

**Dec. 23, 1941.**

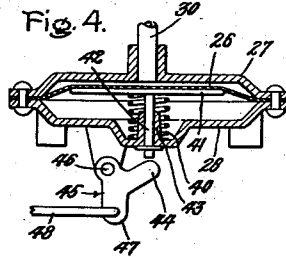
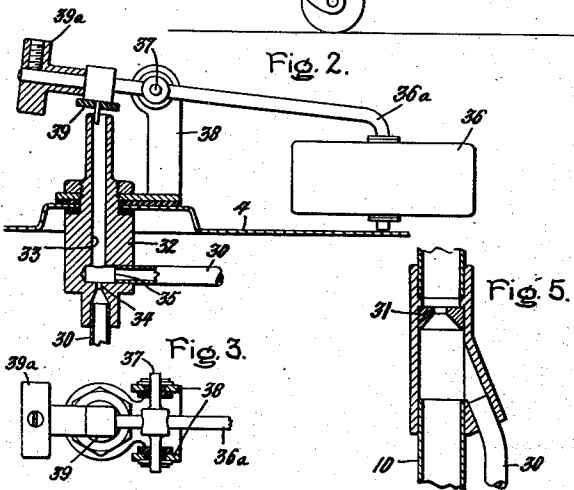
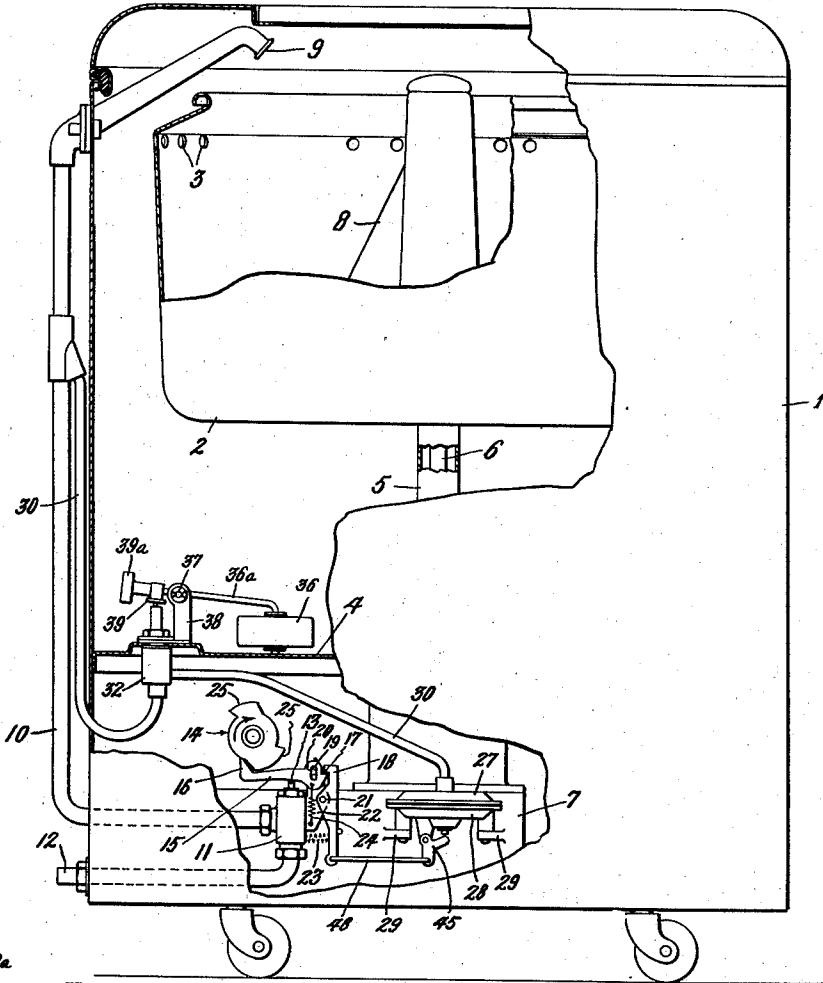
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**2,267,392**

WASHING MACHINE

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Fig. 1.



