

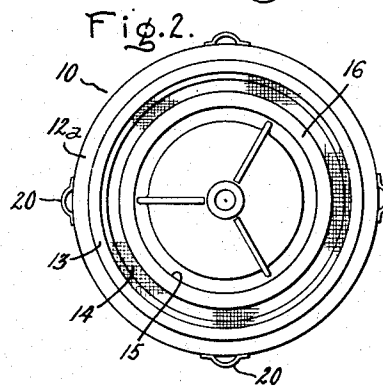
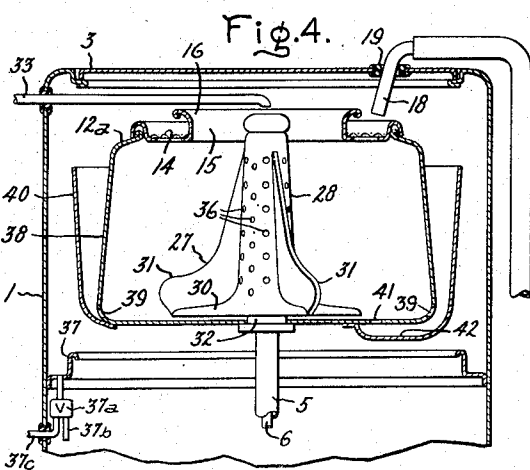
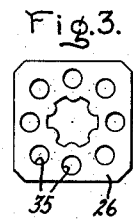
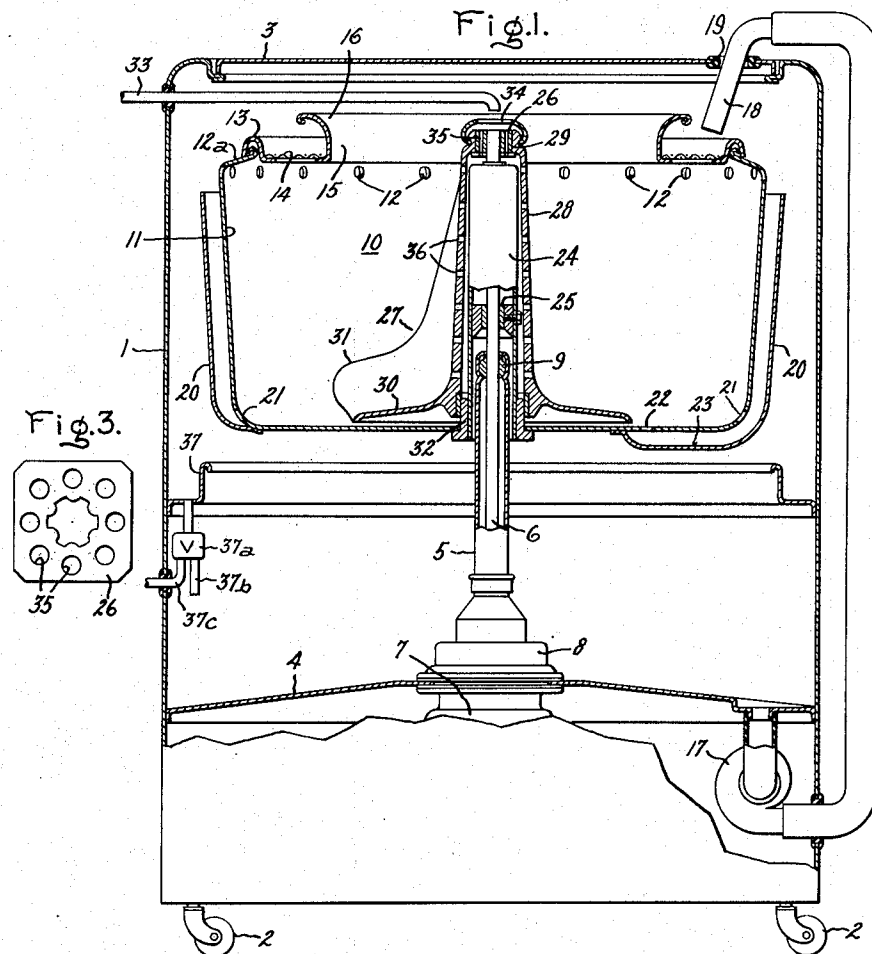
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WASHING MACHINE

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WASHING MACHINE

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6 Claims. (Cl. 68—18)

The present invention relates to washing machines of the type in which clothes are washed and centrifugally dried in a single compartment or receptacle.

The object of my invention is to provide an improved construction and arrangement in washing machines of this type, and for a consideration of what I believe novel and my invention, attention is directed to the following description and the claims appended thereto.

