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3,246,837

SEDIMENT EJECTOR AUTOMATIC WASHING MACHINES

Filed March 4, 1963

2 Sheets-Sheet 1

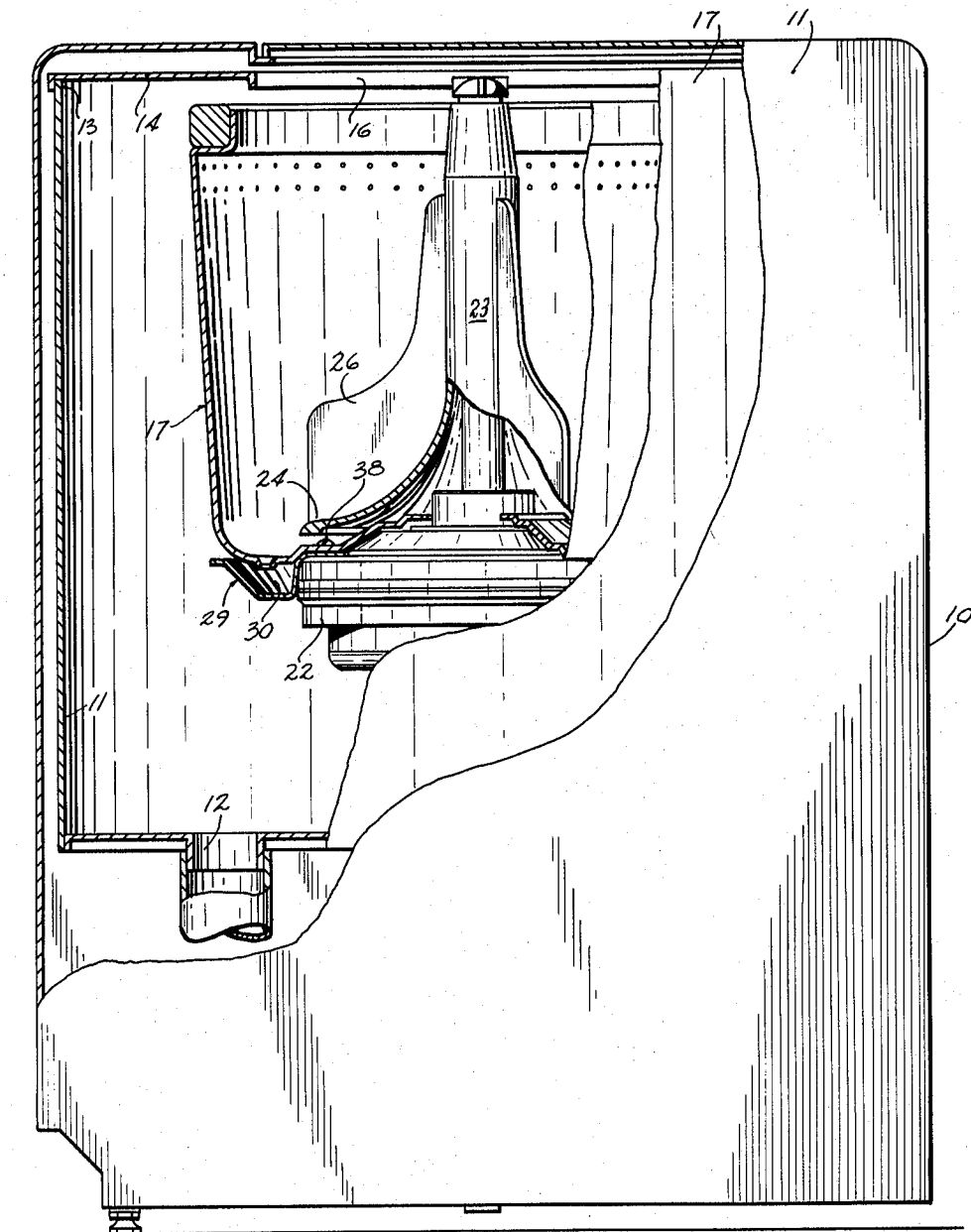


FIG. 1

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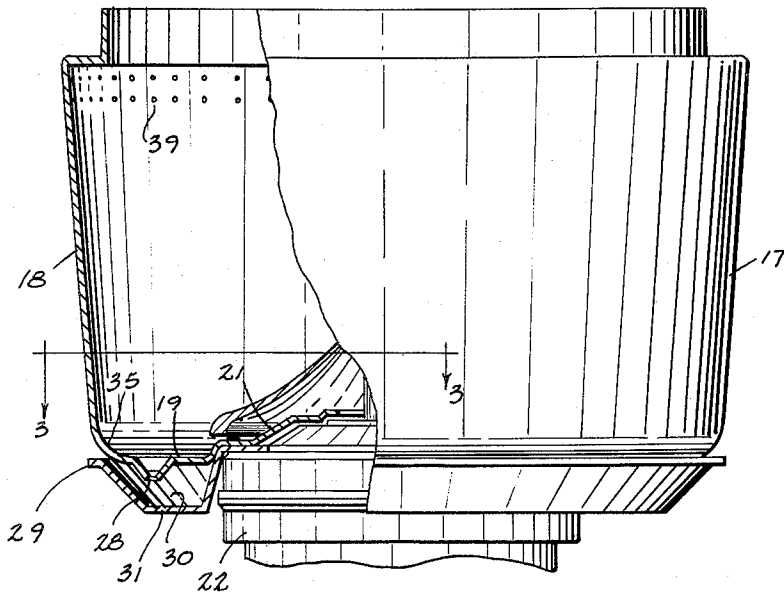


FIG. 2

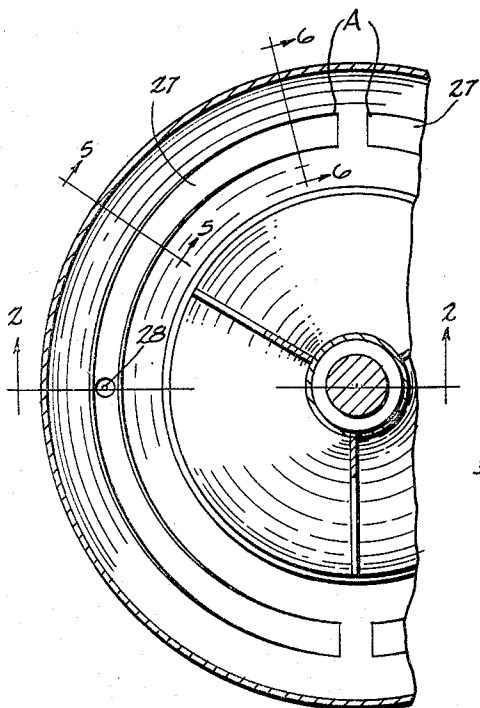


FIG. 3

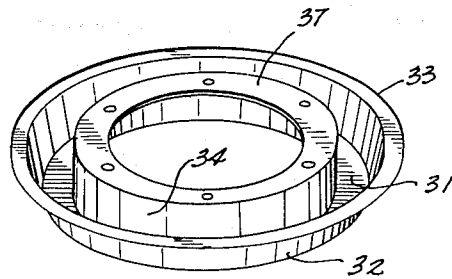


FIG. 4

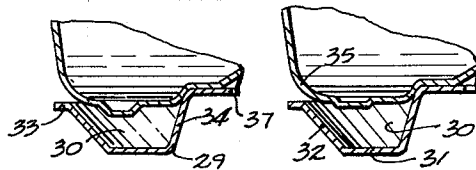


FIG. 5

FIG. 6

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SEDIMENT EJECTOR FOR AUTOMATIC WASHING MACHINES

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5 Claims. (Cl. 233-27)

This invention relates to improvements in equipment primarily designed for use with automatic washing machines and particularly to structure for the automatic ejection of sediment removed from clothes during a washing operation. Specifically, the invention is directed to means located beneath the base of a wash tub for collecting sediment during a wash agitation and disposing of such sediment at the commencement of a spin drying operation.

