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WASHING MACHINES AND THE LIKE

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3 Sheets-Sheet 1

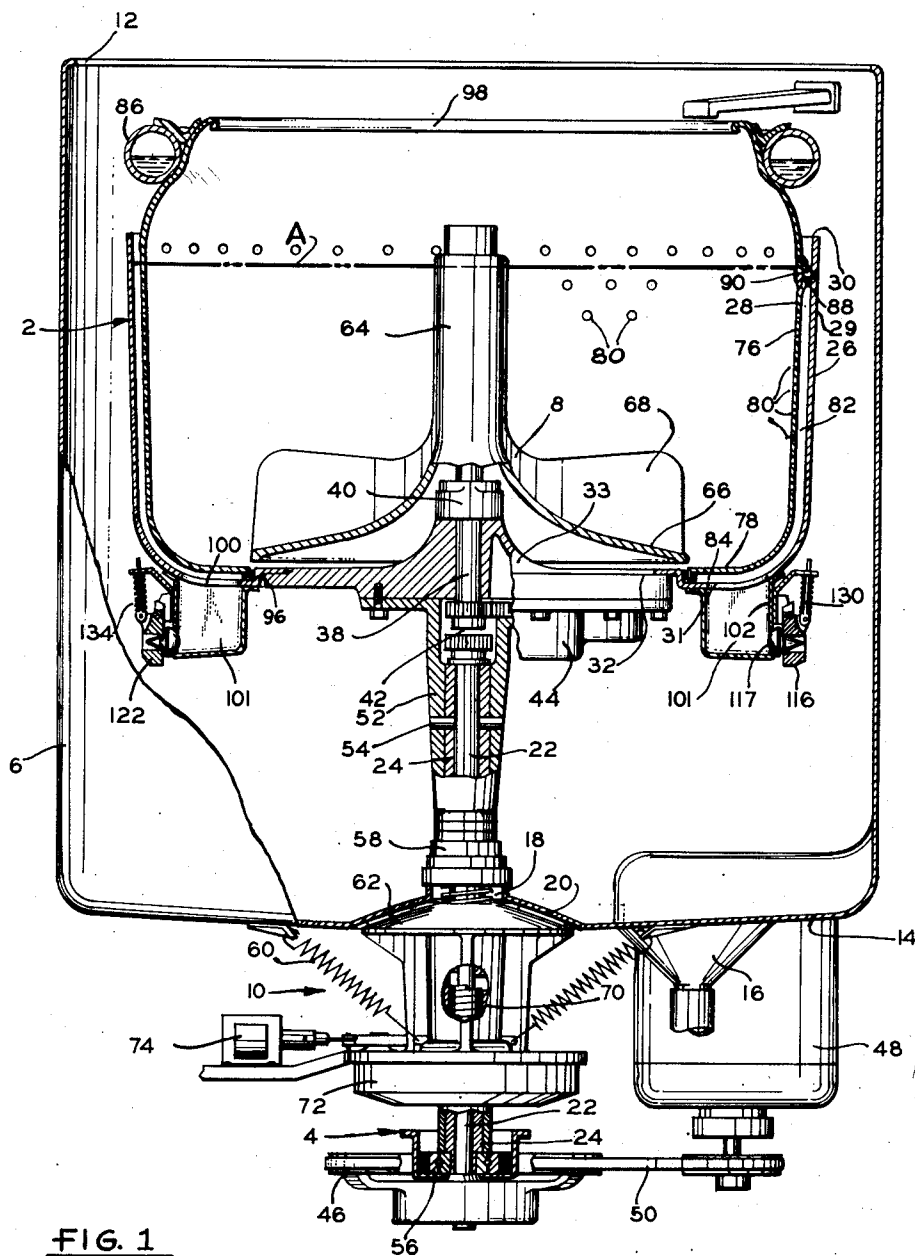


FIG. 1

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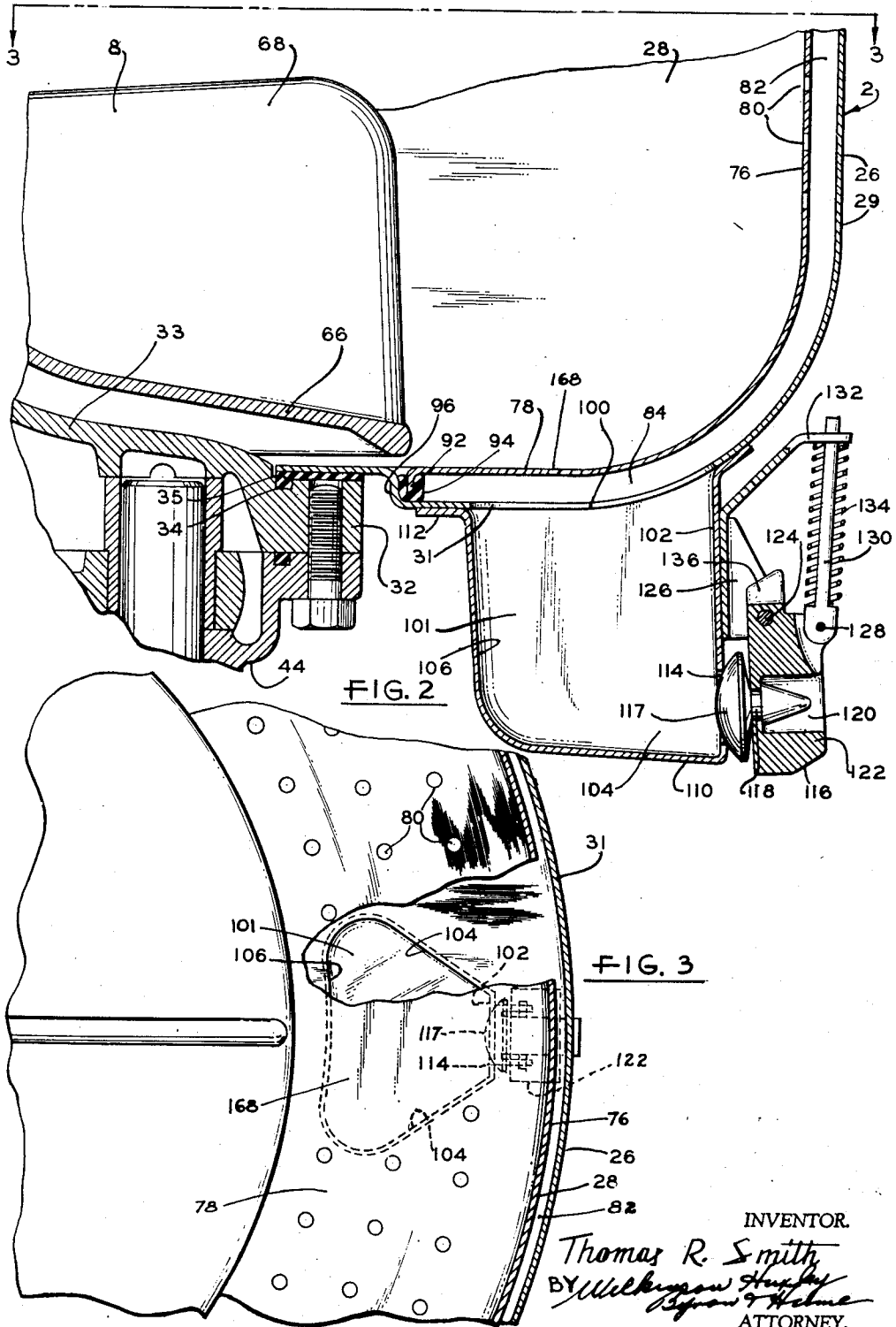
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SEDIMENT COLLECTING MEANS FOR WASHING MACHINES AND THE LIKE

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This invention relates to washing machines for fabrics and more particularly to a washing machine having a tub which is rotated about a vertical axis.

Among the objects of the invention is to provide a rotatable tub for a washing machine with an improved sediment collecting chamber or chambers which facilitates the removal of heavy particles of foreign matter or sedimentary material from the chambers out of contact with the fabrics being washed when the tub is rotated above a predetermined speed.

This invention is primarily directed to washing machines embodying a rotatable double tub construction; the inner tub being perforate and spaced from the outer imperforate tub to provide an annular liquid conducting space therebetween. Sediment collecting chambers or zones in the form of enlarged pockets are incorporated in the bottom wall of the outer imperforate tub adjacent its outer periphery which are in direct communication with the annular space between the tubs. As the sedimentary material enters the annular space during the fabric washing operation the water action therein gradually shifts the material around in this space until it passes over one of the chambers whereat it will have a tendency to settle. Each sediment collecting chamber has side walls converging toward its outer wall which has an opening or passage therein normally covered by a centrifugally operated valve to prevent leakage therethrough during the washing operation and the valve is operated by centrifugal force when the tub reaches a predetermined speed to open the passage to permit the discharge of a portion of the liquid through the opening out of contact with the fabrics being washed. When the valves open the sedimentary material collected in the chamber is discharged therefrom by centrifugal force; the rapid flow of liquid entering the space and this discharge is facilitated by the particular shape of the side walls of the chamber.

Accordingly it is another object of the invention to provide a washing machine having a rotatable tub of double tub construction with an improved self-cleaning sediment collecting chamber or chambers which utilizes the space provided between the tubs for conducting the sedimentary material toward the sediment collecting chambers out of contact with the fabrics being washed.

It is another object of the invention to provide a washing machine having a rotatable tub of double wall construction with sediment collecting means located in the lower portion thereof in direct communication with the space between the double wall construction and through which sedimentary material is discharged out of contact with the fabrics being washed.

