

[54] WASHING MACHINE

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[58] Field of Search68/23.1, 23.2, 23.3; 74/573; 210/363; 233/23 A, 1 C

[56] References Cited

UNITED STATES PATENTS

2,836,083	5/1958	Smith	68/23.2
2,984,094	5/1961	Belaieff	68/23.2
2,525,781	10/1950	De Remer	210/363
2,968,970	1/1961	Depper	68/23.2

FOREIGN PATENTS OR APPLICATIONS

10,629 12/1879 Germany.....210/363

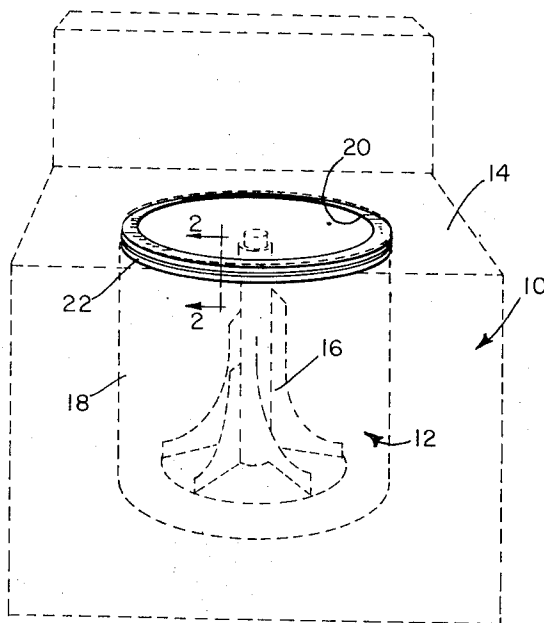
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[57] ABSTRACT

A washing machine for washing clothes and having counterweight means for balancing the washing tub during a washing operation to preclude an unbalanced condition of the tub when the contents thereof are unevenly distributed therein. A plurality of weight members are mounted on the upper portion of the washing tub and are freely movable therearound for automatically compensating of any unbalanced load condition of the tub as the washing tub spins during a washing operation.

