Dec. 18, 1962 C. J. KNERR ET AL 3,068,679

LIQUID ADDITIVE DISPENSERS FOR WASHING MACHINES

Filed Oct. 12, 1959

Fig. 3

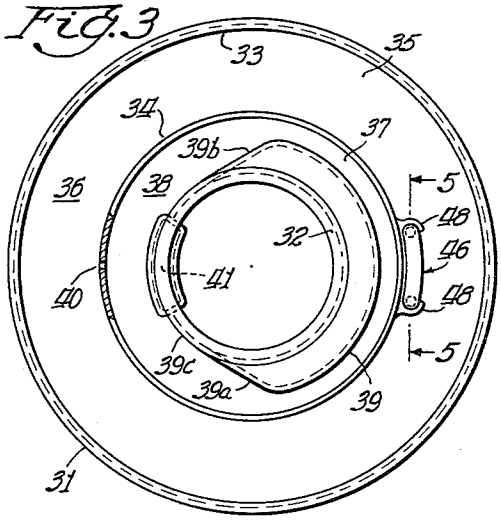


Fig. 4

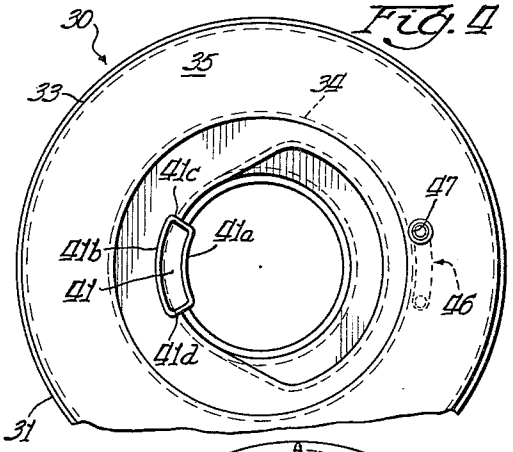


Fig. 2

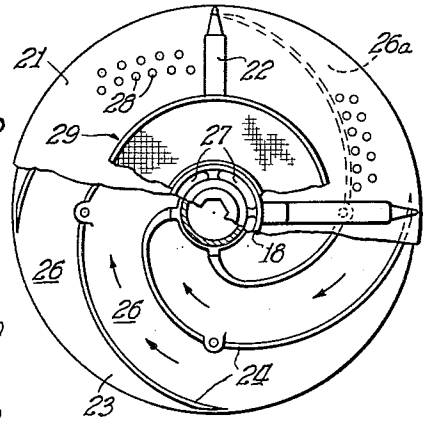


Fig. 1

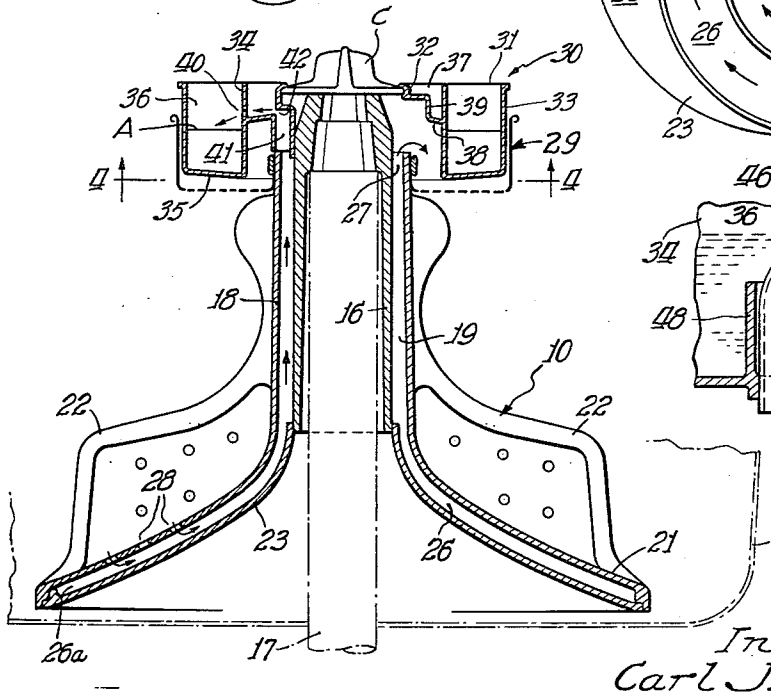
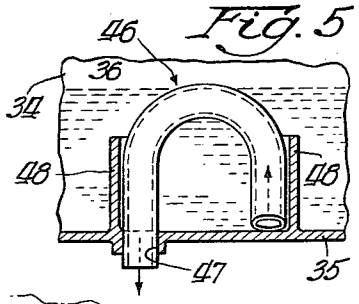


