This invention relates to laundry washing machines, and has for its object a particularly simple construction or means by which the scum that floats on the top of the washing liquid in the casing or receptacle is removed or ejected during the sloshing or surging of the liquid under the influence of the rotatable, or, otherwise movable, container in the casing, without overflowing or removing an appreciable amount of liquid.

It further has for its object means for removing the scum in machines of the type in which the outer casing or receptacle for the washing liquid is a horizontal cylinder and the clothes container a perforated drum rotatably mounted on a horizontal axis coincident with, or parallel to, the axis of the outer casing.

Other objects will appear throughout the specification.

The invention consists in the novel features and combinations of constructions hereinafter set forth and claimed.

In describing the invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a front perspective view of a washing machine embodying this invention.

Figure 2 is a rear perspective view on a reduced scale, partly broken away to show the interior rotatable perforated clothes container.

Figure 3 is an enlarged elevation of the scum removing chamber and the common control valve for the washing and rinsing liquids.

Figure 4 is a fragmentary sectional view on line 4—4, Figure 3, the contiguous portion of the outer casing or water receptacle and the clothes container drum being also shown.

Figures 5 and 6 are sectional views taken respectively on lines 5—5 and 6—6, Figure 4.

Figures 7 and 8 are transverse sectional views taken on the same lines as Figures 5 and 6 respectively and illustrating the position of the movable valve member, when shifted to establish communication with the rinsing fluid supply and the drum, and to establish communication between the water supply and the outer casing.

Figures 9 and 10 are isometric views of the movable valve member.

Figures 11 and 12 are fragmentary isometric views of the control valve for the rinsing and washing liquid and contiguous parts, Figure 11 showing the position of the valve, when set to let the water or liquid feed into the casing, and Figure 12, the position assumed when operated to let the water flow through the rinsing conduit.

I designates an outer casing, which is usually in the general form of a horizontal cylinder; and 2 designates a clothes container, preferably in the form of a cylinder or drum mounted on a horizontal axis in the casing, which axis is coincident with or parallel to the axis of the casing. The outer casing 1 is mounted upon a suitable base 3 which also houses mechanisms, accessory to the machine, as actuating mechanism for the drum, drain valve mechanism, etc.

The drum is actuated in any suitable manner or by any suitable actuating mechanism connected to an axle 4 on the rear end thereof. The casing is provided on its front end with a loading door structure 5, which door also closes a door opening in the end of the drum remote from the driving axle 4.

During a washing operation, a washing fluid or solvent is filled into the outer casing to a predetermined low level, as indicated by the line 1—1 (Figure 1), and this may be considered the normal level; the drum is rotated first a predetermined number of times in one direction and then in the reverse direction, and this oscillating movement is repeated. During the washing operation, the level is raised to a height indicated by the line H—H, and during this sudsing, a thick layer of suds and scum floats on the water. Some of the floating suds, which contains dirt that is liable to settle on the clothes, is being constantly removed during the surging of the water. Also, during the initial part of the rinsing operation, the level of the water is raised to H—H to float off the scum that would settle on the clothes. During the latter part of the rinsing operation, the dump valve of the machine remains open and the rinsing is effected by jets of clean water. The drum is perforated in the usual manner, and as seen in Figure 4, is also formed with peripheral projections or blades 6, which facilitate the surging operation.

One feature of the invention is a means for removing the scum without removing an appreciable amount of water or liquid during the surging of the liquid.

As here shown, the means for removing the scum comprises a scum outlet or float chamber provided on the peripheral wall of the outer casing above the normal and high levels of the liquid, this chamber having an overflow outlet in the form of a slot located at substantially the level of the widest part of the casing in a horizontal direction.

The washing machine here illustrated is shown...
as provided with but one scum removing means on one side thereof.

10. The chamber 11 is secured to the peripheral or cylindrical wall of the outer casing and communicates with the interior of the casing through perforations 13 formed in the portion of the wall of the casing on which the chamber 11 is mounted. The chamber 11 is secured in position in any suitable manner, as by fastening members 14 extending through a marginal flange on the chamber and threading into the cylindrical wall of the outer casing. The bottom of the chamber 11 is formed inclined for facilitating the draining of the liquid that surges into the chamber back into the outer casing. The outlet 12 is located an appreciable distance above the bottom. This chamber 11 extends at its lower portion below the horizontal plane of the axis of the drum. As the liquid is carried around the drum, that nearest the drum, has a greater velocity than that toward the cylindrical wall of the casing. This gives a somewhat tilting effect to the layer of scum accumulating on the surface, which causes a large part thereof to be pumped into the scum chamber. The drain pipe 15 delivers into a sewer or other outside receptacle and does not drain back into the casing 1.

20. Usually, the overflow scum outlet 12 is located near the top of the chamber 11 near the level or slightly above the normal level of the liquid contents of the casing, so that during the surging of the liquid, the scum on the surface thereof is thrown into the outlet 12. The greater part of the chamber 11 is located below the outlet 12 and communicates with the interior of the casing 1 through means which retards the easy flow of the liquid back into the casing, the retarding action giving time for the greater part of the scum on the surface of the water in the chamber 11 to be thrown out through the outlet 12.

