Sept. 3, 1963 F. T. PAGANINI 3,102,409

CLOTHES WASHING MACHINE

Filed April 18, 1962 2 Sheets-Sheet 1

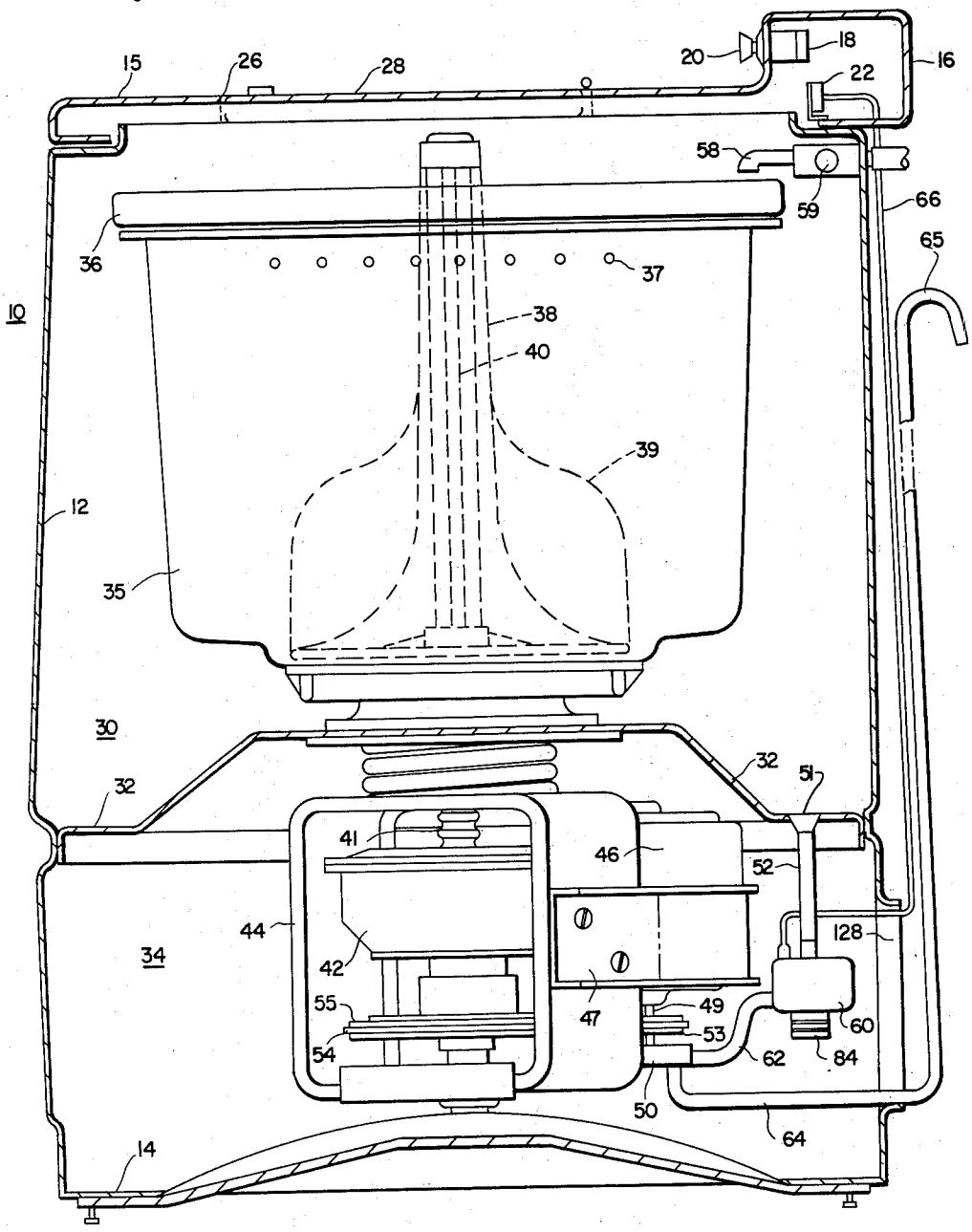



FIG. 1

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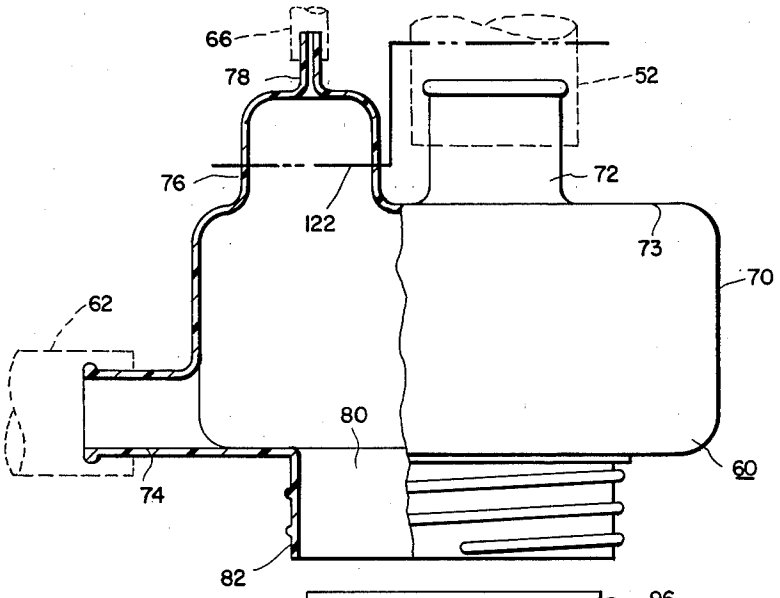



FIG. 2

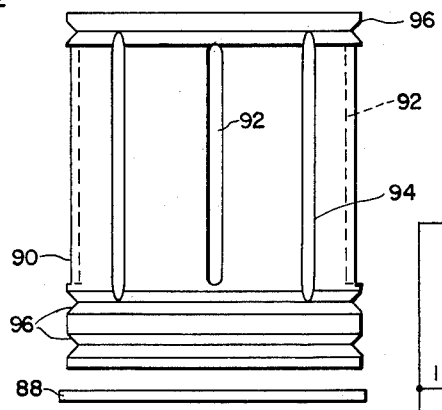



FIG. 3




FIG. 4

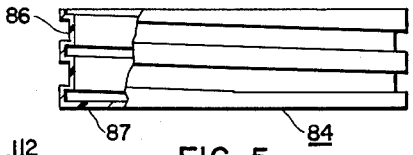



FIG. 5

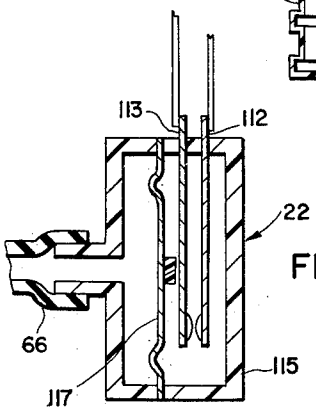



FIG. 7

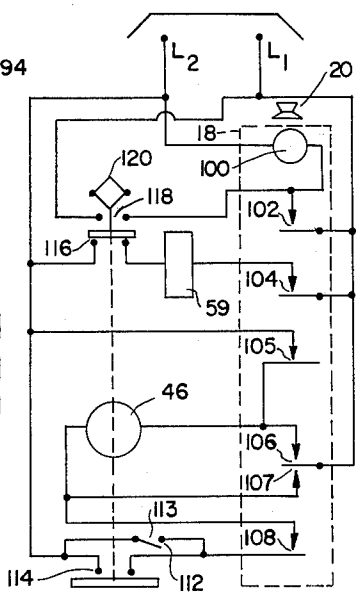



FIG. 6

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3,102,409

# CLOTHES WASHING MACHINE

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4 Claims. (Cl. 68—18)

The present invention relates to clothes washing machines and more particularly to liquid distribution systems for washing machines.

My invention is particularly useful in washing machines of the type using water level sensing mechanisms to close a water inlet valve when a predetermined amount of water has been admitted. Such mechanisms include a fill control chamber in the drain line. The chamber may house a valve-controlling float, or, in preferred mechanisms, trap a column of air responsive to the rising water level to actuate a conventional pressure sensitive diaphragm. Actuation of the diaphragm terminates the fill operation. In the air-column actuator system, the closed reservoir or chamber communicating with the diaphragm is installed in the drain line upstream of the drainage pump. Pursuant to the present invention, this chamber also accomplishes an important added function, that of guarding the pump from objects escaping into the drain line.