Fig. 5



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LIQUID ADDITIVE DISPENSERS FOR WASHING MACHINES

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This invention relates to a liquid additive dispenser for washing machines of the oscillating agitator type.

In the use of liquid additives in clothes washing machines, the liquid additive should preferably be introduced into the wash water, either automatically or manually, in a manner to insure the mixture and dispersion of the liquid additive in the wash water prior to contact with the clothes. This is particularly true in the use of liquid bleach as any direct contact of the bleach with the clothes may cause undesirable changes of color of the clothes and also injury to the clothes fabric. A further factor of importance for insuring the adequate mixture and dispersion of the liquid additive in the wash water, and particularly liquid bleach, is that there is presently on the market certain powdered detergents embodying fluorescent dyes effective to provide whiteness to the clothes and these dyes are neutralized in the event bleach is added to the wash water prior to complete dispersion and dissolution of the detergents in the wash water so that no whitening action of the clothes occurs by the fluorescent dyes. It has been recommended that, after the detergents are placed in the washer, a two to four minute agitation period should occur before the bleach is allowed to enter the wash water to insure that the detergents have been thoroughly mixed with the wash water and dissolved in the wash water prior to the bleach being allowed to enter and be dispersed in the agitated wash water.

It is an object of the present invention to provide an improved liquid additive dispenser for washing machines of the oscillating agitator type.

Another object of the invention is to provide a liquid additive dispenser for washing machines of the oscillating agitator type and which operates to dispense a liquid additive into the wash water by the action of the agitator during normal operation of the machine.

Another object of the invention is to provide a liquid additive-containing dispenser for washing machines of the type described, and adapted by the oscillating motion of the agitator, to be supplied with wash water for mixing with the liquid additive during agitator oscillation and, after a predetermined time period, to discharge the liquid additive-wash water mixture into the clothes-containing wash water in the washing machine.

Another object of the invention is to provide a liquid additive dispenser for clothes washing machines of the oscillating agitator type, the dispenser being mounted on the agitator to oscillate therewith during operation of the washing machine and containing a liquid additive and wherein agitator oscillation is operative to cause a portion of the wash water in the washing machine to enter the dispenser for a predetermined time period and, at the termination of such time period, the dispenser is effective to automatically discharge the mixture of the wash water and liquid additive into the clothes-containing wash water in the washing machine.

Another object of the invention is to provide the liquid

additive dispenser for clothes washing machines of the agitator type in which the dispenser is mounted on the agitator above the wash water operating level in the washing machine and contains a liquid additive, the agitator being adapted and constructed, during oscillating movement thereof to direct a portion of the wash water in the washing machine into the dispenser for mixture with the liquid additive, the dispenser having means for automatically discharging the liquid additive and wash water mixture into the clothes-containing wash water of the washing machine when a predetermined quantity of the mixture is contained within the dispenser.