8 Claims, 4 Drawing Figures



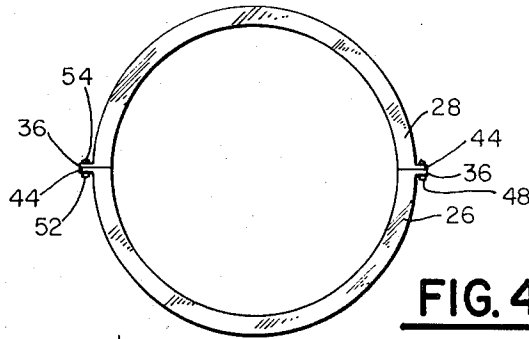


FIG. 4

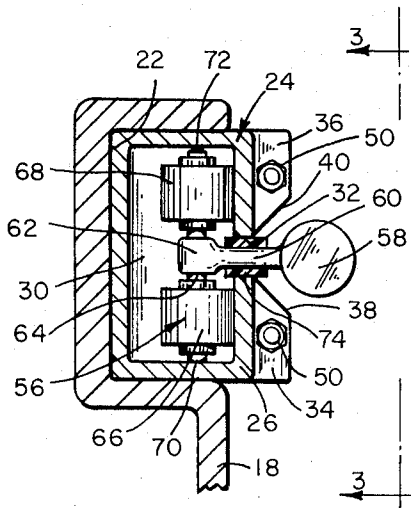


FIG. 2

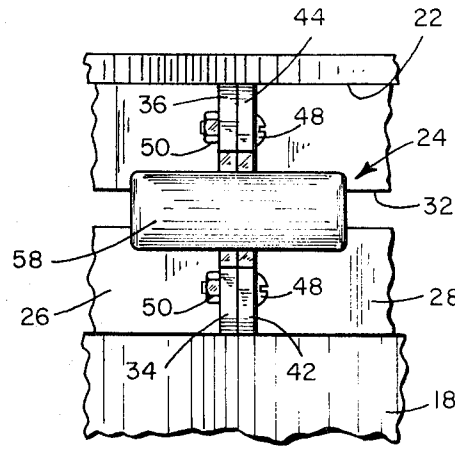


FIG. 3

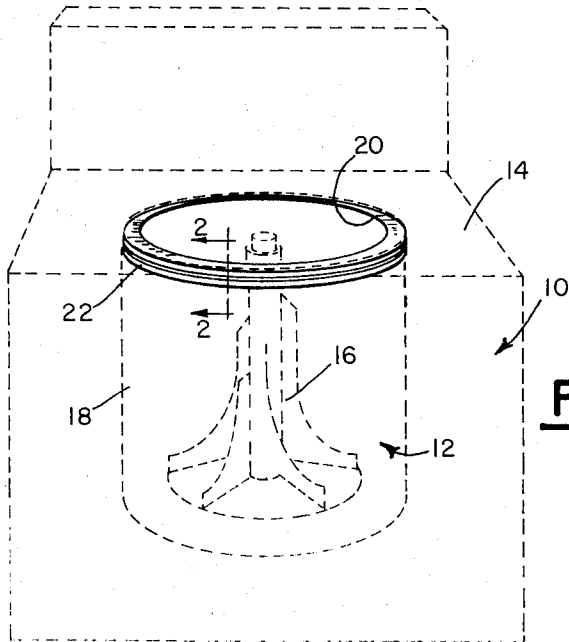


FIG. 1

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WASHING MACHINE

This invention relates to improvements in washing machines and more particularly, but not by way of limitation, to a washing machine having counterbalancing means for substantially eliminating an unbalanced load condition of the washing tub during a washing operation.

Automatic clothes washing machines having inner washing tubs designed for spinning or rotating during the washing operation are well known and in wide spread use today. During some portions of the washing cycle the speed of rotation of the tub may be sufficiently great to produce considerable centrifugal force on the articles disposed within the tub. These articles are usually forced against the walls of the tub during these fast spin periods and the articles "pile up" frequently, or collect together within the tub in a manner to produce an unbalanced load in the tub. This concentration of weight of the load in the tub usually interferes with the normal smooth spinning operation thereof and is a disadvantage in this type of washing machine. Not only does the unbalanced condition interfere with the washing operation, but also the tub may knock or hit against other portions of the washing machine in a manner providing considerable noise and even shock to the machine which may result in actually moving the position of the entire machine. Many of the machines are provided with switching devices, and the like, for automatically stopping the rotation or spinning of the tub or shutting down the operation of the machine when an unbalanced load condition occurs, and the operator of the machine must redistribute the load within the tub and reset the switching mechanism to resume the washing operation.

The present invention contemplates a novel means for a washing machine particularly designed and constructed for automatically counterbalancing the weight of the load in the machine regardless of whether or not the load in the tub is evenly distributed therein. The novel device comprises a plurality of weight members secured to the tub in such a manner as to be freely movable around the outer periphery thereof as the tub spins during a washing operation. The weight members automatically respond to the forces created by the spinning of the tub to maintain the weight of the tub in a balanced condition at all times. In the event the articles within the tub collect at one area therein, the weight members will collect at an area oppositely disposed therefrom, and thus maintain the tub balanced during the spinning operation thereof. Thus, the efficiency of the machine is greatly increased.

It is an important object of this invention to provide a novel clothes washing machine particularly designed and constructed for maintaining the washing tub in a balanced condition during the washing operation.

It is another object of this invention to provide a novel washing machine wherein counterbalancing of the inner rotatable tub is provided for maintaining the tub in a substantially normal position when the load accumulates in one area therein, thus maintaining an efficient operation thereof during the complete washing cycle.

Another object of this invention is to provide a novel automatic washing machine wherein the spinning action of the inner tub is balanced and which is simple and efficient in operation and economical and durable in construction.

Other and further objects and advantageous features of the present invention will hereinafter more fully appear in connection with a detailed description of the drawings in which:

FIG. 1 is a perspective view of a washing machine embodying the invention with portions thereof depicted in dotted lines for purposes of illustration.

FIG. 2 is an enlarged sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is a view taken on line 3—3 of FIG. 2.

FIG. 4 is a plan view of an annular housing member utilized in the invention.

Referring to the drawings in detail, reference character 10 generally indicates a washing machine of any well known automatic type and as shown herein is of the top loading type comprising an inner tub 12 mounted within an outer housing 14 in any well known manner (not shown). A centrally disposed agitator 16 is provided in the tub 12 and is rotatable or oscillatory therein for washing clothes as is well known. The tub 12 is usually mounted for independent rotation with respect to the agitator for spinning at a relatively high speed during portions of the washing cycle, as is well known and as will be hereinafter set forth.

The tub 12 preferably comprises a substantially cylindrical outer wall 18 having the lower end thereof closed and the upper end thereof open as shown at 20 for permitting access to the interior thereof. An annular recess 22 is provided around the outer periphery of the wall 18 in the proximity of the open end 20 thereof for receiving a counterbalancing unit generally indicated at 24.