Many devices have been applied to or made a part of a washing machine for the purpose of removing dirt or other waste material from a wash tub after such material has been dislodged from clothes as a result of a washing operation. Generally, these devices have been designed largely with a view to the removal of lint, soap scum, and dirty water. However, it almost inevitably occurs that any tub load of clothes contains sand or other solids which, when dislodged, sink to the base of the tub. Following a washing operation, the tub is rotated at high speed to centrifugally remove dirty water and scum from the clothes preparatory to a wash rinse operation. Regardless of whether or not the solid tub is fitted with a perforate inner basket, or includes upwardly opening exit channels in the tub side wall, the spinning operation fails to remove the heavy solids that accumulated on the tub bottom during washing. Consequently, when a wash rinse operation is started these solids will be disturbed and displaced and tend immediately to contaminate the fresh water intended to remove any remaining suds or scum from the clothes. It appears that neither a spinning operation nor an over-the-top flush rinse is capable of removing dirt solids from the tub and, of course, the extent to which these solids occur determines the ultimate degree of cleanliness of the clothes upon completion of a laundering operation.

My invention, as hereinafter described, is directed to the premise that a considerable portion of dirt or other sediment, released during a washing operation, is relatively solid and heavy as compared with the usual grime and dirt. In consequence, these particles should be removed from the wash receptacle as they become dislodged and not permitted to remain in the wash tub with the probability of their recontaminating the material from which they were dislodged. To accomplish this, a sediment ring is mounted directly beneath the tub bottom. Radially outwardly, the ring is defined in part by a circular trough, the circumferential lip of which is spaced downwardly from the tub bottom. Suitable vents in the tub bottom are located directly above the trough and continuously serve as exits from tub to ring of all particles as they are dislodged during a washing operation.

It is an object of the present invention to provide an extremely simple and automatically operable structure for the collection and disposal of sediment such as may be composed of sand, extracted dirt and other heavy foreign particles during conventional steps in the operation of an automatic clothes washer.

Another object of the invention is to provide structure that enables immediate removal from a wash containing tub all sediment or other solid particles as such sediment is released from clothes during a wash agitation.

A further object of the invention lies in the provision of structure that, in combination with a specially designed wash tub bottom, and without the aid of passageways,

traps or valves, enables the continuous removal of sediment from the tub during a washing cycle and thereafter the immediate disposal of the collected sediment at the start of a spin drying cycle.

Other objects and advantages of the invention will be more fully understood and appreciated from a consideration of the following specification, taken in conjunction with the accompanying drawings; and in which

FIG. 1 is a side elevational view of a cabinet housed washing machine, part of the cabinet wall, collector tank and tub being broken away to orient the invention;

FIG. 2 is a larger view of the tub with a wall broken away to show the association between the tub bottom and sediment ring therebeneath (see line 2-2 of FIG. 3);

FIG. 3 is a fragmentary horizontal sectional view taken substantially on the line 3-3 of FIG. 2 and shows one of two vents in the tub bottom;

FIG. 4 is a perspective view of the sediment ring prior to attachment to the tub bottom;

FIG. 5 is an enlarged fragmentary vertical sectional view taken substantially on the line 5-5 of FIG. 3; and

FIG. 6 is a view similar to FIG. 5, taken on the line 6-6 of FIG. 3.