It is still another object of the invention to provide a washing machine having a rotatable tub of double wall construction with a sediment

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collecting chamber which is readily accessible for cleaning.

It is yet another object of the invention to provide a washing machine having a rotatable tub of the double tub type with an annular space therebetween which is in direct communication with sediment collecting chambers disposed remote from the fabrics being washed.

It is still another object of the invention to provide a sediment collecting chamber in a rotatable tub for a washing machine which is self-cleaning.

Other objects, features, capabilities, and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawings:

Figure 1 is a partial vertical sectional view of a washing machine having a double tub construction with the improved sediment collecting chambers incorporated therein;

Figure 2 is an enlarged partial vertical sectional view of the improved sediment collecting chamber;

Figure 3 is a horizontal sectional view on a slightly reduced scale taken along the line 3—3 of Figure 2 with parts broken away for clearness;

Figure 4 is a partial vertical sectional view of a modified form of sediment collecting chamber; and,

Figure 5 is a horizontal sectional view taken generally along the line 5—5 of Figure 4 showing the sediment collecting chamber in top plan.

Referring now more in detail to one form of a combined washing and centrifugal drying machine, embodying a generally cylindrical rotatable tub 2 of double wall construction mounted for rotation about a vertical axis and made in accordance with the present invention, there is shown a base structure 4 which provides a support (not shown) for an outer, generally cylindrical, stationary tub or catch basin 6, a support for the inner rotatable tub structure 2, having a centrally located vertically mounted agitator or washing device 8 disposed therein, as well as a support for mechanism, generally referred to as 10, for operating the agitator and rotating the tub in the washing cycle, as will be hereinafter more fully described.

The stationary tub 6 has its upper end 12 disposed high enough so that its side wall intercepts and deflects downward any liquid discharged from the inner rotatable tub 2. Also, the stationary tub 6 further includes a bottom wall 14 having a drain opening 16 and a centrally disposed enlarged opening 18 in a crowned portion 20 through which vertical coaxial shaft means extend. The shaft means is in the form of an inner rotatable shaft 22 and an outer rotatable tubular shaft 24, for actuating the agitator 8 and supporting and rotating the tub 2, respectively.

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The inner rotatable tub includes an outer imperforate tub or receptacle 26 and a spaced inner perforate tub or container 28. The outer tub or receptacle 26 is substantially cup-shaped in vertical cross section and has an upwardly and outwardly flaring side wall 29 terminating in an open end to define a top edge 30 above the normal liquid level A desired in the tub and over which the major portion of the liquid is discharged when the tub is rotated during the liquid extracting operation. The lower end of the side wall 29 merges by means of a relatively large end smooth radius to a generally horizontal bottom wall 31 which has its inner end rigidly secured to a flange 32 formed as part of a centrally located and raised hub portion 33. This hub portion terminates adjacent the outer periphery of the agitator 8 and the top face of the flange 32 may be provided with a groove 34 or the like for the reception of suitable sealing material 35 to prevent leakage between the bottom wall 31 and flange portion 32 when the receptacle 26 is rigidly secured to the hub by any suitable means. It can be seen that when the outer imperforate receptacle 26 is rigidly secured to the hub portion 33 a unitary imperforate structure is provided.

Projecting through and upwardly from the hub 33 is a vertically disposed oscillatable shaft 38 splined or connected in any suitable manner to the agitator 8 for actuating or oscillating the same about its vertical axis to agitate the water and fabrics to be washed within the tub. Any suitable sealing means 40 may be utilized between the hub 33 and the shaft 38 to provide a fluid tight joint.

Means for oscillating the agitator are provided by suitable oscillating mechanism generally indicated at 42 which, in this construction, is carried in a gear housing 44 disposed at the bottom of and bolted to the hub portion 33 to increase the mass thereof. This oscillating mechanism is preferably directly operated by the inner vertically disposed rotatable shaft 22 which has a driven pulley 46 secured thereto at its lower end, the same being continuously rotated in one direction by a motor 48, when energized, by means of a belt 50.

The gear housing 44 is further provided with a downwardly projecting hub 52 concentric with the shaft means and rigidly secured to the upper end of the outer tubular shaft 24 by means of pins 54, while the lower end of shaft means 22 and 24 are mounted in a combination radial and thrust bearing 56 adjacent the lowermost portion of the base 4. Leakage between the outer hollow shaft 24 and stationary tub 6 is prevented where the shaft means traverses the tub at the opening 18 by means of a resilient spring biased seal or boot 58 having upper and lower sealing surfaces adapted to engage the lower portion of the hub 52 and an upstanding portion of the stationary tub about the opening 18, respectively.

