onto the outside of the agitator, while in the embodiment of the invention illustrated in Figure 6 the additive is discharged into the interior of the agitator and out the bottom thereof. In both instances, however, the discharge operation is effected in the same manner as described hereinbelow in great detail.

For most convenient understanding of the operation of the dispenser of this invention herein described and illustrated, attention is invited to Figures 3, 4 and 5. In these figures the dispenser is shown on the agitator in somewhat enlarged views and respectively in three successive stages of operation. The first stage of operation is a steady state condition or during agitation of the washing fluid in the washing machine by the agitator during which the agitator is oscillated. Following the stage of Figure 3, the agitator and basket are rotated at a relatively high speed to effect an extracting operation to remove the washing fluid from the clothes by centrifugal force. After the centrifuging operation of Figure 4 the agitator returns to either a steady state or an oscillating condition as illustrated in Figure 5.

At the beginning of use of the machine, the clothes are placed into the basket about the agitator and washing fluid is admitted into the tub and basket whereupon the agitator begins to oscillate. Either before oscillation of the agitator begins or even during oscillation of the agitator the operator of the machine may supply the additive material such as a liquid, bleach or starch or dye or softener or fluffifier to the automatic dispenser by pouring the same into the container 18 through the entrance aperture 31 provided in the top 21 thereof.

In Figure 3 the additive liquid is indicated generally at 32 and is shown to fill the cointainer 18 to a height no greater than the reverse bend or bight portion 25 of the tubular passage arrangement 22. Thus the liquid generally seeks its own level and attains a level 33 within the short leg 23 of the tubular passage 22 below the reverse bend 25.

After completion of the agitation cycle of operation of the washing machine it then moves into a centrifuging cycle as explained hereinabove. During the centrifuging portion of the operation of the machine the agitator and the basket are rotated at a relatively high speed. With the agitator, the dispensing system 17 also rotates and the liquid 32 therein eventually rotates together therewith to attain a position against the outer wall 20 of the container due to the centrifugal force exerted thereagainst. In this condition of operation, the liquid fills most of the syphon tube by filling the short leg 23, the bight portion 25, the vertical portion of the long leg 26, and so much of the inwardly extending portion 27 of the long leg as is outward from the surface line 34 of the liquid being centrifugally acted upon. The discharge end 28 of the long leg extends inwardly beyond the surface line of the additive liquid and the liquid is retained in the tube and container by the centrifugal force.

Upon stoppage of rotation of the mechanism or sufficient slowing down thereof to relieve the centrifugal force on the additive liquid, the liquid begins to run out of the discharge end 28 or 30 of the syphon tube by a syphon action and substantially all of the liquid is drained from the container since the inlet end 24 of the short leg 23 extends almost to the bottom of the container and the sloping walls of the bottom of the container cause the liquid to be directed toward the inlet end 24 of the syphon tube.

From the foregoing it will be readily observed that numerous modifications and variations may be effected without departing from the true spirit and scope of the novel concepts and principles of this invention. I, therefore, intend to cover all such modifications and variations as may fall within the true spirit and scope of the novel concepts and principles of my invention.

I claim as my invention:

1. In a laundry machine of the type having an agitator

and receptacle means movable and rotatable about a common vertical axis for successive washing and extraction operations, means to supply an additive to the receptacle means following the first extraction operation comprising a substantially cylindrical container mounted on the agitator substantially coaxially therewith for rotation therewith, a bottom wall on said container, a substantially cylindrical side wall on said container, a centrally apertured top wall on said container, and a discharge tube secured to the side wall of said container, said tube having an inverted U-shape with one end thereof within the container and adjacent to the bottom wall at a radially outwardly spaced portion thereof, and the other end of said tube terminating outside of said container radially inwardly from the said one end and below said one end, whereby the tube is substantially filled with material from the container during rotation of the agitator by centrifugal force and drains the material from the container into the receptacle means by syphon action following such rotation.