Referring particularly to FIGS. 2, 3 and 4, the counterbalancing unit 24 comprises at least two arcuate or semicircular housing sections 26 and 28 of an outer cross-sectional configuration complementary to the cross sectional configuration of the recess 22 for seating therein as particularly shown in FIG. 2. The housing sections 26 and 28 are each open at the opposite ends thereof wherein a continuous annular chamber 30 is provided within the abutting sections 26 and 28 when disposed within the recess 22, for a purpose as will be hereinafter set forth. Each housing section 26 and 28 is substantially identical and only the section 26 will be described in detail herein.

A centrally disposed slot 32 is provided in the outer periphery of the housing section 26 and extends circumferentially throughout the entire length thereof. The slot 32 is open at both ends thereof whereby a continuous circular opening will be provided around the outer periphery of the abutting sections 26 and 28. A pair of outwardly extending flanges 34 and 36 are provided on one end of the section 26 and spaced on the opposite sides of the slot 32. The inwardly directed edges 38 and 40, respectively, of the flanges 34 and 36 are tapered downwardly and away from the slot 32 for a purpose as will be hereinafter set forth. The opposite end of the section 26 is provided with a similar pair of flanges 42 and 44 (only one flange 44 is shown on section 26 in FIG. 4, with two flanges 44 and 46 being shown on section 28 in FIG. 3). The flanges 34 and 36 of section 26 may be secured to the flanges 42 and 44 of the section 28 in any suitable manner, such as by bolts 48 and lock nuts 50, and similarly the flanges 34 and 36 of section 28 may be secured to the flanges 42 and 44 of the section 26 by bolts 52 and lock nuts 54,

thus securing the sections 26 and 28 together to provide an annular housing or guide disposed within the recess 22.

A plurality of weight or balancing units 56 are provided for the counterbalancing unit 24 and comprise a weight element 58 spaced from the outer periphery of the sections 26 and 28 and having a stem or arm member 60 extending through the slot 32 and into the chamber 30. The weight element 58 may be of any desired weight as required to provide an adequate counterbalancing action during use of the machine 10 as will be hereinafter set forth. The inner end of the arm 60 is provided with a sleeve or aperture member 62 journaled on a shaft 64 which is disposed within the guide channel chamber 30. A pair of wheels or rollers 66 and 68 are suitably journaled on the shaft 64 and disposed on opposite rollers of the sleeve 62 for engaging the outer periphery of the chamber 30 on the opposite sides of the slot 32. The opposite ends 70 and 72 of the shaft 64 engage the upper and lower surfaces of the chamber 30 and are preferably either constructed from or coated with a suitable bearing material, such as nylon, Teflon, or the like, for facilitating movement of the shaft 64 within the chamber 30 as the wheel or rollers 66 and 68 roll therein. In addition, the arm 60 is preferably provided with an outer bushing or bearing sleeve 74 disposed in the proximity of the slot 32 for retaining the arm 60 substantially centrally disposed within the slot 32 during movement of the unit 56 within the channel 30. The sleeve 74 may be constructed of any suitable material, such as nylon, Teflon, or the like, for reducing wear and facilitating movement of the arm along the slot 32 as will be hereinafter set forth in detail.

Substantially any desired number of the weight units 56 may be provided for the counterbalancing unit 24, and it will be apparent that the weight units 56 may be quickly and easily installed in the sections 26 and 28 prior to connection of the section 26 to the section 28 by inserting the rollers 66 and 68 within one of the open ends of the chamber 30. The sections 26 and 28 may then be disposed within the recess 22 in abutting relationship and bolted together. In this manner, a continuous annular chamber 30 and continuous slot 32 extend around the circumference or outer periphery of the counterbalancing unit 24. The weight units 56 are freely movable within the chamber 30 and may move around the length of the chamber in accordance with the forces acting on the units 56 during use of the washing machine 10. The wheels or rollers 66 and 68 will ride along the outer periphery of the chamber 30 and will be maintained in the desired vertical position therein by the engagement of the bearing surfaces 70 and 72 with the upper and lower surfaces of the chamber 30. The arm 60 will be maintained substantially centrally disposed within the slot 32 by the sleeve 74. In addition, the sleeve 74 will move freely and easily along the length of the slot 32 as the weight units 56 move around the outer periphery of the tub 12.