Since the combined radial and thrust bearing 56 provides the sole support for the rotatable tub 2, it is free to tilt thereabout and the upper end is capable of moving laterally; therefore, means in the form of centering springs 60, preferably four, are provided to maintain the tub in a substantially vertical position during the washing operation, and although it is not absolutely necessary, it is desirable to have them act in conjunction with a suitable damper mechanism 62 to aid in stabilizing the tub when it is rotated.

The agitator 8, disposed within the rotatable

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tub 2, is provided with the usual center post 64 and is formed with a flaring base or body portion 66 extending downwardly and outwardly above the hub 33 to underly the clothes, and has one or more blades 68 extending radially upwardly and outwardly from the upper portion of the base adapted to agitate the liquid within the tub upon oscillation of the agitator for effecting the washing operation. Also, the outer periphery of the base 66 preferably extends close to and covers the inner end of the bottom wall 31 of the receptacle 26 to prevent fabrics from entering thereunder and engaging any other surface.

In order to rapidly rotate the tub 2 to extract the liquid therein, suitable clutch mechanism 70 carried by the damper mechanism 62 may be provided for effecting a driving relation between the inner shaft 22 and the outer shaft 24. Suitable means are provided in the form of a brake mechanism 72 secured in part to the stationary tub 6 through the springs 60 and to the outer shaft 24 for holding the tub stationary during the washing operation, and for permitting the rotation of the tub during the spinning operation. The operation of both the brake 72 and the clutch 70 is under control of an electrically operated solenoid 74 which, when deenergized, applies the brake and renders the clutch inactive and when energized releases the brake and engages the clutch to connect the inner and outer shafts 22 and 24 together to drive the same in unison. It is to be understood, however, that generally, any suitable mechanisms for operating the washing machine as herein disclosed may be utilized.

Referring now more particularly to the details of construction of the tub assembly 2 which is rotated about its vertical axis, there is shown the substantially imperforate outer tub or receptacle 26 which includes the generally horizontal bottom wall 31 and the upwardly and outwardly flaring cylindrical wall 29 with its top edge 30 disposed above the normal liquid level desired therein. It is to be noted that the curved lower portion of the sidewall 29 and outer portion of the bottom wall 31 provides a smooth surface in order to reduce the tendency of heavy foreign particles to cling or stick at this point.

The inner tub 28 is in the form of an open-ended basket or container having its cylindrical sidewall 76 and flat bottom wall 78 provided with a multiplicity of perforations or openings 80. The inner tub or container is of smaller diameter than the receptacle and is disposed in substantially parallel spaced relation with respect to the sidewall 29 and the bottom wall 31 of the imperforate receptacle to provide a relatively narrow annular space which includes an upper liquid conducting space 82 between the sidewalls 29 and 76 and a lower radially extending annular liquid conducting space 84 between the bottom walls 31 and 78. This space permits relatively free circulation of the washing liquid therebetween during the washing operation and free flow of the washing liquid out of the receptacle over the top edge 30 upon rotation of the tub without contacting the fabrics in the container. In addition, the openings 80 in the bottom and sidewalls of the container readily permit heavy particles of dirt and other sedimentary material to flow therethrough into the annular space and settle toward the lower space 84 during the washing operation. Therefore, in effect, this space defines a sediment collecting zone or space which functions in a manner to be hereinafter described.

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The basket or container 28 which may include a balancing ring 86 is secured in spaced relation to the receptacle 26 adjacent the upper edge 30 to form a unitary structure in any suitable manner, such as, for example, by a series of spacers 88 and screws or bolts 90. The lower portion of the container is centered and held against radial displacement by providing a downwardly directed channel section 92 at the inner edge of the bottom wall 78 with an annular U-shaped gasket 94 which in turn engages a vertical shoulder 96 provided on the bottom wall 31 of the imperforate receptacle 26 adjacent the outer periphery of the agitator 8. The upper portion of the container 28 is preferably imperforate and extends upwardly and inwardly above the normal liquid level to retain the fabrics being washed and it terminates to define an opening 98, whereby the operator may have access to the interior of the container.

The bottom wall 31 of the receptacle 26 is provided with a pair of enlarged oppositely disposed openings 100 and a sediment collecting recess or chamber 101 is mounted on the exterior of the receptacle adjacent the outer peripheral portion and below each opening. In this manner the upper open end of each chamber is in direct communication with the annular space or zone 84 between the container 28 and receptacle 26 and is directly below the perforate bottom wall 78 of the container. Each chamber 101 is provided with an outer wall 102, a pair of side walls 104 which converge toward the outer wall 102, an inner wall 106 of any contour, a relatively flat bottom wall 110 and an upper outwardly extending peripheral flange 112 extending around the upper open end of the chamber 101 which is adapted to be secured to the exterior of the bottom wall of the receptacle in any suitable manner. Due to the fact that these chambers are relatively deep in proportion to the depth of the annular space 84 they provide spaces wherein the liquid is relatively quiet because the turbulent action of the agitator 8 will have very little or only a minor effect upon the liquid in these chambers during the washing operation. The outer wall 102 is provided with a normally sealed outlet opening or passage 114 disposed in the lower portion thereof and referring to Figure 3 it can be seen that, in top plan, the sidewalls 104 of the chamber taper or converge toward the opening 114 in the outer wall 102, this being for a purpose to be hereinafter described.