In the accompanying drawing, Fig. 1 is a sectional elevation of a washing machine embodying my invention; Fig. 2 is a top plan view of the washing compartment or receptacle; Fig. 3 is a top plan view of the agitator drive nut; and Fig. 4 is a fragmentary sectional elevation of a modification.

Referring to the drawing, there is shown a washing machine having an outer casing or tub 1 supported on casters 2 and provided with a cover 3. Extending upward from the bottom wall 4 of the casing is a sleeve 5 through which extends a vertical shaft 6 which is selectively oscillated and rotated by mechanism contained within a casing 7 supported below the bottom wall 4 of the casing 1. This mechanism is well understood and does not require illustration for the purposes of the present invention. A liquid-tight joint 8 is provided between the lower end of the sleeve 5 and the bottom wall of the casing. The sleeve 5 extends above the normal water level in the casing and at its upper end is provided with a self-aligning bearing 9 for the shaft 6. In the upper part of the casing is a receptacle 10 having imperforate walls. The side wall 11 flares or tapers outwardly and upwardly, and at the point of greatest diameter is provided with discharge openings 12 through which the liquid is centrifugally discharged during drying. Above the openings 12 the receptacle side wall extends inwardly to form a rim 12a on the inner edge of which is seated a ring 13 supporting an annular filter 14 of fabric or wire mesh screen. At the inner edge of the filter 14 is a ring 15 providing an outwardly flaring mouth 16 through which clothes may be inserted or removed from the receptacle. During washing, liquid is circulated from the bottom of the casing by means of a pump 17 and discharged onto the filter by a nozzle 18 extending through an opening 19 in the cover. The upper edge of the ring 15 is above the upper edge of the ring 13 so that, in case the filter becomes clogged, the liquid discharged thereon will flow over the ring 13 to the casing. The liquid flowing into the receptacle through the filter overflows from the receptacle through channels 20 formed by arcuate metal ribs secured to the outside of the receptacle side walls, as shown in Fig. 2. Two forms of channels 20 are illustrated respectively at the left and right in Fig. 1. The upper ends of the chan-

nels 20 terminate below the discharge openings 12 and define the liquid level in the receptacle. The channels communicate with the receptacle below the liquid level through openings 21 at the junction of the side and bottom walls of the receptacle, as shown at the left in Fig. 1, and the channel at the right in Fig. 1 in addition communicates with the receptacle through an opening 22 in the bottom wall of the receptacle. During washing, liquid continually overflows from the receptacle through the channels 20 and is thereby withdrawn or discharged from the receptacle. This liquid is returned to the receptacle by the pump 17 through the filter 14. Since the liquid enters the channels 20 from the lower part of the receptacle, soap suds which collect on the top of the liquid do not interfere with the withdrawal of liquid. The continuous circulation and filtering of the liquid remove solid particles in suspension in the washing solution and keep the washing solution clean. In the construction shown at the right in Fig. 1 heavy particles, such as sand, tend to drop through the opening 22 and collect in the horizontal section 23 of the channels. These particles during centrifugal drying are kept out of contact with the clothes. In the absence of such openings, particles of sand would tend to collect on the inner surface of the clothes which line the side walls of the receptacle during centrifugal drying.

The receptacle has a hub 24 surrounding the upper end of the sleeve 5 and rotatably supported on the shaft 6 by means of a sleeve bearing 25 fixed to the inner surface of the hub and by means of a combined sleeve and thrust bearing (not shown) located between the shaft and the upper end of the receptacle hub. Splined on the upper end of the shaft 6 is a drive nut 26 for an agitator 27. The agitator has a hub 28 provided with a recess 29 at its upper end into which the drive nut 26 fits. The agitator hub extends downwardly around the receptacle hub and terminates in a disk 30 adjacent the bottom of the receptacle from which vanes 31 project. The lower end of the agitator hub is journaled on a sleeve 32 on the receptacle hub.

During washing, the shaft 6 is oscillated at a rate of the order of sixty complete oscillations a minute and through an angle of the order of 210°. Since the receptacle is journaled on the shaft 6 it remains substantially stationary during washing. During drying, the shaft 6 is rotated at a high speed and a driving connection (not shown) is established between the shaft and the receptacle so that the receptacle and agitator rotate together. Due to centrifugal force, the clothes are thrown outward against the side walls of the receptacle and the liquid therein flows up the side walls and out through the discharge openings 12 against the side walls of the casing 1 and runs

down the casing side walls into a trough 37. The trough 37 is provided with a valve 37a having discharge outlets 37b and 37c selectively discharging to the bottom of the casing 1 or to a drain. When the valve is adjusted to discharge to the casing, the liquid is stored in the bottom of the casing. During centrifugal drying, the clothes may be rinsed by liquid introduced through a pipe 33 into an opening 34 in the upper end of the agitator hub. The rinsing liquid flows downward through openings 35 in the agitator drive nut into the space between the receptacle and agitator hubs and flows outwardly therefrom through openings 36 in the side walls of the agitator hub. The openings 36 are spaced circumferentially around the agitator hub, and the rinsing liquid is accordingly uniformly sprayed over the clothes which line the receptacle side walls. The spray rinsing liquid is discharged from the openings 12 in the receptacle against the side walls of the outer casing 1 and is collected in the annular trough 37 from which it may be conducted to a drain through outlet 37c so as not to dilute the washing solution stored in the bottom of the casing. At the conclusion of the washing operation, the washing solution which has been collected in the bottom of the casing may be returned to the receptacle by the pump 17.