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## UNITED STATES PATENT OFFICE

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## WASHING MACHINE

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3 Claims. (Cl. 68—23)

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

The object of my invention is to provide an improved construction for controlling the water supply to the rotatable receptacle so the receptacle will be filled to the proper level for washing. 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 an enlarged sectional elevation of the float control for the by-pass conduit; Fig. 3 is a sectional top plan view of the float control; Fig. 4 is a sectional elevation of the hydraulic operator which shuts off the water supply; and Fig. 5 is a sectional elevation of the connection between the water supply and bleeder conduits.

Referring to the drawing, I have shown my invention applied to a washing machine of the type illustrated in my application Serial No. 373,741, filed January 9, 1941. It comprises an outer casing or tank 1 in the upper part of which is located a rotatable clothes receptacle 2 having side walls flaring outward toward the top and provided with openings 3 at the region of greatest diameter which serve as overflow openings to define the water level in the receptacle during washing and which serve as centrifugal discharge openings during centrifugal drying. Extending up from the bottom wall 4 of the outer casing is a sleeve 5 through which extends a vertical shaft 6 driven by suitable mechanism in a casing 7. The shaft 6, by suitable arrangements, selectively oscillates an agitator 8 for washing or rotates the receptacle 2 for centrifugal drying. Such arrangements, as well as the mechanism for driving the shaft 6, are well known and need not be illustrated for the purposes of the present invention.

Water is supplied to the receptacle 2 through a nozzle 9 arranged to discharge at all times into the open top of the receptacle and connected through a conduit 10 and a valve 11 to a water supply conduit 12. The valve is operated by a plunger 13 spring-biased to the closed position. When depressed from the position illustrated, the plunger 13 opens the valve. The valve is controlled by a cam 14 which may, for example, be rotated in the direction of the arrow by suitable timing mechanism. Cooperat-

ing with the cam 14 is a lever 15 having at one end a projection 16 bearing on the cam, having an intermediate portion bearing on the plunger 13, and having the other end provided with a shoulder 17 engageable by a latch 18. Adjacent the shoulder 17, the lever 15 is provided with an elongated slot 19 through which extends a guide pin 20. The latch 18 is pivoted at 21 on a plate 22 integral with the valve 11 and the latch is biased into engagement with the shoulder 17 by a compression spring 23 arranged between the valve 11 and the lower end of the latch 18. The lever 15 is lightly held against the valve operating plunger 13 by a tension spring 24 arranged between the lever 15 and the plate 22. If, while the parts are in the position illustrated, the cam 14 is turned in a clockwise direction until the projection 25 on the cam engages the projection 16 on the lever 15, the lever 15 will be pivoted in a counter-clockwise direction about the point of contact between the shoulder 17 and the latch 18, moving the plunger 13 downward and opening the valve. If, while the valve is open, the latch 18 is pivoted in a clockwise direction about its pivot 21 until it is clear of the shoulder 17, the lever 15 will be released (or, from another aspect, the latch will be tripped) and the valve operating plunger 13 will be moved upward to the closed position under its spring bias. The closing of the valve upon tripping of the latch is possible due to the fact that the spring bias for the plunger 13 is stronger than the spring 24. After the latch has been tripped, as described above, the valve cannot be reclosed until the latch is reset by turning the cam 14 so that the projection 25 is clear of the projection 16 of the lever 15.

The tripping of the latch 18 to cause the closing of the valve 11 to shut off the water supply is effected through a hydraulic pressure operator comprising a diaphragm 26 clamped at its periphery between the adjacent edges of the dished plates 27 and 28 supported on bosses 29 on the casing 7. The upper plate 27 is connected through a bleeder conduit 30 to the conduit 10. As shown in Fig. 5, the conduit 10 is provided with a restriction 31 above the point of connection of the bleeder conduit 30 which is for the purpose of increasing the hydraulic pressure in the bleeder conduit. At an intermediate point in the bleeder conduit is a casting 32 mounted on the bottom wall 4 of the outer casing 1. The casting 32 has formed therein a by-pass conduit 33 discharging to the bot-