Another object of the invention is to provide a liquid additive dispenser for clothes washing machines of the agitator type, the dispenser being adapted to be mounted on the top of the agitator above the wash water operating level in the machine and to oscillate therewith during operating of the washing machine, the agitator having means for causing a portion of the wash water in the clothes washing machine to be directed into the dispenser for mixture with the liquid additive for a predetermined period of time and, subsequently, after a predetermined volume of the mixture is contained in the dispenser, the dispenser automatically discharging the liquid additive-wash water mixture into the clothes-containing wash water in the washing machine.

The invention consists of novel constructions, arrangements and devices to be hereinafter described and claimed for carrying out the above stated objects and such other objects as will appear from the following description of the preferred embodiment of the invention illustrated with reference to the accompanying drawing wherein:

FIG. 1 is a cross-sectional view of an agitator disposed within a clothes-receiving basket of a washing machine, and a liquid additive dispenser incorporating a preferred embodiment of the invention mounted on the agitator;

FIG. 2 is a top view of the agitator, partially broken away, and with the dispenser removed, to more clearly illustrate structural details of the agitator;

FIG. 3 is a top view of the dispenser shown in FIG. 1;

FIG. 4 is a bottom view of the dispenser, said view being taken on line 4—4 of FIG. 1 and looking in the direction of the arrows; and

FIG. 5 is a sectional view of the dispenser, said section being taken on line 5—5 of FIG. 3.

Referring to FIG. 1, there is disclosed an agitator **10** of the type shown and described in Gerhardt et al. U.S. Patent No. 3,022,655 issued February 27, 1962, the agitator being positioned within a vertically disposed imperforate wash basket **11** within an imperforate tub (not shown) and the agitator is oscillated by drive mechanism (not shown), the tub, drive mechanism, and other portions of the washing machine structure are preferably, but not necessarily, of the type disclosed in Gerhardt et al. Patent No. 2,807,951 issued October 1, 1957.

The agitator **10** is adapted during oscillation of the agitator, to provide for recirculation of the fluid or wash water within the basket and a filter is disposed on or about the top of the agitator in the path of the recirculated water to remove the lint and scum from the water. More particularly, the agitator **10** comprises an upstanding hollow post portion **16** for receiving the oscillated drive shaft **17** of the drive mechanism, a radially spaced wall **18** defining a water passageway **19** between the wall

18 and post 16, and a downwardly and outwardly flaring base portion 21. Disposed about the outer surface and extending outwardly from the flaring base portion 21 are a plurality of vanes 22 for causing turbulence of the water within the basket 11 when the agitator is oscillated. A conical shaped, imperforate plate 23 is provided with a plurality of spiral or helical vanes 24 disposed about the inner surface and extending outwardly to substantially the periphery of the flaring base 21, the plate being suitably secured to the base of the agitator. The vanes 24, between the base portion 21 of the agitator and plate 23, define a plurality of helical shaped spaces 26 in the base of the agitator. Four openings 27 in the agitator 10 are in fluid communication with the water passageway 19 and the spaces 26. A plurality of openings 28 are provided in the top of the flaring base 21 and are placed in the base so that they open into the spaces 26 at a point substantially forward of the end of the longest vane 24 thereby providing a pocket or cavity 26*a* in the agitator base. The openings 27 serve as outlets for the wash water pumped upwardly, as indicated by the arrows, by the vanes 24 in the agitator into an annular filter pan 29 disposed on the agitator 10. During oscillation of the agitator, the water in the basket 11 will be pumped upwardly through the openings 28, passageways 26 and 19, and outlets 27 into the filter pan 29 to remove scum and lint from the continuously circulating wash water. For a more complete disclosure of the filter agitator herein shown and described, reference is made to the aforesaid Gerhardt et al. U.S. Patent No. 3,022,655 issued February 27, 1962.