It is generally known that in centrifugal extraction washing machines rotatable on a vertical axis, there is a tendency for small objects such as handkerchiefs and socks to be floated over the basket sidewall during the centrifuging and pass into the drain line, and enter and damage the drain pump. The usual mode of retaining these objects within the basket is by way of mechanical guarding devices about the periphery of the basket. These devices are not wholly effective, and it is the practice to supplement the guards by wire mesh screens covering the drain line or pump entrance to intercept these small objects before entering the pump inlet. Screens however are readily clogged by lint accumulations which will ultimately restrict the flow of liquid into the drain line and pump.

It is therefore an object of the invention to provide an improved means for preventing small objects from being drawn into the drain pump of a clothes washing or clothes centrifuging machine.

It is a further object to provide in a pressure chamber for use in a positive water fill system for a clothes washing machine, a clothes-trapping guard for safeguarding the machine pump mechanism.

It is a further object of the invention to utilize in a positive fill control system for a clothes washer, a closed water receiving chamber for establishing a hydrostatic air column for actuating a fill terminating mechanism, in combination with a readily accessible, removable clothes guard which prevents small clothing articles and other objects from entering the pump mechanism. The guard allows lint and objects such as loose threads, etc., to pass through for discharge from the machine.

To accomplish these and other objects, the invention contemplates the use of a positive water fill control system with a closed chamber within which a rising water level increases the air pressure in a sealed tube. The chamber includes means providing a clothes guard through which the washing and rinsing liquid must pass on the way to the drain pump mechanism. In a preferred form, this guard comprises a hollow open-ended cylinder, the side walls of which are slotted to pass liquid and small entrained particulate size objects such as lint, sediment and dirt to the drain pump. The slots intercept any handkerchiefs, socks, wash cloths and the like which may fall into the main drain tube. Sufficient slot area is provided, so that articles caught do not



block the drain and flood the machine. These caught articles are held until such time as a trap in the chamber is opened for cleaning, a task which can be accomplished most readily. Thus, such articles are stopped and held before reaching the drain pump and prior to any damage occurring to the pump. Later these objects can readily be removed without the necessity of use of any tools.

This invention both as to its organization and mode of operation together with other objects, features and advantages thereof may best be understood by reference to the detailed description viewed with the accompanying drawings in which:

FIG. 1 is a side elevational view of a washing machine with the side removed to facilitate viewing the machine interior;

FIG. 2 is a partly sectioned side elevational view of the body portion of the fill control system;

FIG. 3 is a side elevational view of the guard cylinder;

FIG. 4 is a side sectional view of the sealing member;

FIG. 5 is a side sectional view partially broken away of the closure cap;

FIG. 6 is a simplified schematic diagram of the portion of a cycle control circuit designed for use with the invention; and

FIG. 7 is a somewhat schematic sectional elevation of a pressure-responsive switch.

Referring now to FIG. 1 of the drawings, the clothes washing machine 10 there illustrated, is of the generally known vertical axis type. More particularly, the machine 10 comprises a substantially rectangular appearance housing 12 supported on a conventional base 14 adapted to rest on a room floor. The enclosing housing or outer casing 12 includes a conventional wrap around element including front, side and top walls. At the rear of the top wall 15 is mounted a stepped back-splasher 16 which serves as a control console. The inside of this console contains a time-cycle control mechanism 18 for conducting the washing machine through its several washing, rinsing, and extraction operations. By way of example, there is shown a timer control knob 20 which is rotatable manually to set control mechanism 18 for a properly operative cycle of the desired length. Also within console 16, there is mounted the water-fill responsive switch 22, the operation of which will be discussed more fully.

A substantially centrally disposed top opening 26 is conventionally provided in top wall 15 to allow access to the interior of the housing 12. A conventional lid 28 is provided for the purposes of covering the top opening 26; the lid being hinged to top wall 15 at its rear edge and movable thereabout.

