An agitator mounted dispenser of detergent or the like for a recirculation type automatic washing machine. A slightly unbalanced detergent compartment is held out of the flow of recirculating water by a support having mating ramp surfaces between the detergent compartment and the agitator mount. The ramp incline extends upwardly and outwardly in a radial direction from the agitator. During agitation, the centripetal force of the ramp holds the compartment on the support but during high speed rotation the centrifugal forces on the unbalanced compartment cause the compartment to ride up over the ramp support and drop down into the path of the recirculating water flow.

7 Claims, 7 Drawing Figures
CENTRIFUGALLY RESPONSIVE DISPENSER FOR WASHING MACHINE

BACKGROUND OF THE INVENTION

This invention relates to a dispenser of detergent or the like for an automatic fabric washing machine preferably of the type having recirculating water flow during the wash and rinse cycles. A dispenser constructed in accordance with the invention may be used to automatically insert detergent into the wash water after the completion of a presoak cycle.

Automatic dispensers for such additives as water softening agents are well known. However, such dispensers are not capable of introducing an additive, such as a detergent, subsequendy to an initial presoak operation, therefore necessitating the interruption of the cycle by the housewife at the beginning of the washing operation to add the detergent.

Accordingly, it is an object of this invention to provide a dispenser of design for an automatic washing machine adapted to automatically introduce an additive or a fabric treating chemical following a preselected cycle such as is used for presoak purposes.

It is a more specific object of the invention to provide such a dispenser particularly adapted for use in a recirculation-type washing machine, in which the additive is normally inserted by mixing with the recirculating water.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, an improved dispenser of detergent or the like is provided for use in an automatic fabric washing machine and arranged such that the detergent is automatically introduced into the water following the completion of a preselected cycle of operation, for example a presoak cycle. To this end the dispenser includes means for mounting the dispenser on the washing machine agitator and includes a rotationally unbalanced movable compartment for holding the detergent or the like. The dispenser also includes latch means associated with the agitator mount and with the compartment for supporting the compartment out of the water during normal agitation. This last mentioned means is arranged to be responsive to centrifugal forces exerted by the unbalanced compartment during high speed rotation of the agitator to release the compartment into position for mixture of the detergent with the water.

BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed the invention will be better understood from the following description of the preferred embodiments taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a sectional elevational view of a dispenser constructed in accordance with one embodiment of the invention;

FIG. 2 is a sectional elevational view of the dispenser of FIG. 1 with the detergent compartment being shown in an upper or detergent-holding position and being partially in solid lines and in a lower, dispensing position in dotted lines;

FIG. 3 is a plan view, with the detergent compartment means being shown in a latch disengaged position so that dispenser will now drop to a dispensing position;

FIG. 4 is a plan view of the dispenser latch area with the dispenser in the dispensing position;

FIG. 5 is a partial sectional view of a second embodiment of the invention;

FIG. 6 is a plan view showing the device latch area in the latch (up) non-dispensing position; and

FIG. 7 is a plan view showing the compartment latch area in the lower detergent-dispensing position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, there is shown a fabric washing machine 10 of the generally vertical agitator, spin basket type having a conventional basket 11 to receive fabrics to be cleaned and disposed within an outer imperforate tub 12. The agitator 13 is vertically mounted in the center of the tub to move fabrics about driven by a motor 14 and transmission 15. A pump 16, also driven by the motor 14 and transmission 15, is connected by a conduit 17 to a discharge nozzle 18 for recirculating liquid from the tub 12 through the pump 16, conduit 17, and nozzle 18 into the lint filter pan 19.

Referring more specifically to FIG. 2, the dispenser 20 comprises means including a central housing 21 for mounting the dispenser on the washing machine agitator 13. As shown, housing 21 is cup-shaped and adapted to fit somewhat loosely over the central hub 22 of a conventional lint filter pan 19. A downward projection 23 from cap structure 24 provides a bearing surface between the top of the lint filter hub 22 and, coupled with the loose fit of housing 21 over hub 22, permits the dispenser to free wheel on the agitator during the normal oscillation of the agitator about its axis such as occurs during the wash and rinse cycles. In accordance with one aspect of the invention, the fit between hub 22 and housing 21 is such that during the liquid extraction spin of the tub and agitator, the dispenser is brought up to, or nearly up to the rotational speed of the agitator.