Owing to this arrangement, the water or liquid with scum washing under the influence of the rotation of the drum rises or is impelled into the chamber 11 but the dirty scum thereon is floated out through the outlet 12; thus during the sudsing and rinsing operations, the scum is prevented from accumulating to such an extent as to foul the clothes being washed.

The valve structure for controlling the flow of the washing liquid to the outer casing 1 and the passage of a rinsing fluid to the clothes container drum 2, is built, as a unit, with the scum removing chamber 11 and located on one side of said chamber.

21 designates the valve casing, and 22 a rotary, and usually a two-way, valve member in the casing. The valve casing communicates with the interior of the outer receptacle 1 through an outlet passage 23 in the valve casing, and with a conduit for conducting the rinsing fluid to the drum 2, through an outlet passage 24, and is operable to open either of said passages and close the other. The washing liquid is usually water, hot or cold, or a mixture of the same, with a soap or solvent therein, and also the rinsing liquid is hot or cold water.

25 and 26 designate respectively hot and cold water conduits which are connected to a suitable supply, and these have normally closed manually operable valves 27 and 28 therein. 28 is a conduit conducting the rinsing fluid from the outlet passage 24 of the valve casing 21 to the interior of the drum, this conduit extending around to the rear side of the outer casing and communicating with the drum through the rear wall of the outer casing. This pipe arrangement per se forms no part of this invention.

The valve member 22 is rotatably mounted in the casing 21 and is normally arranged in position to close the passage 24 leading to the rinsing conduit 26, and to establish communication between the hot and cold water conduits 25 and 26 and the outer casing 1 through the outlet passage 30 (see Figures 3, 11 and 12), the passage 30 communicating with the port 23 opening into the outer casing 1. When the valve member 22 is in its normal position, it is in the position shown in Figures 5 and 11, and when in position to supply the rinsing fluid is in the position shown in Figures 7, 8 and 12. The valve member is formed with a transfer passage 31, which, when in normal position, communicates with the inlet chambers 32 and 33 of the valve casing 21 into which the hot and cold water conduits discharge. This passage 31 communicates with the outlet passage 30, as seen in Figure 6, and when in this position, a full portion 34 of the valve member 22 cuts off the chamber 24 of the valve casing with which the rinsing conduit communicates. When in this position, if either or both the hot and cold water valves 27 and 28 are open, the water will flow through the passages 31, 30 and port 23 into the outer casing 1. When the valve member 22 is turned into the position shown in Figures 7, 8 and 12, the same passage 31 communicates with the chamber 24 of the valve casing 21, which chamber communicates with the rinsing conduit 26, and also with the hot and cold water chambers 32, 33 of the valve casing, so that when either the hot or cold water valves 27 and 28 or both are open, the water will flow from the chamber 23 or 23 or both, through the passage 31 into the chamber 24 and out through the rinsing conduit 26, and during this time, the passage 31 is cut off from the passage 30 leading to the outer casing 1 by the wall 36 of the valve member 22. The valve member 22 is thus normally in such position that it will communicate with the drum 1, if the hot and cold water valves are open. To rinse, the valve is turned to cut off the outlet to the outer casing 1 and establish communication with the rinsing conduit 26 or is turned to the position shown in Figures 7 and 8.

The valve is operated by a suitable handle 37 mounted thereon.

What I claim is:

1. In a laundry washing machine, a horizontal, substantially cylindrical outer casing for receiving a washing liquid and a perforated drum rotatably mounted on a horizontal axis in the casing, the casing having a chamber located outside of the portion of the casing in which the drum is mounted and opening into said portion at a point opposed to the periphery of the drum and above the normal level of the liquid in the casing, said chamber having an outlet located above its bottom and the lowermost part of the side of the chamber opening into the portion of the casing in which the drum is mounted, whereby the surface liquid and the drum thereon is thrown into a chamber communicating the surging of the liquid under the influence of the rotating drum and the liquid runs from the chamber back into the casing and the scum passes into the outlet.

2. In a laundry washing machine, a horizontal casing for receiving a washing liquid, the
casing having a wall, and a perforated cylindrical clothes drum rotatably mounted on a horizontal axis in the casing, the wall being opposed to the periphery of the drum on one side thereof and therewith forming a passage through which the liquid is carried during rotation of the drum, a chamber located outside said wall of the casing and communicating with the casing through a wall having openings permitting unobstructed flow of liquid and scum thereon into the top of the chamber and restricting the flow of liquid from the chamber back into the casing to retard the lowering of the level of the liquid in the chamber, the chamber having an overflow outlet opening into the chamber near the top thereof, all whereby the liquid and the scum thereon is thrown into the chamber from the casing during the surfing of the liquid, and is restrained in its return from the chamber back into the casing under the influence of the rotating drum, and the liquid drains from said chamber back into the casing, and the floating scum passes into the outlet.