A generally rectangular, large size drain tub 30 is provided in the upper portion of housing 12. Defining the lower wall of tub 30 is a bulkhead 32 welded or otherwise suitably sealed to the inner wall of the housing, and spaced a distance above base 14 to define a machinery compartment 34 arranged in the lower portion of housing 12. Within this compartment there are located the machine drive structure elements as will be described more fully.

Centrally positioned within tub 30 and mounted for rotation about a substantially vertical axis is the upstanding wash basket 35. The wash basket is generally imperforate, is in the form of an inverted frusto-cone, with upwardly and outwardly flared side walls leading to an open face adjacent the casing top opening 36. About the periphery of the basket adjacent the open face, there may be secured an annular balance ring 36 of high density material providing a comparatively large moment of inertia for the basket. Below the balance ring and near its upper periphery, basket 35 contains a horizontally

aligned series of apertures or slots 37 for centrifugally ejecting water from the basket.

At the center of the spin basket there is positioned a vertical agitator 38 from which there extend a plurality of radial agitating vanes 39. The agitator is mounted coaxially on an agitator shaft 40 and is oscillated thereby. Also mounted coaxially about the agitator shaft is a tubular spinner shaft (not shown), the upper end of which is secured to the basket at the axis of rotation thereof. As is well known, a transmission mechanism acts through the spin shaft to rotate the basket at high speed when the cycle mechanism initiates a centrifugal extraction operation. The spin shaft extends within a tubular sheath 41 through bulkhead 32 into the machinery compartment and the lower end of the spin shaft is fixed securely to the upper portion of transmission housing 42 so that the spin shaft and spin basket are co-rotative with the transmission housing 42. About the transmission casing there is mounted an open rectangular support frame 44 secured about and protecting the transmission casing 42. Within the transmission casing 42 there is housed the drive linkage (not shown) necessary to transmit the motive power from drive motor 46 to the driven mechanism. These linkages may take any suitable form known in the art to effect the oscillation of agitator 38.

Power for the washing and extraction operations is provided by a main drive motor 46. Motor 46 may, as shown, be mounted to the support structure 44 by a suitable channel beam 47. The motor 46 has its output shaft 49 depending from the motor structure. Secured about the motor shaft is a coupling to a drain pump 50 of any generally known type such as that shown in U.S. Patent 2,654,239 issued to S. B. Welch on October 6, 1953. The pump may preferably have its impeller fastened directly to the motor shaft so that the pump may expel waste water out the drain line on rotation of the motor in one direction. With the motor inoperative or on rotation of the motor in the opposite direction, the pump will not remove water from the tub, all as described in the cited Welch patent. To supply the pump 50, a drain opening 51 is provided with a drain line 52 in communication with pump 50. This opening is positioned in the lowermost area of the tub so that all water entering the tub is directed by gravity toward opening 51. The motor 46 drives the transmission mechanism (not shown) by way of a belt connection including the sheaves 53 and 55, and the driving belt 54. As mentioned previously, the transmission housing 42 is mounted within the frame support 44 in parallel relationship to the motor 46, and includes internal transmission linkages coupled drivingly to the agitator shaft 40. As is generally known, on rotation of the motor in one direction, the transmission linkage is activated to oscillate the agitator and on rotation of the motor in the opposite direction rotates the transmission housing 42 and the spin basket at high speeds suitable for water extraction.

The drive motor 46 as used herein comprises a reversible induction motor of the split-phase type which may be of the two-speed type, but for simplicity will be described herein as a single-speed motor. The motor, a typical appliance motor, may have a rating of about ⅓ horsepower and an operating speed at full load of about 1,725 r.p.m. The motor is energized through appropriate circuitry established by the time cycle mechanism 18, and at appropriate times is energized for rotation in the clockwise or counterclockwise direction to effectuate the necessary agitate and spin operations, as will be described more fully in conjunction with the explanation of the schematic circuit of FIG. 6.

In addition, the general construction of washing machine 10 includes a water inlet horn 58 discharging across the open top of basket 35 for supplying fresh inlet water to the basket under control of water inlet solenoid valve 59. The single solenoid valve 59 is shown is representative of the hot water and cold water solenoid valves necessarily employed in a washing machine. The single solenoid valve shown for the purposes of this invention supplies wash water for fill and rinse water during those portions of the cycle.