The dispenser also comprises means including compartment 25 for holding a quantity of additive material such as detergent or the like. Compartment 25 has a trough 26 extending around the circumference of housing 21 and is movable up and down along the axis of the agitator. An upper rim structure 27 is provided on compartment 25 for minimizing splashing of detergent and liquid from the trough 26 during agitation. In accordance with an important aspect of the invention, compartment 25 is adapted to be rotationally unbalanced which in the dispenser of FIG. 2 is accomplished by the inclusion of an eccentric weight 28 on the outer perimeter of trough 26. For reasons which will be explained subsequently compartment 25 further includes a pair of notches 29 and 30, shown in FIG. 3, in lateral alignment with weight 28 each being on opposite sides of the housing 21.

The dispenser also comprises latch means including supporting guide ribs 31 and 32 associated with housing 21 and compartment 25 for supporting compartment 25 out of the stream of recirculating water during normal agitation. Guide ribs 31 and 32 have inclined surfaces 33 and 34 in supporting engagement with inclined mating ramp surfaces 35 and 36 under the underside of compartment 25 and are responsive to centrifugal forces exerted by the unbalanced compartment 25 during high speed rotation of the agitator to release
3,757,544

3,757,544 compartment from its position on top of supporting ribs 32 and 31 downward into a position lying within a lint filter pan 19. The notches 29 and 30 in the dispenser in cooperation with the guide track 37 and guide ribs 32 provide a means for directing the axial and radial movement of the compartment 25 and a means for support; support being achieved as stated previously. The dispenser need only be moved generally horizontally off the inclined surfaces in a direct opposite that of arrow 39 to disengage it from supporting points 34 and 33 allowing it to move generally downward axially along agitator into the position lying in the lint filter pan 19 shown in dotted outline in FIG. 1. In this position, the recirculating water flow, diagrammatically illustrated by arrow 40, mixes with the detergent in compartment 25 and the dissolved detergent solution flows out of the compartment 25 through openings 41.

In operation, the housewife places the dispenser on the agitator post on top of the lint filter hub 22, pours some detergent in the receptacle, and turns the machine on, beginning with a presoak cycle. The tub fills with water and the agitator may or may not perform an oscillatory motion to move the fabrics about while water is recirculated from the inlet nozzle 18 through the lint filter pan 19. During this cycle, the receiving means 38 is in its upmost position out of the path of the recirculating water. At the conclusion of the presoak cycle, the extraction operation begins with the agitator, dispenser and basket 11 rotating at relatively high speed to centrifugally extract liquid from the fabrics. While rotating at this high speed, the centrifugal force acting upon the unbalanced receiving means overcomes the retaining force of the ramp surfaces 33 and 34 mating with the compartment support surfaces 36 and 35 and moves laterally to the position wherein it is forced by gravity down to the position in the lint filter pan. When the wash cycle begins, the recirculating water is directed into the dispenser where it will dissolve the detergent and carry it into the tub to assist in washing the fabrics.

Referring now to FIGS. 5 through 7, an alternative form of a dispenser constructed in accordance with this invention is illustrated in which separate detergent compartments 42 and 43 are provided; each compartment having a trough 44 extending circumferentially around housing 45 and is movable up and down along axis of agitator. An important aspect of this invention has each compartment's configuration such that if rotated at high speed the centrifugal force developed will overcome the retaining force created by the mating of the ramp structures 46 on the housing end 47 on the guide rib 48 and the compartment will drop down into the filter pan 19 and into the flow of the recirculating water.

The dispenser mounting means has a housing 45 which fits loosely around the filter pan hub 22 and is supported on same by downward projection 49 on the inner surface of said dispenser housing 45. This bearing surface permits the dispenser to free-wheel when the agitator is oscillating and to attain rotational speed when the agitator rotates.