Referring to FIG. 1, the reference numeral 10 is used to generally designate a cabinet in which an automatic washing device is located. In the present illustration, the device includes a collector tank 11 having a bottom drain 12. As is common, the top rim 13 of the tank is closed by a fixed cover 14 that is centrally apertured at 16 to give access to the open top of a wash tub 17. This tub may, as best shown in FIG. 2, have a slightly outwardly inclined side wall 18 from a bottom 19. The bottom is circularly contoured in steps 21 toward the tub center to match and have joined thereto a suitable operative transmission, generally designated at 22. Above the steps is an agitator 23, the flared rim 24 of which includes generally radial blades 26.

As may be seen in FIG. 3, the tub bottom 19 is provided with two semi-circular channels 27. These channels follow identical patterns around the periphery of the bottom 19 and only one will therefore be described. Commencing with that portion of the channel indicated as "A," it will be noted that the channel is so shallow that it blends and becomes flush with the tub bottom. Shortly removed from the start of the channel, it appears much as shown in FIG. 6. The channel progressively deepens as may be seen in a comparison of FIG. 6 with FIG. 5. Approximately 90° from point "A," the channel has deepened to an extent to include inwardly sloping sides and at its greatest depth is apertured to provide a vent 28. (See FIG. 2). Beyond this vent, the remainder of the channel progressively shallows till it again blends with the tub bottom at a point approximately diametrically opposite "A."

Attention is now directed to a sediment ring 29. As may be clearly seen in FIGS. 2, 5, and 6, the ring consists of a trough 30 defined by a bottom wall 31, an inclined peripheral wall 32 that terminates in a lip 33, and an inner wall 34. It is to be noted that the wall 32 extends above the vents 28 and is spaced from the curved portion 35 which connects the tub wall 18 with the bottom 19. The inner wall 34 of the trough extends almost vertically upward and terminates in a substantial flat rim 37. This wall is higher and the curved point of meeting with rim 37 is designed to nest with one of the steps 21 of the tub bottom 19. As may be seen in FIGS. 1 and 2, the top of the transmission 22 and central tub bottom are contoured alike and it is proposed to sandwich the rim 37 therebetween. When so organized, these parts are secured together by suitable screws 38.

As is well known, clothes, water, and a suitable wash detergent are placed in a tub, such as the one presently

shown. An agitator is then caused to oscillate and in so doing moves the clothes about to loosen and displace any foreign material with which they may be contaminated. As the washing operation progresses, grime and other small particled dirt are collected in the detergent in the form of scum and can later be removed from the tub by a conventional spinning action. However, during the wash period, other foreign material of a heavier and more substantial nature has also been dislodged from the clothes and this material, by its very nature, sinks to the tub bottom. Of course, since the agitator covers a large central portion of the tub bottom, this material will collect in the peripheral channels 27 and will be moved back and forth under influence of agitation. The vents 28, although of relatively small diameter, are sized to permit liquid from the tub to pass into the trough 31. This liquid carries with it the material collected in the channels 27, removing it from the tub as released from the clothes. The extent of liquid passing from the tub to the ring, while sufficient to flow the material, is insufficient to affect the washing operation due to any appreciable lowering of the tub's liquid level.

In practice, the period during which a washing operation takes place is sufficient for all loosened particles to have moved into the trough of the ring. The tub is next rotated to centrifugally remove the liquid and accumulated dirt and scum preparatory to agitator rinse. As the tub picks up speed of rotation, the material trapped in the sediment ring is flung outwardly through the space between the tub bottom and the trough wall 32 into the tank 11. It can well be visualized that the wash liquid, when it enters the tank from the tub, through the exit holes 39 provided therefor, will move downwardly carrying with it sediment just centrifuged from the ring. All of this being waste in liquid, dirt and scum and sand-like particles will pass out of the tank through the drain 12. As a result of this procedure, the clothes in the tub are entirely free of dirt and scum and all other dirt-like particles and when clean liquid is next introduced into the tub for a rinse cycle, there can be no recontamination of the clothes.