In order to prevent the washing liquid from flowing out of the openings 114 during the washing operation, a centrifugally operated valve 116 is positioned at each opening outwardly thereof to close or seal the same during all normal washing operating conditions. This valve generally comprises a resilient spherical-shaped plug 117 having a reduced neck or shank portion 118 which is adapted to enter and be held in a stepped recess 120 provided in a weighted body member 122 that is adapted to rotate about an upper horizontally mounted pivot pin 124. This pivot pin is secured in a bracket 126 which in turn is welded or secured to the outer portion of the outer wall 102 of the sediment collecting chamber 101.

Means for biasing the valve 116 to its closed position, to prevent leakage under normal washing operating conditions, includes a second horizontal pivot pin 128 which is disposed outwardly from the valve pivot pin 124 and adapted to hold the lower end of an upstanding bar or rod 130 whose upper end fits loosely within an opening in an upwardly and outwardly extending arm 75

portion 132 formed as part of the bracket 126. A compression spring 134 is positioned about the rod 130 which reacts between the outwardly projecting arm 132 and the valve body member 122 to force the resilient plug 117 into its closed or passage sealing position. With a valve of this type pivoted in the manner shown, it can be seen that when the tub is stationary the closing force exerted by the spring 134 is at its maximum and that when the tub is rotated and centrifugal force overcomes the compression of the spring, the pivot pin for the bar 130 moves upwardly and inwardly with respect to the pivot pin 124. Therefore, the component of the spring closing force has a tendency to either decrease or remain substantially constant rather than increase and the valve will therefore have a tendency to stay in its open position with a minimum of interference. A chamfered abutment 136 projecting upwardly from the pivot pin 124 is adapted to engage a portion of the bracket to limit the opening movement of the valve body member 122.

From the foregoing it can be seen that when the tub 2 is stationary during the washing operation, the liquid and the fabrics within the perforated container 28 are agitated rather violently by the vanes 68 on the agitator 8 and due to this action a portion of the liquid is caused to continually circulate through the openings 80 in the container into and out of the annular spaces 82 and 84 provided between the container and the receptacle 26. In so doing a relatively large proportion of the heavy particles of foreign matter and other sedimentary material will tend to pass through the openings into the annular space, and since the openings 80 break up the violent water action in this space the sedimentary material will settle toward the bottom of the tub in a relatively quiet manner. After dropping or settling to within the confines of the space 84, the slight horizontal oscillating movement of the liquid within the lower space or zone tends to move or shift the sedimentary material therein in a horizontal plane until it passes over one of the sediment collecting chambers 101. As this relatively heavy sedimentary material passes over one of the collecting chambers it quite naturally settles therein and since the liquid capacity is relatively large and quiet it will remain there. Although all of the sedimentary material entering the annular sediment collecting space 84 may not be moved into the sediment collecting chambers 101 during the washing operation, it will eventually be worked into these chambers upon subsequent washing or rinsing operations and be discharged from the chambers through one of the openings 114.

After the washing operation the tub is rotated to centrifugally extract the liquid therefrom. As the tub is accelerated the washing liquid tends to move outwardly by centrifugal action and a major portion of the same will be discharged through the openings 80 into the annular space 82 and upwardly through this space out of contact with the fabrics and over the top edge 30 of the outer imperforate receptacle. Upon attaining a predetermined speed, centrifugal force acting on the weighted valve body members 122 against the compression of the springs 134 holding the valves closed causes the valves 116 to move away from their seated position. When this occurs the valves open rather rapidly and permit a relatively large volume of liquid, dependent upon the speed of rotation and the size of the outlet opening 114, to flow through the chambers 101. This

relatively rapid flow of liquid through the chambers quite naturally picks up or entrains the heavy sedimentary material collected therein and since centrifugal force is also acting on this sedimentary material, the liquid and sedimentary materials are discharged through the openings 114 into the stationary tub 2 for eventual discharge through the drain opening 16. Due to the high velocity of the liquid and the tapering or converging side walls 104 toward the outer walls 102 of the chambers 101, it will be evident that the chambers are self-cleaning whenever the tub is rotated above a predetermined speed.

At the end of the rotating or spinning operation the solenoid 74 is deenergized, and in so doing applies the brake 72 and releases the clutch 70 to stop and hold the tub 2 stationary. It should be mentioned that the operation of the washing machine during the rinse period is identical to the operation thereof during the washing period, except it is of shorter duration, after which the tub is again rotated and the centrifugally operated valves 116 are opened to expel a portion of the liquid therethrough along with any additional sedimentary material which has collected in the chambers 101.