Each dispenser is guided in its up and down motion on the agitator by guide tracks 48 on the dispenser housing 45 and adapted to mate axially out of the corresponding slots 50 in the dispenser compartment. Radial restraint of each compartment is accomplished by the mating of tabs 51 and ribs 52 with axial move-ment being restrained by flange 53 and cap structure 54.

As can be understood from the foregoing description, the dispenser when used in an automatic fabric washer, provides an automatic introduction of additive to the wash water following a presoak cycle. The dispenser is of simple and inexpensive design and highly reliable in operation.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings. It is therefore intended that within the scope of appended claims the invention may be practical otherwise than as specifically described.

1. An additive dispenser for a vertical axis agitator, spin basket type automatic washing machine having a lint filter pan attached to said agitator, a tub for containing the water and recirculation means for circulating the water from the tub through said dispenser and filter pan by means of which the additive is automatically introduced into the washing machine following the completion of a preselected cycle, the dispenser comprising:

   a mount for the dispenser on the washing machine agitator, said mount having support arms;
   a rotationally unbalanced movable compartment for holding said additive, said compartment having a pair of oppositely disposed notches; and
   latch means for supporting said compartment out of the stream of recirculation water during normal agitation on said support arms and being responsive to centrifugal forces exerted by said unbalanced compartment during high speed rotation of the agitator whereby said compartment moves laterally to align said support arms and said notches to thereby release said compartment from the support arms and move the compartment into position for mixture of said additive with the water.

2. The dispenser of claim 1 in which the agitator mount is adapted to permit the dispenser to freewheel during normal agitation.

3. The dispenser of claim 1 in which the support arms have at least one inclined ramp surface in supporting engagement with the compartment slanted upwardly and outwardly with respect to the axis of the agitator and further comprises a mating ramp surface on the compartment, whereby the centrifugal forces of the unbalanced compartment are sufficient to overcome the centripetal force of the inclined ramp only during high speed rotation of the agitator.

4. The dispenser of claim 1 in which the compartment means comprises a plurality of separate receptacles lying generally in a common horizontal plane and having slideable interlocking adjoining surfaces therebetween whereby said receptacles expand laterally during high speed rotation of the agitator, disengage from the latch means, and drop into position for mixing of the contents thereof with the water.

5. In an automatic fabric washing machine adapted to operate automatically through a preselected cycle of operation and including container means to receive liquid and fabrics to be washed in that liquid, vertical axis agitation means positioned within the container means and adapted to agitate the fabrics during washing, filter means to remove lint and other particulate contaminants from the liquid, and a recirculation means adapted to recirculate stream of liquid from the con-
tainer through the filter means, the improvement of a
dispenser for storing a quantity of treating chemical
and disposing of the treating chemical within the path
of recirculation flow at a preselected time in the cycle
of operation, the dispenser comprising:
a mount for the dispenser on the agitation means,
said mount having support arms;
a compartment for receiving and containing a quan-
tity of treating chemical, said compartment having
a pair of oppositely disposed notches;
said compartment being adapted to move axially rela-
tive to said mount between an upper position
wherein the treating chemical is out of the path of
recirculation flow, and a lower position within said
filter pan wherein the treating chemical is disposed
within the path of recirculation flow to said filter
pan; and
centrifugal responsive restraining means operably as-
sociated with said compartment and said mount,
and adapted to maintain said compartment in said
upper position until the dispenser is subjected to
relatively high speed rotation whereupon centrifu-
gal force moves said compartment laterally to align
said support arms and said notches and release said
restraining means thereby permitting movement of
said compartment from said upper position.
6. The invention of claim 5 wherein said compart-
ment is dynamically unbalanced by an eccentric weight
on the outer perimeter thereof in alignment with said
notches whereby centrifugal force will overcome the
action of said restraining means when the dispenser
is subjected to relatively high speed rotation.
7. The invention of claim 1 wherein said compart-
ment comprises a pair of semi-circular shaped contain-
ers positioned around said mounting means each of
which container is adapted to move laterally of said
mounting means from said latched mode to said unl-
latched mode under the influence of centrifugal force
when the dispenser is subjected to relatively high speed
rotation.

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