2. In a laundry machine of the type having an agitator and receptacle means movable and rotatable about a common vertical axis for successive washing and extraction operations, means to supply an additive to the receptacle means following the first extraction operation comprising a substantially cylindrical container mounted on the agitator substantially coaxially therewith for rotation therewith, a bottom wall on said container, a substantially cylindrical side wall on said container, a centrally apertured top wall on said container, and a discharge tube secured to the side wall of said container, said tube having an inverted U-shape with one end thereof within the container and adjacent to the bottom wall at a radially outwardly spaced portion thereof, and the other end of said tube terminating outside of said container radially inwardly from the said one end and below said one end; and said other end terminating adjacent to the agitator, whereby the tube is substantially filled with material from the container during rotation of the agitator by centrifugal force and drains the material from the container into the receptacle means by syphon action following such rotation.

3. In a laundry machine of the type having an agitator and receptacle means movable and rotatable about a common vertical axis for successive washing and extraction operations, means to supply an additive to the receptacle means following the first extraction operation comprising a substantially cylindrical container mounted on the agitator substantially coaxially therewith for rotation therewith, a bottom wall on said container, a substantially cylindrical side wall on said container, a centrally apertured top wall on said container, and a discharge tube secured to the side wall of said container, said tube having an inverted U-shape with one end thereof within the container and adjacent to the bottom wall at a radially outwardly spaced portion thereof, and the other end of said tube terminating outside of said container radially inwardly from the said one end and below said one end, said agitator including means enclosing the other end of said tube whereby additive is discharged within said agitator, whereby the tube is substantially filled with material from the container during rotation of the agitator by centrifugal force and drains the material from the container into the receptacle means by syphon action following such rotation.

4. In a washing machine having a vertical axis receptacle means for subjecting clothes to a series of washing, rinsing and drying steps and wherein the machine is cyclically operated to wash the clothes, spin-extract washing fluid from the clothes, rinse the clothes, and spin-extract rinsing fluid from the clothes, means to supply an additive to the rinsing fluid automatically following washing and extraction of the washing fluid, said means including a container mounted to rotate in the machine on the vertical rotational axis thereof during extraction by the machine and including confining means to rotate the additive contemporaneously therewith, and a syphon tube having an inlet portion near a radially outwardly spaced portion of the bottom of said container, said syphon tube having an intermediate portion above the level of said inlet portion to be filled from the container by centrifugal force during extraction and an outlet portion outside of said container at a level lower than said inlet and spaced radially inwardly thereof to empty the container into the receptacle means by syphon action following extraction.

5. A mechanism operative to automatically drain the contents of a container into a receptacle following rotation thereof on a vertical axis comprising a receptacle, a container in said receptacle, said container being rotatable on the same axis as the receptacle and having confining means to confine the contents thereof during rotation, and tubular passage means on an outer wall of the said container, said tubular passage means having an inverted U-shaped passage therein with an inlet within the container adjacent to a radially outwardly spaced portion of the bottom wall thereof and an outlet without said container below the bottom wall thereof and disposed radially inwardly from the inlet, whereby the tubular passage is substantially filled with material from the container by centrifugal force and empties the container into the receptacle by syphon action, when it is temporarily rotated with the container.

6. A mechanism to automatically drain the contents of a container into a receptacle following rotation on a vertical axis comprising a receptacle, a container in said receptacle and having a bottom wall, an outer wall and a top wall with an aperture in the top wall for admitting material thereinto, said container being rotatable on the axis of said receptacle, passage defining means on said outer wall, the passage in said means having an inverted U-shaped configuration with an inlet within the container near the bottom wall and adjacent to the outer wall and an outlet outside of said container and inside of said receptacle below the inlet and inwardly displaced therefrom.

7. In a dispensing system operable to retain the material to be dispensed, a receptacle disposed on a vertical axis for oscillation and rotation, a substantially cylindrical container in said receptacle mounted for rotation on the vertical axis thereof, a bottom wall in said container, a substantially cylindrical side wall on said container, a centrally apertured top wall on said container, and a discharge tube secured to the side wall of said container, said tube having an inverted U shape with one end thereof within the container and adjacent to the bottom wall at a radially outwardly spaced portion thereof and the other end of said tube terminating outside of the container but inside of said receptacle radially inwardly of said one end, whereby the tube is substantially filled with material from the container during rotation thereof by centrifugal force and drains the material from the container by syphon action following such rotation.