Referring now to the modification disclosed in Figures 4 and 5, there is shown a double tub construction 138 which is similar to the construction shown in Figures 1 to 3, with the exceptions that the outer tub 140 is formed integral with the hub portion 142 and a single enlarged sediment collecting chamber or zone 144 is provided instead of two oppositely disposed ones. Since all other elements are similar, the reference characters on like parts remain the same.

In this particular instance, the outer wall 140 of the imperforate outer tub extends downwardly and then inwardly to form a shoulder 146 adjacent the outer periphery of the agitator 8 and then extends inwardly to form the hub portion 142 which houses the oscillatable shaft 38 for oscillating the agitator 8. The gear housing 44 is secured to this hub portion and the outer tubular shaft 24, as shown in Figure 1, to form a unitary structure and to provide a direct drive for rotating the tub 2 about its vertical axis.

The inner tub or container 28 is positioned or centered by means of the shoulders 146 adjacent the periphery of the agitator 8 through the medium of the flange 92 and gasket 94, as in the embodiment shown in Figures 1-3, and is rigidly secured in spaced relation to the outer tub or receptacle 26 adjacent its upper edge by means of the usual spacers and screws to form a unitary structure with an annular liquid-conducting space therebetween.

A portion of the bottom wall 148 of the receptacle is recessed to provide the sediment collecting chamber 144 and it has an opening or passage 150 therethrough in its outermost wall portion 152 adjacent the bottom wall 149. This opening is normally closed or sealed by a centrifugally operated valve 154 identical in construction and operation as the valve 116 previously described.

The opposite side walls 156 of the chamber 144 are tapered or converge toward the outlet opening 150 in the outer wall 152 to direct the liquid and sedimentary material toward the same when the tub is rotated at relatively high speed in the usual manner.

Like in the previous modification, the sediment collecting chamber 144 is in direct communication with the annular spaces or zones 82

and 84 between the container and receptacle and as the sedimentary material shifts horizontally in the annular space 84 and passes over the chamber 144, it drops therein and remains until the tub is rotated above a predetermined speed at the end of the washing or agitate rinse operations. In this instance, the chamber 144 extends from adjacent the outer periphery of the receptacle and beneath the bottom wall 78 toward the agitator shaft and terminates well under the downwardly flaring rim 66 on the agitator 8. In this manner not only the heavy particles passing through the openings 80 in the container 28 but also the heavy particles entering under the agitator 8 during the washing operation are directed toward or into the sediment collecting chamber.

In order to provide means for cleaning this chamber from time to time, if necessary, and to prevent smaller pieces of fabrics, such as socks and the like, from passing under the agitator and into the chamber 144 with the possibility of clogging the opening 150, the inner portion of the sediment collecting chamber under the agitator is covered with a removable screen 158. This screen may be secured in position in any suitable manner, such as, for example, by having backwardly and downwardly extending leg portions 160 which interlock with the curved rear portion of the side walls 156 and the rear wall 162 of the recess, and a forwardly located bent leaf spring 164 which engages the container under the inner downturned edge 92 on the bottom wall 78 to hold the forward end of the screen in position. A knob 166 is provided to aid in the removal of the screen after the agitator 8 has been removed from the spline connection on the agitator shaft 38.

This sediment collecting chamber operates in a manner identical to the previously mentioned modification in that the heavy foreign particles and other sedimentary material entering the annular space 84 gradually shifts horizontally and tends to collect in the chamber 144 during the washing operation. During the liquid extraction operation the centrifugally operated valve 154 opens and the sedimentary material in the chamber along with a portion of the liquid in the tub will be discharged through the outlet opening. The location of the recess and the direction of flow of the liquid is such as to retard or prevent the sedimentary material from re-entering the container 28 to soil the fabrics being washed.

Since the annular spaces 82 and 84 between the inner and outer walls of the container and receptacle are relatively narrow, the possibility of having relatively long objects, such as, for example, bobby pins or the like, entering these spaces through the openings 80 and working into the sediment collecting chambers, which may cause malfunction of the valves is reduced considerably. The exception to this would be the openings 80 in the bottom wall 78 over the chambers 101 and 144; therefore, it may be desirable to eliminate the perforations or openings 80 in the bottom wall 78 which lie directly above and about the chambers 101 and 144 in both modifications to provide a baffle section 168 to thereby reduce to a minimum the possibility of having items of this nature enter the sediment collecting chambers.

From the foregoing it can be seen that a washing machine having a rotatable tub of double wall construction has been provided which has an annular liquid-conducting space between the walls and that sediment collecting chambers have been provided in the bottom wall of the outer tub

adjacent its outer periphery in direct communication with the annular space to collect the sedimentary material entering this space, and that when the tub is rotated above a predetermined speed the sedimentary material is discharged therefrom through outlet openings provided in the outer wall of the chambers without contacting the fabrics being washed and that the chamber or chambers are self-cleaning.