In the modification shown in Fig. 4 there is shown a machine equipped with a receptacle having side walls 38 which taper downwardly and outwardly, the machine in other respects being substantially the same as the machine previously described. Corresponding parts are indicated by the same reference numerals. At the point of greatest diameter the receptacle side walls are provided with discharge openings 39 through which the liquid is centrifugally discharged during drying. The liquid flowing through the openings 39 flows into channels 40 on the outside of the receptacle having walls tapering upward and outward and is discharged through the upper ends of the channels. The upper ends of the channels 40 terminate below the rim 12a of the receptacle and define the liquid level in the receptacle 38. Two forms of channels are illustrated, respectively at the left and at the right in Fig. 4. In the form of channel at the right in Fig. 4, the channel extends under the bottom of the receptacle 38 and communicates therewith through an opening 41 through which heavy particles, such as sand, fall into the horizontal section 42 of the channel. This serves the same function as the opening 22 and the horizontal section 23 in the construction of Fig. 1. During washing, the liquid overflowing the channels 40 is returned to the receptacle through the nozzle 18 on to the filter 14, as in the previously described construction. During centrifugal drying, the liquid discharged through the openings 39 flows out through the channels 40. In all other respects the construction and operation are the same as in the previously described construction.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a combined washing and drying machine, a rotatable receptacle for receiving clothes to be washed and centrifugally dried, walls defining channels at the side walls of the receptacle, the upper ends of the channels being below the top of the receptacle and open to the outside of the receptacle to define the liquid level in the receptacle and the lower ends of the channels communicating with the interior of the receptacle

below the liquid level, and means effective during washing for removing suspended particles from the liquid overflowing said channels and returning the cleaned liquid to the receptacle.

2. In a combined washing and drying machine, a rotatable receptacle for receiving clothes to be washed and centrifugally dried, said receptacle having side walls flaring outwardly from the bottom toward the top, said side walls being provided with centrifugal discharge openings at the region of greatest diameter, and means forming passages on the side walls of the receptacle, said passages having open upper and lower ends, the upper ends being disposed outside said receptacle side walls below said centrifugal discharge openings and defining the liquid level in the receptacle and the lower ends communicating with the interior of the receptacle.

3. In a combined washing and drying machine, a rotatable receptacle for receiving clothes to be washed and centrifugally dried, said receptacle having side walls flaring downward and outward from the top, said walls being provided with centrifugal discharge openings at the bottom, walls on the side walls of the receptacle defining passages communicating with said openings and flaring upward and outward therefrom toward the top of the receptacle and having open upper ends outside of and terminating below the top of the receptacle to define the liquid level therein, and means effective during washing for removing suspended particles from the liquid overflowing said passages and returning the cleaned liquid to the receptacle.

4. In a combined washing and drying machine, a rotatable receptacle for receiving clothes to be washed and centrifugally dried, channels on the side walls of the receptacle flaring upward and outward from the bottom of the receptacle and having the open upper ends thereof outside of and below the top of the receptacle and defining the liquid level in the receptacle and having the lower ends thereof communicating with the bottom of the receptacle, and means effective during washing for removing suspended particles from the liquid overflowing said channels and returning the cleaned liquid to the receptacle.

5. In a combined washing and drying machine, a rotatable receptacle for receiving clothes to be washed and centrifugally dried, an agitator in the receptacle having a vertical hollow hub with perforations in the side walls thereof and having vanes projecting therefrom, means for rotating the agitator and receptacle during centrifugal drying, and an opening at the top of the hub communicating with the interior thereof into which rinsing liquid may be introduced during centrifugal drying so as to flow out through said perforations.

6. In a combined washing and drying machine, a rotatable receptacle for receiving clothes to be washed and centrifugally dried, walls defining passages on the side walls of the receptacle, the lower ends of the passages being connected with the receptacle through openings in the receptacle bottom wall and the upper ends of the passages opening to the outside of the receptacle below the top of the receptacle to define the liquid level therein, and means effective during washing for removing suspended particles from the liquid overflowing said passages and returning the cleaned liquid to the receptacle.

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