8. Liquid handling apparatus rotatable on a vertical axis and being conditioned by rotation about said axis to dispense fluid by a syphon action, comprisnig wall means defining a fluid-receiving chamber capable of retaining the fluid therein during rotation, conduit means having an inlet inside of said chamber radially outwardly of the rotation axis and an outlet outside of said chamber and a portion between the inlet and outlet above the level of the inlet, and means for rotating said chamber about the vertical axis, said outlet, said inlet and said portion of said conduit means being constructed and disposed to retain a sufficient amount of fluid forced from said chamber into said inlet of said conduit means to prime said conduit means upon rotation and forming a syphon passage to cause a syphoning effect through said conduit means when ratation of said chamber is substantially ceased.

9. A dispenser for dispensing liquid into an intermittently rotatable vertical axis laundry receptacle comprising a container to receive a charge of liquid and having wall

means capable of retaining the liquid during rotation of the container said container being mounted and constructed for coaxial rotation of the container and the contents thereof with the laundry receptacle, and means forming a syphon passage having an inlet inside of said container at a radially outwardly spaced bottom portion thereof and an outlet outside of said container but inside of the receptacle and spaced below said inlet, said means forming said syphon passage, said inlet and said outlet being constructed and disposed to receive and retain fluid during rotation of said container to prime the syphon passage with liquid by centrifugal force during rotation for syphon flow of liquid from the container to the receptacle after cessation of rotation of the receptacle.

10. Liquid handling apparatus conditioned upon rotation on a vertical axis to dispense fluid by a syphon action, comprising wall means defining a fluid-receiving chamber capable of retaining fluid therein during rotation thereof, conduit means having an inlet inside of said chamber and an outlet outside of said chamber, and means for rotating said conduit means and said chamber on the vertical axis, said conduit means having means intermediate said inlet and said outlet to form a syphon passage and to retain a sufficient amount of said fluid received by said conduit means at said inlet during rotation to prime said conduit means and cause a syphoning effect through said conduit means when rotation has substantially ceased.

11. A dispenser for dispensing liquid into an intermittently rotatable vertical axis laundry receptacle comprising a container having means for retaining fluid upon rotation thereof and being mounted and constructed for coaxial rotation of the container and the contents thereof with the laundry receptacle, and means forming a syphon passage having two legs of unequal length, the shorter leg of said syphon passage having an inlet inside of said container at a radially outwardly spaced bottom portion of the container and extending upwardly to the top of the container, the longer leg of said syphon passage being connected to the shorter leg and extending domnwardly, said longer leg having an outlet discharging outside of said container and inside of said receptacle below the level of said inlet, said longer leg including means to retain liquid to prime said syphon passage with liquid by centrifugal force during rotation for syphon flow after rotation has ceased.

12. In a laundry machine, a vertical axis rotatable receptacle for receiving liquid and clothes to be laundered in successive washing and extracting operations, and a dispensing container in said receptacle and having means constructed and arranged to retain a charge of liquid while rotatable with said receptacle and having a syphon conduit means with at least two legs of unequal length opening in the container and the receptacle, respectively, through which liquid can be transferred from the container over an intermediate elevation provided by the walls of the container to a lower level in the receptacle, said syphon conduit means having its shorter leg formed with an inlet at a radially outwardly spaced bottom portion of the container, said longer leg including means to retain liquid being forced up into the shorter leg of the syphon conduit means by centrifugal force during rotation, whereupon the excess weight in the longer leg when primed causes a syphon flow into the receptacle when rotation has substantially ceased.

13. In a laundry machine, a vertical axis receptacle for receiving liquid and clothes to be laundered in a sequence of successive washing and extracting periods, and a dispensing container in said receptacle and having means to retain liquid during rotation thereof, said container having a syphon conduit means with at least two legs of unequal length opening into the container and the receptacle, respectively, joined by a portion above the level of the inlet through which liquid can be transferred over an intermediate elevation provided by the walls of the container, said syphon conduit means having its shorter leg formed with an inlet at a radially outwardly spaced bottom portion of said container, said longer leg having means forming an outlet discharging into said receptacle at a level below said inlet and including means to retain liquid from the container forced up the shorter leg of the syphon conduit means during rotation and to cause a syphoning effect when rotation has substantially ceased.

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