While I have herein described and upon the drawings shown illustrative embodiments of the invention, it is to be understood that the invention is not limited thereto, but may comprehend other constructions, arrangements of parts, details, and features without departing from the spirit thereof.

I claim:

1. A tub for a washing machine adapted to receive liquid and fabrics to be washed and to be rotated about a vertical axis to extract the liquid therefrom, comprising an imperforate receptacle having side and bottom walls, an open-ended perforate container having side and bottom walls disposed within said receptacle, the side and bottom walls of said container and receptacle being spaced apart to define an annular liquid conducting space therebetween, a pair of chambers each having an outlet therein disposed beneath said outer tub and in direct communication with said space, and means for controlling the flow of liquid out of said outlet when the rotation of said tub is below a predetermined speed.

2. A tub for a washing machine adapted to receive liquid and fabrics to be washed and to be rotated about a vertical axis to extract the liquid therefrom, comprising an imperforate receptacle having side and bottom walls, a perforate open-ended container having side and bottom walls disposed within said receptacle and in spaced relation thereto to define an annular liquid conducting space therebetween, a sediment collecting recess disposed in the bottom wall of said receptacle in direct communication with said space, said recess being defined in part by an outer peripheral wall having a discharge passage therein, and valve means normally closing said discharge passage when said tub is rotated below a predetermined speed, but operable under centrifugal force when said tube is rotated above said speed to open said discharge passage.

3. In a washing machine having a tub adapted to receive liquid and fabrics to be washed and to be rotated to centrifugally extract the liquid from the fabrics, said tub comprising an imperforate receptacle having a bottom wall and an upwardly flaring side wall with an upper open end extending above the normal liquid level therein, and an open-ended perforate inner container disposed within said outer tub to provide an annular space therebetween along the side and bottom walls of said receptacle, a chamber formed in the bottom wall of said receptacle having an outer peripheral wall and being in direct communication with said annular space for collecting sedimentary material entering the same, an outlet passage for said chamber formed in said wall, and speed responsive means for sealing said passage against discharge of liquid and sedimentary material, said speed responsive means being movable under centrifugal force to open said passage when said tub is rotated above a predetermined speed.

4. In a washing machine having a tub adapted to receive liquid and fabrics to be washed and to be rotated to centrifugally extract the liquid

from the fabrics, said tub comprising an imperforate receptacle having a bottom wall and an upwardly flaring side wall with an upper open end extending above the normal liquid level therein, a perforate open-ended container having a side and bottom wall, means for securing said container within said receptacle so that their respective side and bottom walls provide an annular space therebetween, a sediment collecting chamber carried adjacent to and below the outer periphery of said receptacle in direct communication with said annular space whereby sedimentary material entering said annular space is directed toward said chamber by liquid motion and said chamber having a liquid outlet opening in its outer wall, and speed responsive means for sealing said outlet, said speed responsive means being operable above a predetermined speed to open said outlet to permit the flow of liquid from said space through said chamber to flush the sedimentary material therefrom.

5. In a washing machine having a tub adapted to receive liquid and fabrics to be washed and to be rotated to centrifugally extract the liquid from the fabrics, said tub comprising an imperforate outer receptacle having a bottom wall and an upwardly flaring side wall with an upper open end extending above the normal liquid level therein, an open-ended perforate inner container rigidly secured within said receptacle to provide an annular liquid circulating space between the side and bottom walls thereof and the side and bottom walls of said outer tub, a sediment collecting chamber carried in the bottom wall of said receptacle, said chamber being provided with outwardly directed and inwardly converging side walls and an outer end wall and having at least a part thereof in direct communication with said annular space between said container and said receptacle to thereby collect the sedimentary material entering said space from the interior of said container during the washing operation, and a centrifugally operated valve for sealing said outlet during the washing operation, said valve being moved under centrifugal force for opening said outlet above a predetermined speed to permit a portion of the liquid and sedimentary material to flow therethrough.

6. In a washing machine having a tub adapted to receive liquid and fabrics to be washed and to be rotated to centrifugally extract the liquid from the fabrics, said tub comprising an imperforate receptacle having a bottom wall and an upwardly flaring side wall with an upper open end extending above the normal liquid level therein, an open-ended perforate container disposed within said receptacle to provide an annular space between the side and bottom walls thereof and the side and bottom walls of said receptacle, a sediment collecting chamber including an outer wall carried by the bottom wall of said receptacle directly beneath said perforate container and in direct communication with the annular space between said walls to collect sedimentary material entering said space during the washing operation, said chamber having an outlet passage in its outer wall for discharging the sedimentary material therethrough, and valve means normally closing said opening during the washing operation but movable under centrifugal force during the extracting operation to permit flow of liquid through said opening.