Turning more specifically now to the water fill control system of the invention, there can be seen in the drain line 52 of FIG. 1, a closed chamber 60 within which water accumulates during the machine operative cycle. Leading from one side of the chamber 60 is a drain conduit 62 leading to and feeding the pump 50. From the pump, there is a conventional outlet hose 64 which leads to a conventional plumbing drain or sewer system. Usually, said hoses lead upwardly to a discharge end 65 arranged to hook over the side of a stationary tub (not shown). Leading upwardly from the closed chamber 60 is a comparatively small diameter tube 66 which extends upwardly to a connection to fill switch 22. Tube 66 acts as a hydrostatic pressure tube terminating in a suitable diaphragm within switch 22, shown schematically in FIG. 7. The mechanism of switch 22 may be generally of the type known from U.S. Patent 2,305,154 issued on December 15, 1942, to R. C. Gilbert. The mechanism 22 and tube 66 are utilized in generally the same way as the hydrostatic fill system shown by Gilbert. In such systems, as liquid rises in the tube base, the column of air trapped in the tube becomes increasingly compressed, until at a predetermined pressure indicative of a desired degree of fill, a flexing or displacement of the diaphragm actuates the switch to deenergize the water fill solenoid valve, such as 59.

In FIG. 2, is shown in greater detail, the chamber 60. This chamber includes an imperforate, generally cylindrical, body 70 which may be molded of such materials as polyethylene, polypropylene or the like. From the body 70, there are a number of openings. A first of these openings, 72, extends vertically upwardly from the top surface 73 of body 70 and receives drain hose 52 leading to the tub drain opening 51. A second opening 74 opens laterally from the base of body 70, and accommodates a hose or conduit 62 leading to the inlet of pump 50. Above the top surface 73, there is formed a bell-shaped housing 76 in open communication with the interior of body 70; said housing terminates in an upwardly directed tube opening 78 to which is attached the hydrostatic tube 66 previously mentioned.

The bottom of body 70 is formed to provide a circular opening 80 communicating with a large diameter, externally threaded conduit 82. A suitable cap 84 of material like that of the tank body is internally threaded for securement to the conduit 82. The cap includes an imperforate cylindrical sidewall 86 and an imperforate base 87. The hollow cap accommodates a resilient sealing gasket 88 to effect a water tight seal as the cap 84 is made tight on the conduit 82.

An open-ended guard cylinder 90 is sized to fit readily within conduit 82, and in final assembly, to extend from the disc base 87 of cap 84 to adjacent the upper surface 73 of tank body 70 in the area below opening 72. The interior capacity of the guard cylinder is such that it will contain, without materially restricting flow of water to the pump, two or three articles the size of children's socks, or handkerchiefs or the like, which experience has shown are most prone to escape over the rim of the basket. Naturally, the cylinder will not bear against the upper surface or such a condition would impede the complete tightening of the cap onto its conduit. The cylinder when positioned in the assembly will present its open top directly below and surrounding the duct opening 72. The cylinder is slotted with a series of elongated, radially spaced, slots 92. These slots preferably are of about one fourth inch in width and extend vertically for almost the entire main body portion of the guard 90. Optimally there may be provided four slots. Spaced midway between the slots are individual stiffen-

ing ribs 94 which serve to strengthen the guard structure 90. The upper and lower ends of the cylinder are formed inwardly with one or more peripheral stiffening rings 96 at the top and preferably more than one ring at the bottom. These rings tend to rigidize the cylinder structure and may also serve to brace the adjacent cap sidewall 86, after assembly. With the cap in place, there is formed within the cylinder a depending trap for catching and holding objects without disturbing the flow through the slots 92.

In FIG. 6, there is shown the portion of a washing machine control circuit necessary to explain the functioning of the invention. The control knob 20 is for manual adjustment of the time-cycle control mechanism 18 which includes a conventional timer motor 100 and cam actuated contacts 102, 104, 105, 106, 107 and 108 which are time controlled in a generally known manner to open and close various control circuits at predetermined periods in the operative cycle. Contacts 102, which complete the circuit to timer motor 100, are temporarily closed by manual rotation of knob 20 to start the motor 100. Shortly thereafter, contacts 102 restore to open position; as presently explained, they reclose at the start of the washing operation, and remain closed for continuing the operation of the timer motor. This is necessary because the alternate timer motor circuit is periodically interrupted, as later appears. Contacts 104 are connected in series with the solenoid valve 59 for energization of the solenoid thereof. Contacts 104 are closed whenever water fill is required and are opened on the start of the immediately subsequent operation, which may be a wash operation or an extraction operation. Contacts 106 and 108 control the drive motor circuit to operate it in its washing cycle direction. To complete the agitate circuit to the driver motor 46, there are provided contacts 112, 113, which are sealed within the watertight casing 115 of water level switch 22. Said contacts are normally open and are closed only on actuation by the diaphragm 117 in a known manner. When the operational cycle attains its centrifugal extraction stage, to spin out either the wash or rinse water, the timer closes the motor-reversing contacts 105 and 107. These contacts are sequenced in a manner providing that the motor 46 will come to a stop at all times between closures of contacts 105 and 107 on the one hand and contacts 106 and 108 on the other.

Completing the circuit are motor-controlled contacts 114, 116, and 118 which are speed responsive under the control of motor centrifugal device 120. Contacts 114 are normally open and close only when the motor is rotating at a speed above a predetermined motor speed to maintain the motor rotative in the agitate direction. Contacts 116 are normally closed, and in this condition, complete the energizing path to water fill solenoid 59. This energizing path is prepared by closure of timer-operated contacts 104. Contacts 116 open at motor speeds above a predetermined speed to deenergize the solenoid valve circuit. Contacts 118 close the timer motor circuit following fill, to restart the timer for agitation.

Now analyzing the operation of the machine, FIG. 6 shows a portion of the circuit necessary for the machine operation. First, knob 20 is manipulated to the start position which closes contacts 102. Contacts 102 on closure complete the energizing circuit to timer motor 100 which starts the rotation of the timer cams (not shown) to close the cam contacts in a sequence designed to perform the required operative cycle. Contacts 104 close shortly thereafter to complete a circuit through normally closed contacts 116 to solenoid valve 59. Also during the operation of the timer motor 100, contacts 106 and 108 close a preparatory circuit to the main drive motor 46. This preparatory circuit is open at contacts 112 and 114 at this time, so the motor circuit is not complete. Contacts 102 reopen subsequent to the closure



of cam contacts 104, to open the timer motor circuit. Solenoid valve 59 on energization feeds water to the inlet horn 58 and fills basket 35.

As basket 35 fills with water above the level of apertures 37, the excess water flows out these openings 37 and begins to fall onto bulkhead 32 of tub 30. Since opening 51 is at a low area of bulkhead 32, this opening receives practically all of the basket overfill. This basket overfill flows into drain line 52, and into the body 70 of the fill control mechanism. Motor 46 has not been energized, whereupon the pump 50 acts to block outflow of water from the body 70. Water backs up in line 62 and begins to fill the tank body 70. As the liquid rises in the tank body past top surface 73, a comparatively large volume of air (relative to tube 66) is trapped in bell 76. As the water level continues to rise in duct 72, the volume of trapped air in the air bell 76 causes a rapid increase in the pressure in tube 66. As a result, when the water level reaches to approximately the dashed line 122, the rightward displacement of diaphragm 117, as viewed in FIG. 7, operates to close contacts 112 and 113. Closure of these contacts completes the circuit to motor 46 over a path from lead L1 through contacts 106, motor 46, contacts 108 and 112 to lead L2. The motor is thus energized in the agitate direction.

As the motor accelerates, it closes centrifugal contacts 114 to shunt out the diaphragm switch contacts 112, 113, and lock the motor to the centrifugal switch contacts. Contacts 116 open the circuit to solenoid valve 59, terminating water inflow to the basket. Timer motor 100 is energized over closed contacts 118, and the motor then proceeds to close contacts 102 and open time controlled contacts 104 to completely open the fill circuit. Motor 46 on rotation in the agitate direction rotates pump 50 in a direction which generates a negative head of water in the pump maintaining the water in the tub drain lines. Motor 46 rotates to oscillate agitator 38 for washing such clothes as are in the basket.

At the conclusion of the time allotted for agitate, contacts 106 and 108 open, deenergizing motor 46. After the motor has had sufficient time to decelerate, contacts 105 and 107 close. This closure completes a reverse path to motor 46 from lead L1 through contacts 107, motor 46, contacts 105 to lead L2. The motor is energized for spin in this direction and proceeds to accelerate basket 35. Also, rotation of the motor for spin, rotates pump 50 to drain the exhaust water out outlet drain 64. Basket 35 rotating at high speed centrifugally extracts water from the basket through holes 37. All this water accumulates in drain tub 30 for flow down drain line 52. All this liquid passes into the hollow cylinder 90 for flow through cylinder slots 92 into tank body 70. From the tank body the exhaust liquid flows out duct 74 and through drain line 62, and pump 50. From pump 50, this fluid is expelled to the exhaust line 64.

In this analysis, it was pointed out that all exhaust liquid passes through the drain line 52 and pours into the cylinder. This water carries with it entrained lint and some times small items of clothing or fabric such as handkerchiefs, socks and the like which may have escaped from the basket during the extraction operation. The lint, being of small, particulate size, will pass readily through the quarter inch width slots while the fabric items will not pass through the comparatively narrow slots. Thus the cylinder 90 acts as a guard to prevent objects larger than particulate size from reaching the pump, but allows lint and sediment to pass through easily and will flush down the drain.

It will be understood that after the spinout of the wash water, the machine fills again, operates the agitator for rinsing the clothes, and then centrifugally extracts the rinse water. The fill control mechanism and other switching components operate in the manner described above. The cycle is concluded when the timer returns the switch

102 to open position immediately after the other time-cycle switches have restored to their FIG. 6 condition.

It is well known that in children's playclothes particularly, substantial amounts of sand may accumulate, and that buttons, pins, and the like may become detached from clothing during washing. A pump guard embodying the present invention intercepts and retains such non-floatable items, while permitting lint and other light material to pass to the pump. Water bearing such contaminants enters the guard cylinder from the top, and must make an abrupt change in flow direction to pass to the pump. Heavy material is thrown from the main stream, to accumulate in the imperforate lower portion of the cylinder, which, as shown, is of quite substantial length.

After the conclusion of a cycle, the cylinder may readily be cleaned, if desired. Cap **84** is readily accessible through the large cabinet opening **128**, and can be unscrewed without the use of tools. Sand, buttons, pins and the like will be trapped in the cap **84**, and any small laundry articles which may have entered the chamber **70** are immediately evident and may be recovered. After cleaning the cylinder, seal disc and cap may be returned to position in a simple one-step restoration, following which the cap **84** is replaced and tightened. In this way the guard cylinder is readily restored to position to perform its pump-guarding function during the next cycle.

While there has been described what is at present thought to be a preferred embodiment of the invention, it will be understood that various modifications may be made therein and it is my intent to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In a clothes washing machine of the type in which clothes are washed in a wash basket rotatably mounted within a water retentive tub and from which wash and rinse water is centrifugally discharged into said tub: the combination comprising electrically actuated means for feeding water to said basket and said tub;

a substantially cylindrical fill control chamber below said tub;

a tub drainage conduit communicating between a low portion of said tub and an inlet opening in the top of said chamber whereby said chamber freely receives water from said tub; a fill sensor in communication with said chamber, said sensor reacting to a predetermined quantity of liquid received by said chamber from said tub;

a switch mechanism actuated responsive to the reaction of said sensor for stopping the further feeding of water to said machine;

a water drainage pump openly communicating with said fill control chamber for discharging water flowing therethrough from said tub;

an open-ended cylindrical pump guard having an inside diameter substantially larger than that of the chamber inlet opening and an outside diameter substantially less than that of the control chamber, said guard having a plurality of elongated, axially extending passages through the wall thereof;

means providing a tubular extension of said chamber at the bottom thereof, said extension being concentric with said inlet opening and substantially shorter than said guard cylinder, said extension being sized to snugly receive the end portion of said cylinder;

and cap means arranged to fit about said cylindrical extension to close the bottom thereof against leakage of water;

the said end portion of said cylinder being imperforate and with said tubular extension forming a trapping-chamber for intercepting and retaining heavy sedimentary material while permitting passage of floatable material such as lint.

2. In a clothes washing machine of the type which includes a wash basket movable within a water retentive tub for washing clothes in said basket,



a washing distribution system comprising means for filling said basket and overflowing to said tub,

a fill control reservoir comprising a closed chamber having a removable, imperforate cap at its bottom,

an inlet from said tub to said chamber for receiving the overflowing water from said tub,

a bell portion on the upper surface of said chamber,

a hydrostatic air tube leading from said bell portion,

said bell portion positioned to increase the air pressure in said tube on rise of water in said inlet above the top surface of said closed chamber,

a switch responsive to a predetermined increase in air pressure within said tube for ending the fill of water to said machine,

means for extracting water from the basket to said tub for exhaust therefrom,

a water drainage pump conduit means leading from said chamber to said pump for feeding extracted water to said pump,

said pump operative during said extraction to draw water from said tub through said chamber,

an upstanding hollow cylinder interposed in said chamber in the path of passage of all water to said conduit means,

said cylinder having an imperforate lower wall portion of substantial axial length and a plurality of slots through its upper wall portion for passing water to said pump,

said slots sized to detain objects larger than particulate size from reaching said pump while passing objects of particulate size such as lint and sediment for exhausting from said pump,

said cap receiving said cylindrical lower portion to form therewith a trap for retention of non-floatable matter such as sand and the like.

3. In a clothes washing machine of the type in which clothes are washed in a wash basket rotatably mounted within a water retentive tub and from which wash and rinse water is centrifugally discharged into said tub: the combination comprising electrically actuated means for feeding water to said basket and said tub;

a substantially cylindrical water chamber below said tub;

a tub drainage conduit communicating between a low portion of said tub and an inlet opening in the top of said chamber whereby said chamber freely receives water from said tub;

a water drainage pump openly communicating with said chamber for discharging water flowing therethrough from said tub;

an open-ended cylindrical pump guard having an inside diameter substantially larger than that of the chamber inlet opening and an outside diameter substantially less than that of the control chamber, said guard having through the wall thereof, a plurality of elongated, axially extending passages substantially the length of said chamber;

means providing a tubular extension of said chamber at the bottom thereof, said extension being concentric with said inlet opening and substantially shorter than said guard cylinder, said extension being sized to snugly receive the end portion of said cylinder;

and cap means arranged to fit about said cylindrical extension to close the bottom thereof against leakage of water;

the said end portion of said cylinder being imperforate and with said tubular extension forming a bottom trapping-chamber for intercepting and retaining heavy sedimentary material while permitting passage of floatable material such as lint.

4. In a clothes washing machine of the type in which clothes are washed in a wash basket rotatably mounted within a water retentive tub and from which wash and

rinse water is centrifugally discharged into said tub: the combination comprising means for feeding water to said basket and said tub;

a substantially cylindrical chamber below said tub;

a tub drainage conduit communicating between a low portion of said tub and an inlet opening in the top of said chamber whereby said chamber freely receives water from said tub;

a water drainage pump openly communicating with said fill control chamber at a low point thereof for discharging water flowing therethrough from said tub;

an open-ended cylindrical pump guard having an inside diameter substantially larger than that of the chamber inlet opening and an outside diameter substantially less than that of the control chamber, said guard having a plurality of elongated, axially extending passages through the wall thereof;

means providing a tubular extension of said chamber at the bottom thereof, said extension being concentric with said inlet opening and substantially shorter than said guard cylinder, said extension being sized to snugly receive an end portion of said cylinder;

and means for closing the bottom of said extension against leakage of water;

the said end portion of said cylinder being imperforate and coextensive with said tubular extension to form therewith a trapping-chamber for intercepting and retaining heavy sedimentary material while permitting passage of floatable material such as lint.



**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,103,966 | Behan | Dec. 28, 1937 |
| 2,343,743 | Breckenridge | Mar. 7, 1944 |
| 2,885,879 | Bloom | May 12, 1959 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 884,966 | Great Britain | Dec. 20, 1961 |