tom of the outer casing and in line with a restricted nozzle 34 for limiting the flow through the bleeder conduit 30. Water from the bleeder conduit 30 flows into the casing 32 through the restricted nozzle 34 in the form of a relatively high velocity jet directed into the by-pass conduit 33. This jet has an injector action at point 35 which tends to produce a suction in the section of the bleeder conduit 30 leading to the diaphragm 26. It is accordingly impossible for pressure to build up on the diaphragm 26 so long as the by-pass conduit 33 is open. The operation is therefore independent of variations in the water supply pressure. The nozzle 34 restricts the flow through the bleeder conduit 30 to an amount which is negligible compared to the amount of water discharged into the receptacle through the filling nozzle 9. Accordingly no substantial amount of water collects in the bottom of the outer casing until the receptacle 2 has been filled to the level of the openings 3, which is the desired level for washing. When the receptacle is filled, the water overflowing through the openings 3 raises the liquid level in the bottom of the outer casing, lifting a float 36 carried on one end of an arm 36a pivoted at 37 between arms 38 fixed to the casing 32. The other end of the arm 36a carries a valve 39 which closes the by-pass conduit 33 upon raising of the float 36. The weight arm 36a is partially balanced by a counterweight 39a. Upon closing of the by-pass conduit the hydraulic pressure in the bleeder conduit 30 builds up to a value sufficient to move the diaphragm 26 downward from the position illustrated in Fig. 4 against the force of a spring 40 arranged between the plate 28 and a rigid metal disk 41 fixed to the underside of the diaphragm 26. The disk 41 is fixed to a plunger 42 slidable in a boss 43 on the plate 28. Upon downward movement of the diaphragm 26 the lower end of the plunger 42 engages one arm 44 of a bellcrank lever 45 pivoted at 46 on the underside of the plate 28. The other arm 47 of the bellcrank lever 45 is connected by a link 48 to the lower end of the latch 18. Upon downward movement of the diaphragm 26 the link 48 pivots the latch 18 clear of the shoulder 17 so that the valve 11 closes under its spring bias to shut off its water supply.

In the use of the machine, the water supply to the receptacle 2 is initiated by turning the cam 14 to a position in which one of the pro-

jections 25 engages the projection 16. When the receptacle is filled, the overflowing water raises the float 36, causing a building up of pressure on the upper side of the diaphragm 26 of the hydraulic operator which trips the latch 18 and shuts off the water supply. After tripping of the latch 18, the valve 11 cannot be reopened until the cam 14 is turned to move the projection 25 clear of the projection 16 so as to reset the latch. Although the water supply is shut off by a hydraulic operator, the operation is independent of variations in the water supply pressure due to the injector action of the nozzle 34.

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

1. In a washing machine, an outer casing, a rotatable clothes receptacle therein overflowing to the casing, a water supply conduit discharging to the receptacle, a valve in said conduit biased to the closed position, a latch for holding the valve in the open position, a hydraulic pressure operator for releasing the latch, a bleeder conduit leading from the water supply conduit to the hydraulic operator, a by-pass conduit leading from said bleeder conduit for relieving the pressure in said hydraulic operator, and means responsive to the liquid level in the casing for closing said by-pass conduit.

2. In a washing machine, an outer casing, a rotatable clothes receptacle therein overflowing to the casing, a water supply conduit discharging to the receptacle, a valve in said conduit biased to the closed position, a latch for holding the valve in the open position, a hydraulic pressure operator for releasing the latch, a bleeder conduit leading from the water supply conduit to the hydraulic operator, a by-pass conduit leading from said bleeder conduit for relieving the pressure in said hydraulic operator, and means responsive to liquid overflowing said receptacle for closing said by-pass conduit.

3. In a washing machine, an outer casing, a rotatable clothes receptacle therein overflowing to the casing, a water supply conduit discharging to the receptacle, a valve in said conduit, a hydraulic pressure operator for closing the valve, a bleeder conduit leading from the water supply conduit to the hydraulic operator, a by-pass conduit leading from said bleeder conduit for relieving the pressure in said hydraulic operator, and means responsive to the liquid level in the casing for closing said by-pass conduit.

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