7. In a washing machine having a tub adapted to receive liquid and fabrics to be washed and to be rotated to centrifugally extract the liquid from the fabrics, said tub comprising an imperforate receptacle having a bottom wall and an upwardly flaring side wall with an upper open end extending the normal liquid level therein, and an open-ended perforate container secured within said receptacle to provide an annular space between the side and bottom walls of said receptacle and said container, a plurality of recesses forming part of the bottom wall of said receptacle disposed beneath the bottom wall of said container and in direct communication with the annular space between said walls for collecting the sedimentary material entering said space during the washing operation, said recesses each having an outer wall and side walls with said side walls sloping toward said outer wall, an outlet passage disposed in the lower portion of each of said outer walls, and centrifugally operated valves for sealing said passages during the washing operation and for opening said passages when said tub is rotated above a predetermined speed to permit centrifugal discharge of washing liquid and the sedimentary material collected in said recesses.

8. In a washing machine having a tub adapted to receive liquid and fabrics to be washed and to be rotated to centrifugally extract the liquid from the fabrics, said tub comprising an imperforate receptacle having a bottom wall and an upwardly flaring side wall with an upper open end extending above the normal liquid level therein, and an open-ended perforate container secured within said receptacle to provide an annular space between the side and bottom walls of said receptacle and said container, a pair of oppositely disposed recesses forming part of the bottom wall of said receptacle disposed beneath the bottom wall of said container and in direct communication with the annular space between said walls for collecting the sedimentary material entering said space during the washing operation, said recesses each having an outer wall and side walls with said side walls sloping toward said outer wall, an outlet passage mounted in the lower portion of each of said outer walls, centrifugally operated valves for sealing said passages during the washing operation and for opening said passages when said tub is rotated above a predetermined speed to permit centrifugal discharge of washing liquid and the sedimentary material collected in said recesses, and baffle means directly above said recesses for preventing direct communication with the interior of said container.

9. A tub for a washing machine adapted to receive liquid and fabrics to be washed and to be rotated about a vertical axis to extract the liquid therefrom, comprising a container having a side wall and a perforated bottom wall for receiving the fabrics to be washed, an annular sediment collecting space beneath said bottom wall adjacent its outer periphery and in direct communication with the container through said perforated bottom wall, a sediment collecting chamber disposed below and in direct communication with said annular space, and having an outlet opening therein, and valve means normally closing said outlet opening but operable under centrifugal force during the extracting operation to permit discharge of liquid and sedimentary material therethrough.

10. A tub for a washing machine adapted to receive liquid and fabrics to be washed and to be

rotated about a vertical axis to extract the liquid therefrom, comprising a container for receiving the liquid and fabrics to be washed and having a bottom wall with perforations therein, a relatively narrow annular sediment collecting space beneath said bottom wall in direct communication with the interior of said container through said perforations, at least one sediment collecting chamber carried below and in direct communication with said annular space and having a lower outlet opening therein, valve means for closing said outlet opening preventing the flow of liquid and sedimentary material therethrough during the washing operation but operable under centrifugal force during the extraction operation to permit flow of liquid and sedimentary material therethrough, and baffle means for said bottom wall disposed directly above said chamber.

11. A tub for a washing machine adapted to receive liquid and fabrics to be washed and to be rotated about a vertical axis to extract the liquid therefrom, comprising a container for receiving the liquid and fabrics to be washed and having a bottom wall with perforations therein, a relatively narrow annular sediment collecting space beneath said bottom wall in direct communication with the interior of said container through said perforations, at least one sediment collecting chamber carried below and in direct communication with said annular space and having a lower outlet opening therein, valve means for closing said outlet opening preventing the flow of liquid and sedimentary material therethrough during the washing operation but operable under centrifugal force during the extraction operation to permit flow of liquid and sedimentary material therethrough, and baffle means for said bottom wall directly above said chamber provided by an imperforate portion of the bottom wall of said container.

12. A tub for a washing machine including agitating means adapted to receive liquid and fabrics to be washed and to be rotated about a vertical axis to extract the liquid therefrom, comprising an imperforate receptacle having a bottom wall and an upwardly flaring side wall with an upper open end extending above the normal liquid level therein, and an open-ended perforate container having side and bottom walls secured within said receptacle to provide an annular space between the side and bottom walls thereof and the side and bottom walls of said receptacle, a sediment collecting chamber formed as a part of the bottom wall of said receptacle with a portion disposed beneath the bottom wall of said container and another portion below said agitating means and having an outlet opening therein, said chamber being in direct communication with said annular space and the lower portion of said agitating means, means for preventing the flow of liquid out of said outlet opening during the washing operation, and a removable screen disposed over said chamber beneath said agitator.

THOMAS R. SMITH.

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