3. In a laundry washing machine, a substantially horizontal casing for receiving a washing liquid, a drum rotatably mounted on the horizontal axis in the casing, the casing having a wall opposed to the periphery of the drum at one side of the drum and therewith forming an upwardly extending passage through which the liquid is carried by the rotation of the drum, a chamber located outside said wall of the casing near the level of the axis of the drum, the chamber opening at one side through said wall into the casing, a partition separating the interior of the casing and the chamber and having openings located near the bottom of the chamber, the chamber having an overflow outlet on the upper side thereof, all whereby the liquid and the scum thereon is thrown into said chamber during the surfing of the liquid under the influence of the rotating drum, the liquid runs from the chamber through said partition into the casing, the floating scum passes into the outlet and the partition serves to delay the return of the liquid from the chamber to the casing.

4. In a washing machine, a horizontal casing for receiving a washing liquid, a cylindrical drum rotatably mounted on a horizontal axis in the casing, the casing having a wall opposed to the periphery of the drum at one side of the drum and therewith forming an upwardly extending passage through which the liquid is carried by the rotation of the drum, a chamber located outside said wall and opening at one side through said wall into the casing to receive the liquid with the scum thereon during the surfing of the liquid under the influence of the rotating drum, said chamber having an overflow outlet from the upper end thereof and a perforated partition between the interior of the casing and the chamber and extending to near the bottom of the chamber, whereby the liquid with the scum thereon is thrown into the chamber and the liquid delayed in its return movement to the casing to permit the scum to overflow, the partition serving as a baffle means to retard the return of the liquid to the casing.

5. In a laundry washing machine, a horizontal cylindrical outer casing for receiving a washing liquid, a perforated washing drum rotatably mounted on a horizontal axis in the casing, the casing having a chamber on the outside thereof, the chamber having an outlet in the upper portion thereof, the greater portion of the chamber being located below the level of said outlet, the chamber communicating at least at its upper and lower portions with the interior of the casing through the cylindrical wall thereof, said chamber being arranged with its outlet near the horizontal level of the horizontal plane of the axis of the casing.

6. In a laundry washing machine, a horizontal cylindrical outer casing for receiving a washing liquid, a perforated washing drum rotatably mounted on a horizontal axis in the casing, the casing having a chamber on the outside thereof, the chamber having an outlet in the upper portion thereof and the greater portion of the chamber being located below the level of said outlet, the chamber having substantially unobstructed communication with the interior of the casing at the upper portion of the chamber and having obstructed communication with the interior of the casing below the upper portion thereof to retard the free flow of liquid from the chamber into the casing, said chamber being arranged with its outlet near the horizontal level of the horizontal plane of the axis of the casing, said scum outlet being arranged on the side of the chamber remote from the peripheral wall of the casing, all whereby surging of the liquid during the rotation of the drum in one direction tends to throw the liquid with the scum thereon into the chamber and the scum floating on the liquid, out through the outlet, and the return of the liquid in the chamber is retarded in its flow back to the casing.

7. In a laundry washing machine, an outer casing for receiving a normally low-level washing liquid therein, a clothes containing drum rotatably mounted in the casing, a scum catcher and remover attached to the casing and communicating with an opening in the casing, both the scum catcher and remover and opening being positioned above the normal low-level of liquid in the casing and being reached by the liquid and scum only when the drum is rotating, so that, during rotation of the drum, scum that is formed and floating on top of the washing liquid is carried up to and through said openings into the scum catcher and remover without conveying away any substantial portion of the washing liquid, thereby enabling the separate washing and rinsing operations to be carried out in the absence of formed scum.

8. In a laundry washing machine, an outer casing for receiving a normally low-level washing liquid therein, a perforated clothes containing drum rotatably mounted in the casing, a scum catcher and remover attached directly to the casing and communicating with a plurality of openings in the wall of the casing, the scum catcher having an inclined bottom permitting return of liquid to the casing, both the scum catcher and remover and openings being positioned above the normal low-level of liquid in the casing and being reached by the liquid and scum only when the drum is rotating, so that, during rotation of the drum, scum that is formed and floating on top of the washing liquid is carried up to and through said openings into the scum catcher and remover without conveying away any substantial portion of the washing liquid, and during reverse rotation of the drum the liquid in the scum catcher will flow down its inclined bottom back into the casing, thereby enabling the separate washing and rinsing operations to be carried out in the absence of formed scum.
9. In a laundry washing machine, a casing for receiving a washing liquid, a perforated cylindrical clothes drum mounted in the casing, the casing receiving liquid to a normal low-level substantially below the axis of the drum and having a wall opposed to the periphery of the drum and provided with a plurality of passageways at different levels through which liquid is carried during the rotation of the drum and surging of the liquid within the casing, means forming a chamber on the outside wall of the casing opposite to, and communicating with the casing through, said passageways, said chamber having an inclined bottom and a waste outlet and a baffle therein permitting an overflow from the upper portion of said chamber to said outlet, whereby as the drum rotates scum and suds on the liquid carried up the inner side of the casing and into said chamber collect in an area of quiescence as compared to the turbulence within the casing and are floated by the rising liquid therein over the said baffle, the liquid flowing down the inclined bottom and returning through said perforations, upon reverse rotation of the drum, to the casing.

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