In the event the load (not shown) within the tub 12 accumulates in one area therein, or is otherwise unbalanced therein, the tub 12 may tend to assume a position deviating from the normal vertical or upright position thereof shown in Fig. 1. This may happen when the tub 12 itself is spinning, such as during a rinse or drying

cycle in the washing operation whereby the centrifugal force may move all of the articles within the tub to the same area therein. As the tub 12 tilts or moves "off center," the weight units 56 will be forced to move through the chamber 30 for accumulating in a position oppositely disposed from the preponderance of weight of the unbalanced load in the tub. As hereinbefore set forth, the weight of the elements 58 may be selected or predetermined in accordance with the normal operating limits of the machine 10, and the weights 58, thus accumulated on the upper rim of the tub 12 will counterbalance the weight of the load within the tub and maintain the tub in a substantially vertical or upright position during the entire washing cycle.

From the foregoing it will be apparent that the present invention contemplates a novel automatic washing machine particularly designed and constructed for substantially eliminating an unbalanced condition for the inner tub during a washing operation. The novel washing machine is provided with a plurality of counterweight members freely movable around the upper rim of the tub in response to forces acting thereon during the washing operation. In the event the load within the tub becomes unbalanced for any reason and the tub tends to move from the normal upright or vertical position thereof, the counterweight members will automatically be moved into a position oppositely disposed from the load within the tub for compensating for the concentration of weight of the load and maintaining the tub in a substantially upright position during the entire washing operation.

Whereas the present invention has been described in particular relation to the drawings attached hereto, it should be understood that other and further modifications, apart from those shown or suggested herein, may be made within the spirit and scope of this invention.

What is claimed is:

1. An automatic washing machine comprising a washing tub for receiving articles to be washed therein, counterweight means provided on the tub, said counterweight means being responsive to forces thereon during the washing operation for maintaining the washing tub in a substantially upright position during the entire washing cycle, and wherein the counterweight means comprises an annular guide channel extending around the outer periphery of the tub, weight elements movably secured to said guide channel and extending radially outward therefrom, said weight elements being movable in said guide channel in response to said forces for maintaining the tub in said upright position.

2. An automatic washing machine set forth in claim 1 wherein the weight elements are carried by roller means disposed within said guide channel and freely movable therein.

3. An automatic washing machine comprising a washing tub for receiving articles to be washed therein, counterweight means provided on the tub, said counterweight means being responsive to forces thereon during the washing operation for maintaining the washing tub in a substantially upright position during the entire washing cycle, and wherein the counterweight means comprises an annular guide channel provided around the outer periphery of the upper rim of the tub, said guide channel being provided with a slot extending circumferentially therearound to provide communica-

tion with the interior thereof, roller means disposed within said guide channel and freely movable therearound, weight means carried by the roller means and movable therewith, said roller means and weight means being responsive to said forces for maintaining the tub in the said upright position.

4. An automatic washing machine as set forth in claim 3 wherein the weight means includes a weight element extending radially outward from the guide channel to provide a counterbalancing action for the tub during a washing operation.

5. An automatic washing machine as set forth in claim 3 wherein the roller means comprises shaft means disposed within said guide channel and engagable therewith for movement therealong, and a plurality of roller members journalled on the shaft and engagable with the guide channel for movement therealong.

6. Counterbalancing means for an automatic washing machine having a washing tub and comprising annular guide channel means disposed around the upper rim of the tub, counterweight means secured to the guide channel means and freely movable therealong, said counterweight means being responsive to forces acting thereon during a washing operation for compensating for unbalanced load conditions in the tub to maintain the tub in a substantially upright position during the washing operation, and wherein the counterweight means comprises roller means journalled within the guide means for free movement therein, weight means carried by the roller means and extending radially outward from the guide channel means to provide said compensation for said unbalanced load conditions in the tub.

7. Counterbalancing means for an automatic washing

machine having a washing tub and comprising annular guide channel means disposed around the upper rim of the tub, counterweight means secured to the guide channel means and freely movable therealong, said counterweight means being responsive to forces acting thereon during a washing operation for compensating for unbalanced load conditions in the tub to maintain the tub in a substantially upright position during the washing operation, and wherein the guide channel means comprises a plurality of arcuate guide channel members secured in abutting relationship around the upper rim of the tub, said arcuate sections being provided with a slot extending along the outer periphery thereof to provide a continuous circular slot around the upper rim of the tub, and said counterweight means comprises a plurality of weight members, and means securing each of said weight members to the guide channel means for free movement therealong.

8. