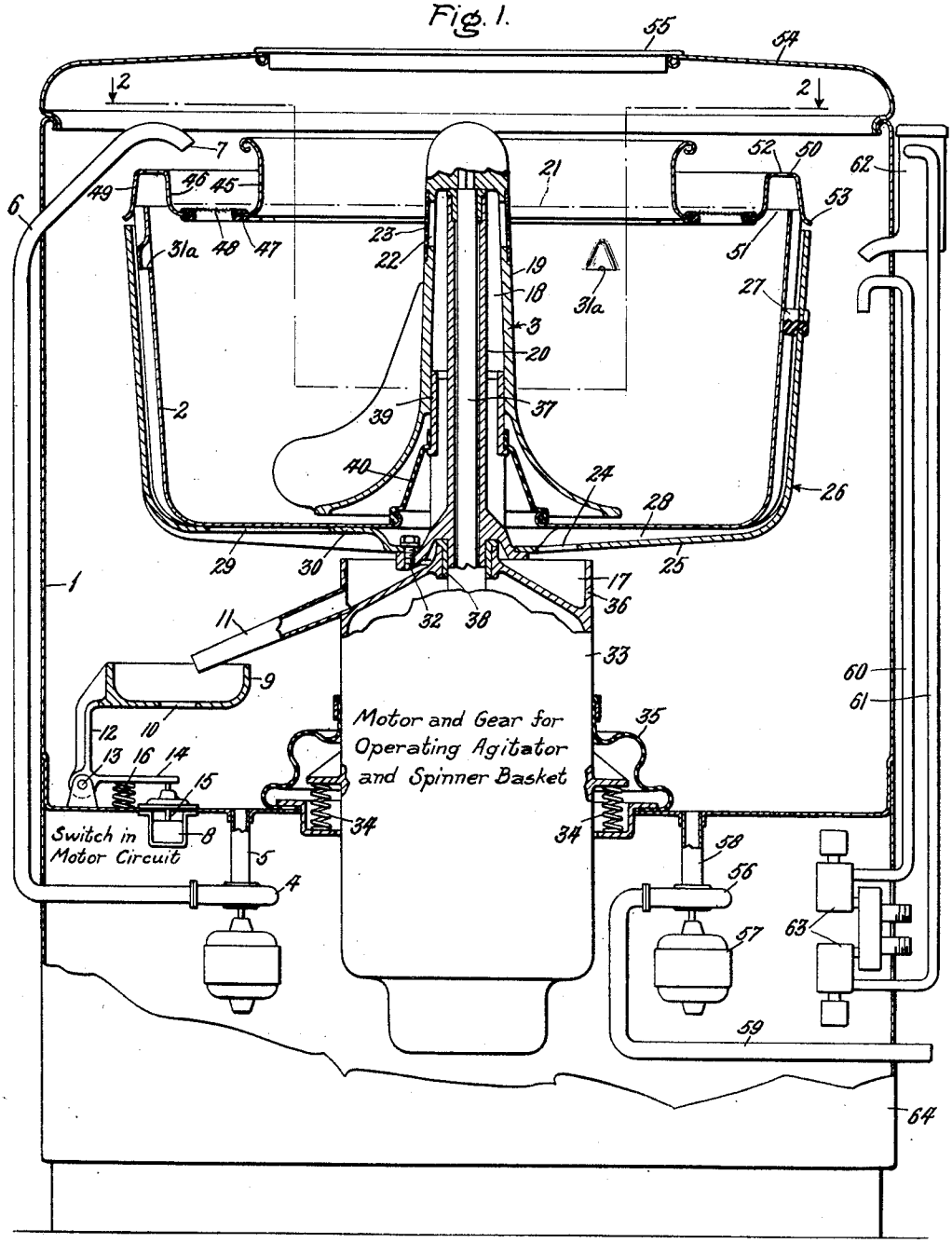
May 22, 1951 T. T. WOODSON 2,554,229

SPIN BASKET AND CASING FOR CLOTHES-WASHING MACHINES

Filed Feb. 24, 1947 2 Sheets-Sheet 1

Fig. 1.



Inventor
Thomas T. Woodson,
by Alfred V. Robt.
His Attorney.

May 22, 1951 T. T. WOODSON 2,554,229

SPIN BASKET AND CASING FOR CLOTHES-WASHING MACHINES

Filed Feb. 24, 1947 2 Sheets-Sheet 2

Fig. 2.

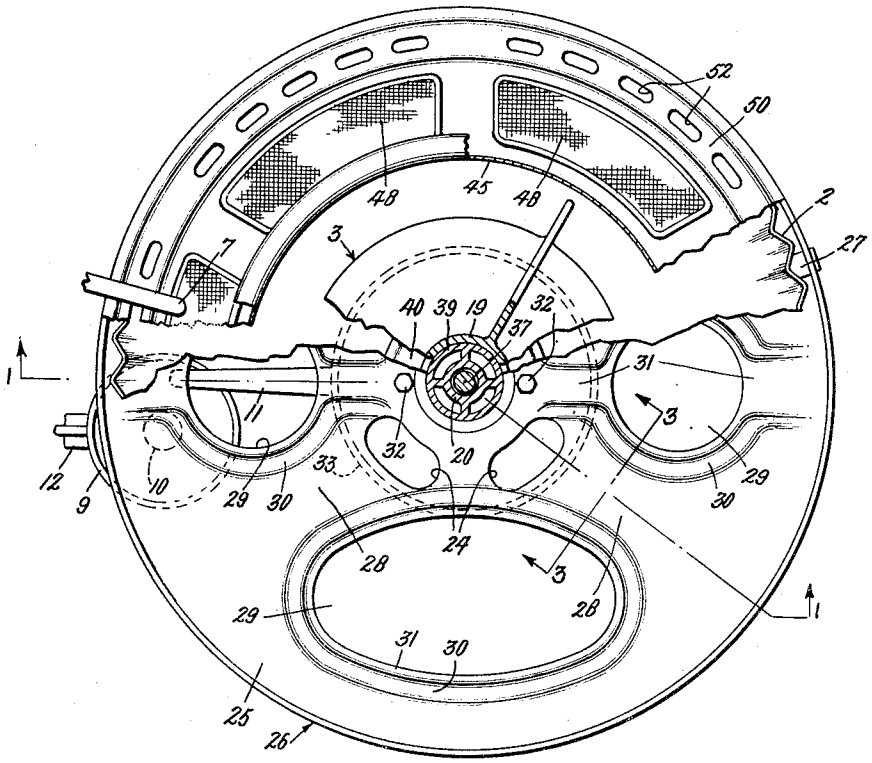


Fig. 4.

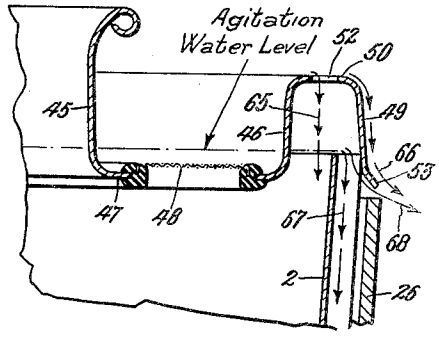
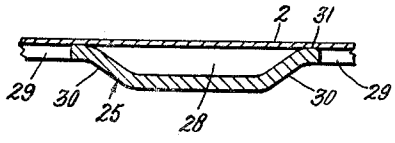


Fig. 3.



Inventor:
Thomas T. Woodson,
by Alfred V. Robst,
His Attorneu

Patented May 22, 1951 2,554,229

UNITED STATES PATENT OFFICE

2,554,229

SPIN BASKET AND CASING FOR CLOTHES-WASHING MACHINES

Thomas T. Woodson, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York

Application February 24, 1947, Serial No. 730,309

7 Claims. (Cl. 68—23)

1

The present invention relates to clothes washing machines of the type wherein during washing cleansing liquid (hereafter termed water) is circulated continuously through the basket or receptacle in which the washing operation is being performed and wherein control means is provided for the electric motor operating the machine which requires during washing operation that the basket be filled with water and a certain overflow maintained to keep the machine in operation. Such a control arrangement is disclosed and claimed in Patent 2,432,271, Herbert F. Bariffi, patented December 9, 1947, and assigned to the same assignee as my present invention. As to certain aspects, the invention relates to such a machine wherein a filter is provided at the rim of the basket for filtering lint, curd and other foreign matter from the water. In a machine of this type wherein operation of the motor is controlled by overflow of water from the basket, it is important that during washing sufficient overflow be maintained to keep the motor circuit closed or otherwise the washing will cease. On the other hand, it is equally important that the motor circuit shall not be closed by overflow unless there is sufficient water in the basket for washing for otherwise the clothes may be damaged. In this connection, it is understood that in the operation of an automatic washing machine the clothes are placed in the basket prior to the time it is filled with water, the supplying of the water and the successive operations for the washing cycles being thereafter carried out automatically.

One object of the present invention is to provide an improved construction and arrangement in a machine of this type which offers substantial improvements and reliability of operation and at the same time is simple in structure and capable of being manufactured at low cost.

A further object of the invention is to provide an improved construction which for all practical purposes eliminates the possibility of the machine stopping due to failure of overflow water when there is sufficient water in the basket to carry on the washing operation.

A further object of the invention is to provide an improved construction which eliminates the possibility of the motor circuit being closed and the washing operation started when there is not sufficient water in the basket.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and to the claims appended thereto.

In the drawing, Fig. 1 is a sectional view, partly diagrammatic, of a clothes washing machine embodying my invention; Fig. 2 is a sectional view taken on line 2—2, Fig. 1; Fig. 3 is a sectional view taken on line 3—3, Fig. 2, and Fig. 4 is a detailed view on a larger scale illustrating the operation of the inventon.

2

Referring to the drawing, 1 indicates a tub having side and bottom walls. In the tub is a spin basket 2 in which is an agitator 3 of known type which is oscillated back and forth through a suitable angle to perform the washing operation, the basket being then held stationary. At 4 is a pump having its inlet connected by a conduit 5 to the bottom of tub 1 and its discharge connected by a conduit 6 to a nozzle 7 which discharges water to the basket. The pump may be operating during all or part of the washing period to circulate water from the tub to the basket, the water overflowing from the basket back to the tub. At 8 is an electric switch which controls the circuit for the motor of the machine when it is operated to oscillate the agitator for washing. Switch 8 is biased to open position and means are provided to hold it closed when the level of the water in the basket is at least at a certain minimum height and there is at least a predetermined minimum overflow. In the present instance, the overflow water responsive means for closing switch 8 is in the form of a cup 9 having an opening 10 in its bottom to which overflow water is discharged by a spout 11. Cup 9 is carried by one arm 12 of a bell crank lever pivoted at its elbow at 13, the other arm 14 engaging the actuating stem 15 of switch 8. Downward movement of the cup and hence the closing of switch 8 is opposed by a spring 16 positioned between the underside of lever arm 14 and the bottom of tub 1.

My invention has to do particularly with an improved construction and arrangement for insuring, as long as there is a suitable amount of water in the basket for washing, that a sufficient amount of water is supplied to cup 9 to keep switch 8 closed; but on the other hand guarding against the possibility that sufficient water will be supplied to cup 9 to close switch 8 at a time when there is insufficient water in basket 2 for washing.

In carrying out my invention, I provide beneath basket 2 a water receiving chamber 17 to which spout 11 is connected, the spout serving to convey water from chamber 17 to overflow cup 9, and in connection therewith, I provide a plurality of separate conduit means for conveying overflow water from the basket to the chamber.

One overflow conduit means comprises a passage 18 formed between the post 19 of agitator 3 and a tubular shaft 20. Agitator post 19 and shaft 20 extend to a point above the normal wash water level in the basket indicated by dot and dash line 21. In post 19 in the vicinity of the normal water level is a series of circumferentially spaced elongated openings or slots 22 covered by a suitable screen 23. The lower end of passage 18 communicates with chamber 17 through openings 24 in the bottom wall 25 of an outer casing 26 which in the present instance performs also a stabilizing function during centrifugal extraction.

Outer casing 26 is in the form of a receptacle

in which spin basket 2 is positioned and another path for flow of overflow water to chamber 17 is through passage means between spin basket 2 and outer casing 26. To this end, the basket is made of smaller diameter than the outer casing and is held in spaced relation thereto by a number of spacers 27 arranged circumferentially around the outer casing in spaced relation to each other. For example, six may be provided. In the present instance, basket 2 is corrugated as shown in Fig. 2. The top edge of basket 2 is about in line with the top edge of slots 22 in the agitator post. Water overflowing the top edge of basket 2 flows downward through the space between basket 2 and outer casing 26 whence it flows through passages 28 and openings 24 to chamber 17. In bottom wall 25 are openings 29 and around these openings are struck-up bosses 30 having flat top surfaces 31 on which the bottom wall of basket 2 rests. Thus, the passages 28 are defined by the spaces between the several bosses 30. This is shown particularly in Fig. 3. One or more of the openings 29 are made relatively large as shown in Fig. 2 to provide openings through which when basket 2 is removed from casing 26 access may be had to the region below the outer casing. In the present instance, four openings 24 and four openings 29 are indicated.

In addition to the foregoing, I preferably provide also a plurality of spaced struck-out openings 31*a* in basket 2 positioned somewhat below the lower edge of slots 22 but sufficiently far from the bottom of the basket to define a water level in the basket at which washing action may safely occur. For example, three openings 31*a* may be provided. Water from these openings flows down through the space between the basket and the outer casing to chamber 17 whence it flows to cup 9.

Outer casing 26 at the center of its bottom wall is connected by bolts 32 to a flange on tubular shaft 20. Thus, tubular shaft 20 provides the support for the basket and outer casing. The lower end of tubular shaft 20 projects down into a casing 33 which is suitably supported on the bottom of tub 1. In the present instance, it is shown as being supported by springs 34, the space between the casing and the bottom of the basket being sealed by a flexible boot 35. Chamber 17 is shown as being formed by a wall 36 integral with casing 33. The agitator 3 is carried by a shaft 37 which extends up through hollow shaft 20 and is suitably connected to the agitator at its upper end. The lower end of shaft 37 projects down into casing 33. Tubular shaft 20 is journaled in a sleeve bearing 38 in the top wall of casing 33. The lower end of the center post of agitator 3 is journaled on a stationary sleeve 39 carried by tubular shaft 20. The space between sleeve 39 and basket 2 is sealed by means of a sealing sleeve 40. In casing 33 is an electric motor which is connected through suitable gearing to shafts 20 and 37 for operating them. During washing, the basket 2 is stationary and the motor in casing 33 oscillates shaft 37 and the agitator through a suitable angle. During centrifugal extracting, the basket 2, outer casing 26, agitator 3 and shafts 20 and 37 are rotated at high speed as a unit to centrifugally extract water from clothes in the tub. This mechanism in casing 33 and the specific control system for the machine form no part of the present invention. Accordingly, they have not been illustrated. The mechanism may be similar to that shown in my application Serial No. 639,817, filed January 8, 1946, now Patent No. 2,526,444, issued October 17, 1950, assigned to the same assignee as the present invention. Also, the control system may be similar to that disclosed in such application.

In the present instance, the machine is shown as being provided with a filter to which nozzle 7 discharges. The filter is in the form of an annular ring, U-shaped in cross section, comprising an inner side wall 45, an outer side wall 46 and a bottom wall 47 in which is a suitable filter screen 48. The filter ring is held over the basket by means of a rim 49 formed integral with outer wall 46 and spaced from it by means of a top flat wall 50. The inner surface of rim 49 rests on the outer edges of the corrugations at the upper edge of basket 2 and may be suitably welded thereto. With this arrangement, it will be seeen that it serves to position the filter ring within the confines of the side wall of basket 2, the outer wall 46 of the filter ring being spaced from the side wall of basket 2 as indicated at 51 in Fig. 1. With this arrangement overflow over the top edge of basket 2 will enter the space between the basket and the outer casing through the spaces formed by the corrugations. Inner wall 45 is higher than outer wall 46 so that the maximum level which water can reach in the filter is defined by wall 46. In other words, any overflow from the filter ring will be over wall 46.