A preferred embodiment of liquid additive dispenser, generally designated 30, is shown in FIGS. 1, 3, 4, and 5, and comprises an annular hollow receptacle or pan 31 surrounding and mounted on the agitator by a supporting flange 32 extending radially inwardly of the pan 31 and having its edge formed to fit around and tightly engage the circular rim of the agitator cap C threaded onto the agitator post 17 for retaining the agitator 10 and drive member 17 in assembly. The receptacle or pan 31 further comprises a pair of radially spaced side walls 33 and 34, and a bottom wall 35 which, as shown in FIG. 1, is inclined downwardly from the side wall 33 to merge with the bottom edge of the radially inner side wall 34. Accordingly, the walls 33, 34, and 35 provide an annular compartment 36 within the pan 31 and completely surrounding the top of the agitator. The pan 31 is also provided with another annular compartment 37 disposed radially inwardly of the compartment 36 of the pan. The compartment 37 is formed by portions of the radially inwardly directed flange 32 of the dispenser and also the pan 31 including the upper portion of the radially inner side wall 34 of the pan and by a horizontal bottom wall portion 38 and vertical side wall portion 39 of the flange 32, and which side wall portion 39 extends, as shown in FIGS. 3 and 4, substantially semi-circumferentially of the compartment 37 and terminates, at opposite ends, in walls 39*a* and 39*b* disposed tangentially of a circular vertical wall 39*c* of the flanges 32 and merging therewith, the bottom wall 38 thereafter enlarging in area and extending between and merging with the side wall 34 and the side wall 39*c*. The compartments 36 and 37 are in fluid communication with each other through the medium of a passage or opening 40 in the wall 34 adjacent the downwardly and outwardly inclined wall 38 of the flange 32 so that any fluid in the compartment 37 will be discharged and drained into the compartment 36. The opening 40 is of such size as to provide a metered flow of fluid from the compartment 37 into the compartment 36.

As previously described, the agitator is provided with four outlets 27 at the ends of the passages 19 thereof through which wash water is forced in the direction indicated by the arrows during each forward oscillation stroke of the agitator so that the wash water in the basket 11 will be forced upwardly through the agitator by the spiral vanes 24 for discharge through the outlets 27 into the lint filter pan 29 surrounding and having its inner wall tightly fitting against the wall 18 of the agitator. In the present embodiment of the invention, the liquid additive dispenser is provided with a funnel portion generally designated at 41 and having its lower open end in fluid communication with one of the discharge openings or outlets 27 in the agitator, the upper end of the funnel 41 having a constricted opening 42 for admitting and directing wash water from the funnel into the compartment 37 for drainage into the compartment 36. More particularly, the funnel portion 41 of the dispenser formed by an enlarged arcuate portion depending from the flange 32 and below the compartment 37 and, as shown in FIGS. 3 and 4, has two arcuate side walls 41*a* and 41*b* radially spaced from each other, and two end walls 41*c* and 41*d*, the side wall 41*b* having its upper end merging with the wall 38 of the flange 32 and the side wall 41*a* being spaced radially inwardly of the flange as shown in FIGS. 1, 3, and 4, and the end walls 41*c* and 41*d* having their upper ends merging with the circular flange 32 to define the funnel 41. Accordingly, it will be clearly apparent that, as the wash water is drawn from the tub, under the influence of the spiral vanes 24 of the agitator, through the openings 28 of the agitator into and through the passages 26 and 19 and one of the openings 27 through the funnel 41 into the compartment 37 for drainage through the opening 40 into the compartment 36, during oscillation of the agitator. The liquid additive, previously poured into the compartment 36 of the dispenser and to a level such as indicated at A in FIG. 1, is thus thoroughly dispersed and mixed with the incoming wash water due to the flow of the wash water into the compartment and also by the oscillating movement of the agitator.

For discharging the liquid additive and wash water mixture from the compartment 36, there is provided a curved syphon tube, generally indicated at 46 in FIGS. 3, 4, and 5, located in the pan 31 of the dispenser and disposed diametrically opposite to the funnel 41 of the dispenser.