Although applicant has shown and described only one structure by which the solid tub of an automatic washer may not only be purged of dirty liquid and sediment as a result of a washing operation, but also purged of solid particles, such, for example, as sand, it will be apparent that with the exception of the general arrangement of parts for this purpose, the structure may be modified insofar as such modification is within the definition as set out in the annexed claims.

Having thus set forth my invention, what I claim as new and for which I desire protection by Letters Patent is:

1. In a washing machine having a tub adapted to contain liquid and material to be washed and being rotatable at high speed about a generally vertical axis to centrifugally extract liquid therefrom, means drivingly engaging said tub for rotation, at least one upwardly opening channel in the portion of the bottom of said tub remote from the axis, the lengthwise central portion of said channel being of greatest depth and having a vent through said bottom, a trough-like ring beneath said bottom channel having an inner rim secured to said bottom and an outer peripheral wall spaced radially outwardly from said rim, the outer peripheral wall of said ring being spaced from and flared outwardly of said bottom and continuously radially outwardly open whereby to discharge accumulated sediment in said ring by centrifugal action on high speed rotation.

2. In a washing machine having a tub adapted to contain liquid and material to be washed and being rotatable at high speed about a generally vertical axis to centrifugally extract liquid therefrom, outlet vents in the bottom of said tub, the portion of the bottom of said tub remote from the axis having channel means inclined downwardly toward said outlet vents, a trough-like ring spaced beneath the peripheral portion of said bottom and rigidly attached thereto, said ring being directly beneath said

channel means and including an outer peripheral wall spaced from said bottom and continuously radially outwardly open whereby to discharge accumulated sediment in said ring by centrifugal action on rotation at high speed, and drive means drivingly engaging said tub for rotation.

3. In a washing machine having a tub with an outwardly inclined wall, said tub having a top opening and being adapted to contain liquid and material to be washed and being rotatable at high speed about a generally vertical axis to centrifugally extract liquid from the tub in the region of its top opening, at least one upwardly opening channel in the portion of the bottom of said tub remote from the axis, the lengthwise central portion of said channel being of greatest depth to create a sump having a vent for gathering and conducting sediment from the interior to the exterior of said tub bottom during a washing operation, a sediment ring having an inner rim attached to the bottom of said tub and including a trough located radially outwardly of said rim and directly beneath said vent, the outer peripheral wall of said trough being outwardly inclined and spaced from said bottom and continuously radially outwardly open whereby to discharge accumulated sediment in said trough by centrifugal action through rotation of said tub, and drive means drivingly engaging said tub for rotation.

4. In a washing machine having a tub adapted to contain liquid and material to be washed and being rotatable at high speed about a generally vertical axis to centrifugally extract liquid therefrom, the tub bottom having a pair of coradial semi-circular channels adjacent the portion of said bottom remote from the axis, said channels gradually increasing in depth from their ends to the centers thereof to form sumps having vents at their greatest depths, a sediment ring secured to said bottom, walls of said ring defining a trough beneath said channels, the outer peripheral wall of said trough being outwardly inclined and spaced from said bottom and continuously radially outwardly open whereby when said tub is rotated any sediment accumulated in said trough will be centrifugally discharged independently of the liquid in said tub on high speed rotation, and drive means drivingly engaging said tub for rotation.

5. In a washing machine having a tub adapted to contain liquid and material to be washed and being rotatable at high speed about a generally vertical axis to centrifugally extract liquid therefrom, means drivingly engaging said tub for rotation, the tub bottom having a pair of coradial semi-circular channels adjacent the portion of said bottom remote from the axis, said channels gradually increasing in depth from their ends to the centers thereof to form sumps having vents at their greatest depths, a sediment receiving ring directly beneath said channels, an inner rim of said ring being secured to the base of said tub, an outer peripheral wall on said ring spaced radially outwardly from said inner rim and terminating in a laterally extending lip spaced sufficiently from the tub bottom to permit discharging of sediment in said ring centrifugally during rotation of said tub, said lip being continuously radially outwardly open.

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