In wall 50 are circumferentially spaced openings 52 (see Fig. 2). These openings are within the confines of the side wall of basket 2 so that any water flow through them is primarily to the basket and not to the space between basket 2 and the outer casing 26. At the lower edge of rim 49 is an annular out-turned lip 53, the outer edge of which is substantially in line with the outer top edge of outer casing 26. It is of an extent such that overflow of water over wall 46 and down rim 49 will be directed to the space between outer casing 26 and casing 1. This serves to prevent overflow over wall 46 from entering the space between basket 2 and outer casing 26. In the present instance, filter 48 is shown as being positioned below the normal water level in basket 2. This feature, however, is not claimed in this application, it forming the subject matter of my application Serial No. 730,307, filed of even date herewith, now Patent No. 2,509,753, issued May 30, 1950, and assigned to the same assignee as my present application.

Casing 1 may be provided with a suitable cover 54 having an opening provided with a readily removable lid 55 through which clothes may be placed in the spin basket. At 56 is a drain pump driven by an electric motor 57, the inlet of the pump being connected by a conduit 58 to the bottom of tub 1 and the discharge being connected to a suitable point for waste water by a conduit 59. At 60 and 61 are warm and hot water pipes for supplying water to the machine, the hot water pipe 61 being connected to the machine through a suitable soap box 62. At 63 is a suitable magnetically controlled valve mechanism for regulating the supply and temperature of water supplied to the machine. These parts are shown only diagrammatically since their specific construction forms no part of the present invention. The tub 1 may be supported in any suitable manner. In the present instance, it is shown as being supported on a skirt 64 which in turn may rest on a floor.

In the operation of the machine, water is sup-

plied through pipe 60 or pipe 61, or both of them, to tub 1. At the same time, pump 4 is driven to pump water from the bottom of the tub into basket 2. Pump 4 has a capacity such that it pumps the water from the tub to the basket at a rate equal to that at which it is supplied to the tub by the supply pipe or pipes. At this time, there will be no water flowing to cup 9, i. e., no overflow from the basket back to the tub, and hence switch 8 is open, which means that the motor circuit of the motor for operating the agitator is open. The circuit is closed when sufficient water is supplied to the cup that its weight will close switch 8. The water level builds up in basket 2, eventually reaching openings 31*a*. When this level of water is reached in the basket, it is safe for the agitator to start operation. Water flows through openings 31*a* down to chamber 17 and thence through spout 11 to cup 9. As soon as the flow is sufficient to provide a volume of water in cup 9, in spite of the outflow through central opening 10, having weight sufficient to overcome spring 16, the cup is lowered to close switch 8. This closes the motor circuit to effect operation of the agitator.

The level of the water continues to build up in basket 2 until the overflow through openings 31*a*, slots 22 and over the rim of basket 2 is equal to the capacity of pump 4. This may be with the level slightly above the top edge of basket 2. It will be seen that all the overflow is to chamber 17 from which it is directed by spout 11 to cup 9. At this time, the overflow may be such that cup 9 will be entirely filled and overflow its rim. This is not material, the only consideration being that there be sufficient overflow to maintain switch 8 closed. If during washing openings 31*a* and slots 22 become partially or wholly shut off by clothes in the basket, a thing which might occur with an exceptionally large amount of clothes in the basket, the water level will continue to rise but the operation will not be affected since water can still overflow down through the space between the basket 2 and the outer casing 26. The only result would be that the water level would increase somewhat.

If, due to accumulation of lint, scum and the like on filter screen 48, the screen should become clogged to an extent such that it does not readily pass the water back to the tub, the level in the filter may build up to a point where the water overflows the top edge of the outer wall 46. When this occurs, the major portion of the water flows through openings 52 back to the basket as indicated by the arrows 65 in Fig. 4. The remainder of the water overflows wall 50 and passes down along wall 49 and is directed by lip 53 to the space between outer casing 26 and tub 1 as indicated by the arrows 66 in Fig. 4. As will be seen from Fig. 2, the openings 52 occupy a fair proportion of the total circumference of wall 50. The water overflowing down rim 49 would be that which overflows wall 50 between the openings 52. The flow of water back to the basket through openings 52 will be ample to maintain the level above the top edge of the basket so that overflow will be maintained through the space between the basket and the outer casing to keep switch 8 closed. This overflow is indicated by the arrows 67 in Fig. 4.

The arrangement is such that flow of water through slots 22 alone, flow of water over the top edge of basket 2 alone, or flow of water through openings 31*a* alone is sufficient to maintain switch 8 closed. With this arrangement,

therefore, there is little, if any, likelihood of the condition obtaining where there is sufficient water in the basket for washing but overflow to cup 9 is prevented to an extent such that switch 8 will not be maintained closed.

Openings 31*a* are of advantage also in that when circulating pump 4 is shut down, the agitator will remain in operation until the water level in the basket reaches the lower edge of openings 31*a*. This may be a period of time of the order of thirty seconds.

Lip 53 guards against the contingency that if, in starting up, there is little if any water in basket 2 and the filter is clogged so that water overflows wall 46, switch 8 will not be closed and the agitator started. This is a condition which might arise if, for example, the soap powder supplied to the machine were not immediately dissolved and was pumped by pump 4 onto the filter. Should overflow of wall 46 occur under these conditions, it will be seen that the water flowing through openings 52 will go into basket 2 and the water flowing down rim 49 will be discharged to the tub through the space between outer casing 26 and the side wall of the tub. Accordingly, no water will at that time flow down through the space between basket 2 and outer casing 26 to reach the cup 9.

When the basket is rotated to centrifugally extract water from clothes in the basket, the water is discharged over the top edge of basket 2 and down and out through the space between lip 53 and the top edge of ring 26 as indicated by the arrows 68 in Fig. 4.

A machine such as that contemplated by my invention may rotate at relatively high speed for extracting water from the clothes; for example, a speed of the order of one thousand revolutions per minute. This requires for best results the use of a balancing ring for the spinner basket. One important feature of my invention is the use of a balancing ring which itself may be in the form of an outer casing in which the spinner basket is so positioned and arranged that passage means is provided between the basket and the outer casing for directing overflow water to the overflow controlled switch. By this arrangement, all the overflow during washing is made effective for maintaining the overflow controlled switch closed. This makes for reliability of operation in an automatic clothes washing machine.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

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

1. In a washing machine, a tub, a spin basket in the tub, an agitator in the basket, walls which define an overflow passage extending from the vicinity of the normal liquid level in the tub axially along the agitator to the bottom of the basket, means defining a liquid receiving chamber beneath the basket to which liquid flowing through said overflow passage is discharged, an outer casing surrounding the basket, said basket and casing having walls which define liquid overflow passage means between the basket and casing which discharge liquid to said liquid receiving chamber, an electric motor for operating the

agitator, liquid flow responsive means controlling said electric motor, means directing liquid from said chamber to said liquid flow responsive means, and means for effecting circulation of liquid from the tub to the spin basket.

2. In a washing machine, a tub, a spin basket in the tub, an outer casing which surrounds the spin basket and is spaced with respect thereto to provide an overflow passage through which liquid overflowing the top edge of the spin basket is directed to the bottom of the basket along the outside of the spin basket, walls defining a chamber beneath the spin basket to which said overflow passage discharges liquid, driving shaft means projecting through the bottom of the basket, clothes washing means operated by the shaft means, walls defining an overflow passage along said shaft means which communicates with said chamber, means for circulating liquid from the tub to said basket from which it flows to said overflow passages, an electric motor for operating said shaft means to actuate the clothes washing means, an electric switch for the motor, and means responsive to flow of liquid from said chamber for actuating said switch.