Referring now to FIGS. 3 and 5, it will be seen that the syphon tube has one end disposed adjacent to the bottom wall 35 of the compartment 36 and has its other end positioned within and extending through an opening 47 in the bottom wall 35 of the compartment 36 of the dispenser, the tube being retained in position within the dispenser by circumferentially spaced arcuate retaining fingers 48 between which the tube 46 is disposed with its vertically extending portions firmly engaged and gripped by the fingers which, as shown in FIGS. 3 and 5, extend radially outwardly of the side wall 34 and merge with the bottom wall 35 of the compartment 36 of the dispenser.

Describing now the operation of the dispenser, oscillation of the agitator 10 causes the wash water to be forced upwardly through the agitator from the basket 11 through one of the discharge openings 27 in the passage 19 of the agitator, the funnel 41, and the opening 42 into the compartment 37. From this compartment 37, the wash water flows through the metering hole or opening 40 into the compartment 36 to effect a mixture and dispersion of the wash water with the liquid additive in the compartment 36. It is contemplated that sufficient wash water will enter the compartment 36 so that the mixture of wash water and liquid additive will fill the compartment 36 in three to four minutes to a level equal to the height of the syphon tube, as shown in FIG. 5. When the level of the wash water and liquid additive mixture reaches this height, the syphon tube immediately and automatically starts its syphoning action and will empty the compartment 36 in approximately one minute. The mixture, syphoning out of the compartment 36, is then further diluted in the lint filter pan with the wash water coming

from the other three passages **27** in the agitator and then drained into the wash water in the basket **11.** It has been determined that the period of time required for the start of the syphoning action is the same for normal and slow agitation due to the fact that any water above the opening or hole **40** is drawn back into the agitator on the return stroke of the agitator during its oscillating movement. Accordingly, it can be seen that the compartment **37** has the same liquid head to allow a fairly constant flow of the wash water through the metering hole **40** at all times. Any of the wash water-liquid additive remaining in the dispenser at the end of the washing cycle is immediately spun out along with the wash water at the beginning of the spin period at which time the liquid will be moved by centrifugal force along and upwardly of the wall **33** of the dispenser and outwardly of the dispenser. During this spinning operation, it will be apparent that the syphon tube **46** will be ineffective to syphon any liquid remaining in the receptacle due to its location closely adjacent to the inner side wall **34** of the receptacle compartment **36.**

While the liquid additive dispenser embodying the invention has been shown and described with reference to a particular lint-filtering agitator arrangement, it is to be understood that the dispenser may be mounted on the basket of the washing machine or on a conventional agitator and be fully operative to dispense the liquid additive through the syphon tube **46** after the addition of a predetermined quantity of wash water or rinse water into the open top of the compartment **36** and, if desired, during a predetermined time period, for, as soon as the liquid level of the liquid additive and water mixture is equal to the height of the syphon tube as shown in FIG. 5, the syphon tube will become immediately and automatically effective to cause the mixture to drain into the wash water in the basket. Accordingly, while the invention has been described in connection with a certain specific embodiment thereof, it is to be understood that this is by way of illustration and not by way of limitation.

What is claimed is:

1. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket; a liquid additive dispenser having means for mounting the same upon said agitator for oscillating movement therewith and being operatively disposed above the operating level of the water in the basket, said dispenser having means for receiving and containing a liquid additive, means for introducing water into said containing means for mixture with the liquid additive therein, and means for discharging the liquid additive-water mixture from said containing means, said discharging means being spaced from and operative independently of said water introducing means; and means operative in response to oscillating movement of said agitator, including passage means provided by said agitator and communicating with said water introducing means, for effecting the flow of water in said basket through said passage means to said water introducing means of said dispenser and into said containing means of said dispenser for mixture with the liquid additive therein and for flow of the mixture through said discharge means of said dispenser.

2. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket; a liquid additive dispenser having means for mounting the same upon said agitator for oscillating movement therewith and being operatively disposed above the operating level of the water in the basket, said dispenser having means for receiving and containing a liquid additive, means for introducing water into said containing means for mixture with the liquid additive therein, and means for discharging the liquid additive-water mixture from said containing means, said discharging means being spaced from and operative independently of said water introducing means; and means operative in response to oscillating movement of said agitator, including passage means provided by said agitator communicating with said water introducing means, for effecting the flow of water in said basket upwardly through said passage means of said agitator to said water-introducing means of said dispenser and into said containing means of said dispenser for mixture with the liquid additive therein and for flow of the mixture through said discharge means of said dispenser.

3. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket; a liquid additive dispenser having means for mounting the same upon said agitator for oscillating movement therewith and being operatively disposed above the operating level of the water in the basket, said dispenser having means for receiving and containing a liquid additive, means for introducing water into said containing means for mixture with the liquid additive therein, and means for discharging the liquid additive from said containing means, said discharging means being spaced from and operatively independently of said water introducing means; and means associated with said agitator and operative in response to oscillating movement of said agitator to pump water in said basket upwardly through said agitator to said water-introducing means of said dispenser and into said containing means of said dispenser for mixture with the liquid additive therein and for flow of the mixture through said discharge means of said dispenser.

4. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level and rotatable about an axis; an agitator mounted for oscillating movement within said basket; a liquid additive dispenser having means for mounting the same upon said agitator for oscillating movement therewith and being operatively disposed above the operating level of the water in the basket, said dispenser having a receptacle for receiving and containing a liquid additive, means for introducing water into said receptacle for mixture with the liquid additive therein, and means for discharging the liquid additive-water mixture from said containing means comprising tubular syphon means positioned within said receptacle and having one open end disposed adjacent the bottom of the receptacle and the other open end extending through the bottom of the receptacle; and means operative in response to oscillating movement of said agitator for effecting the flow of water in said basket to said water-introducing means of said dispenser and into said containing means of said dispenser for mixture with the liquid additive therein and for flow of the mixture through said syphon means of said dispenser upon a predetermined quantity of the mixture being contained within said receptacle, said syphon means being located in said receptacle to prevent flow of the mixture in said receptacle through said syphon means during rotation of said basket.

5. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket and having means defining a water passage through said agitator and including pump means formed within said agitator for pumping the water in said basket upwardly through said agitator during oscillation of said agitator; and a liquid additive dispenser for receiving and containing a liquid additive, said dispenser having means for mounting the same upon said agitator for oscillating movement therewith and being operatively disposed above the operating level of the water in the basket, said dispenser having a receptacle for receiving and containing a liquid additive and having communication with said water passage in said agitator for receiving water pumped upwardly by said agitator for mixture with the liquid additive, and means

for discharging the liquid additive-water mixture from said receptacle.

6. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket and having means defining a water passage through said agitator and including pump means formed within said agitator for pumping the water in said basket upwardly through said agitator during oscillation of said agitator; and a liquid additive dispenser adapted for receiving and containing a liquid additive, said dispenser having means for mounting the same upon said agitator for oscillating movement therewith and operatively disposed above the operating level of the water in the basket, said dispenser having a receptacle for receiving and containing a liquid additive and having communication with said water passage in said agitator for receiving water pumped upwardly by said agitator for mixture with said liquid additive, and a siphon in said receptacle and operative to discharge the liquid additive-water mixture from said receptacle.

7. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket and having means defining a water passage through said agitator and including pump means formed within said agitator for pumping the water in said basket upwardly through said agitator during oscillation of said agitator; and a liquid additive dispenser having means for mounting the same upon said agitator for oscillating movement therewith and disposed above the operating level of the water in the basket, said dispenser having a receptacle having radially spaced inner and outer compartments, the outer compartment being adapted to receive and contain a liquid additive and the inner compartment having means communicating with said agitator passage for directing water, pumped upwardly by said agitator pump means during agitator oscillation, into said inner compartment, means for introducing and metering water from said inner compartment into said outer compartment for mixture with the liquid additive therein, and means operative to discharge the liquid additive-water mixture from said outer compartment upon flow of water from said inner compartment into said outer compartment for a predetermined period of time and attainment of a predetermined quantity of the liquid additive-water mixture in said receptacle.

8. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket and having means defining a water passage through said agitator and including pump means formed within said agitator for pumping the water in said basket upwardly through said agitator during oscillation of said agitator; and a liquid additive dispenser having means for mounting the same upon said agitator for oscillating movement therewith and disposed above the operating level of the water in the basket, said dispenser having a receptacle having radially spaced inner and outer compartments, the outer compartment being adapted to receive and contain a liquid additive and the inner compartment having a funnel positioned within said agitator passage for directing water, pumped upwardly by said agitator pump means during agitator oscillation into said inner compartment, said compartments having a common wall dividing the same and provided with an opening for metering the flow of water from said inner compartment into said outer compartment for mixture with the liquid additive therein, and means in said outer compartment and operative to discharge the liquid additive-water mixture from said outer compartment upon flow of water from said inner compartment into said outer compartment for a predetermined period of time and attainment of a predetermined quantity of the liquid additive-water mixture in said receptacle.

9. In a clothes washing machine having a clothes-containing basket adapted to contain water at a predetermined operating level; an agitator mounted for oscillating movement within said basket and having means defining a water passage through said agitator and including pump means formed within said agitator for pumping the water in said basket upwardly through said agitator during oscillation of said agitator; and a liquid additive dispenser having means for mounting the same upon said agitator for oscillating movement therewith and disposed above the operating level of the water in the basket, said dispenser having a receptacle having radially spaced inner and outer compartments, the outer compartment being adapted to receive and contain a liquid additive and the inner compartment having a funnel positioned within said agitator passage for directing water, pumped upwardly by said agitator pump means during agitator oscillation, into said inner compartment, said compartments having a common wall dividing the same and provided with an opening for metering the flow of water from said inner compartment into said outer compartment for mixture with the liquid additive therein, and a tubular siphon in said outer compartment adjacent said wall and operative to discharge the liquid additive-water mixture from said outer compartment upon flow of water from said inner compartment into said outer compartment for a predetermined period of time and attainment of a predetermined quantity of the liquid additive-water mixture in said receptacle.

10. In a clothes washing machine having a basket adapted to be filled with water to a predetermined level and having an agitator in said basket, a liquid additive dispenser comprising means for mounting the same upon said agitator above the level of the water in said basket, said dispenser having a receptacle having spaced radially inner and outer annular compartments, the outer compartment being adapted to receive and contain a liquid additive and the inner compartment being adapted to receive and contain water, means for providing for a metered flow of water from said inner compartment to said outer compartment for mixture with the liquid additive therein, and a tubular siphon in said outer compartment and having one open end disposed adjacent the bottom of said outer compartment and having its other open end extending through the bottom of said outer compartment and operative to discharge the liquid additive-water mixture from said outer compartment upon flow of water from said inner compartment into said outer compartment and attainment of a predetermined quantity of the liquid additive-water mixture in said outer compartment.

11. In a clothes washing machine having a basket adapted to be filled with water to a predetermined level and having an agitator in said basket, a liquid additive dispenser comprising means for mounting the same upon said agitator above the level of the water in said basket, said dispenser having a receptacle having radially spaced inner and outer annular compartments, the outer compartment adapted to receive and contain a liquid additive and the inner compartment being adapted to receive and contain water and having an opening in the bottom thereof for flow of water into said inner compartment, said compartments having a common wall dividing the same and provided with an opening for metering the flow of water from said inner compartment into said outer compartment for mixture with the liquid additive therein, and a tubular siphon in said outer compartment adjacent said wall and operative to discharge the liquid additive-water mixture from said outer compartment upon flow of water from said inner compartment into said outer compartment for a predetermined period of time and at-

tainment of a predetermined quantity of the liquid additive-water mixture in said receptacle.

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