3. In a washing machine, a tub, a spin basket in the tub, an outer casing which surrounds the spin basket and is spaced with respect thereto to provide an overflow passage through which liquid overflowing the top edge of the spin basket is directed to the bottom of the basket along the outside of the spin basket, walls defining a chamber beneath the spin basket to which said overflow passage discharges liquid, driving shaft means projecting up through the bottom of the basket, clothes washing means operated by the shaft means, walls defining an overflow passage along said shaft means which communicates with said chamber, walls defining passages in the side wall of the basket at a level lower than said second named overflow passage which connect with the space between the basket and the outer casing, means for circulating liquid from the tub to said basket from which it flows to said overflow passages, an electric motor for operating said shaft means to actuate the clothes washing means, an electric switch for the motor, and means responsive to flow of liquid from said chamber for actuating said switch.

4. In a washing machine, a tub, a spin basket in the tub, washing means in said spin basket, means for supplying washing liquid to said basket, a motor for driving said washing means, a switch for connecting said motor to a source of electrical energy, means responsive to the flow of liquid from said basket into said tub for operating said switch means, and means for conducting said liquid to said switch operating means comprising channel forming means fixed relative to said basket and communicating directly therewith to establish a desired liquid level within said basket by overflow therefrom, collector means extending about the vertical axis of said basket below said channel forming means, said channels draining into said collector means, and means for discharging liquid from said collector means to said flow responsive switch means.

5. In a washing machine, a tub, a spin basket in the tub, washing means in said spin basket, means for supplying washing liquid to said basket, a motor for driving said washing means, a switch for connecting said motor to a source of electrical energy, means responsive to the rate of flow of liquid from said basket into said tub for operating said switch means, means for conducting said liquid to said switch operating means comprising an outer casing structure receiving said basket and cooperating with the walls thereof to provide external channels communicating with overflow ports in the basket side walls, collector means extending about the vertical axis of said basket below said structure, said channels draining into said collector means, and means for discharging liquid from said collector means to said rate of flow responsive switch means.

6. In a washing machine, a tub, a spin basket in the tub, washing means in said spin basket, a motor for driving said washing means, a switch for connecting said motor to a source of electrical energy, means for supplying washing liquid to said basket, channel means fixed relative to said basket providing for overflow of washing liquid from said basket, a collector chamber within said tub below said basket to receive said overflow liquid and discharge the same into said tub, means within said tub responsive to rate of overflow discharge from said collector chamber for actuating said motor switch means, and a filter system to intercept washing liquid flowing into the basket, said system including filter means disposed within said basket near the upper edge portion thereof, walls extending upwardly from the sides of said filter means, one of said walls having a plurality of openings within the boundaries of said basket for discharge of liquid thereinto in the event of obstruction of said filter means, and means for securing said filter system to the rim of the basket.

7. In a washing machine, a tub, a spin basket in the tub, washing means in said spin basket, a motor for driving said washing means, a switch for connecting said motor to a source of electrical energy, means for supplying washing liquid to said basket, channel means fixed relative to said basket providing for overflow of washing liquid from said basket, a collector chamber within said tub below the basket to receive said overflow liquid and discharge the same into said tub, means within said tub responsive to rate of flow from said collector chamber for actuating said motor switch means, and a filter system to intercept washing liquid flowing into the basket, said system including a filter screen disposed within said basket near the upper edge portion thereof, wall means extending upwardly from the sides of said screen to provide therewith an annular pocket of substantial depth, one of said walls extending radially upwardly above the level of the screen and having a plurality of openings within the boundaries of the basket for discharge of liquid thereinto in the event of obstruction of said filter screen, and means for securing said filter system to the rim of the basket.

THOMAS T. WOODSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,743,441	Dunham	Jan. 14, 1930
1,850,138	Riall	Mar. 22, 1932
2,270,750	Bariffi	Jan. 20, 1942
2,274,402	Dunham	Feb. 24, 1942
2,328,432	Dunham	Aug. 31, 1943
2,425,378	Lindemann	Aug. 12, 1947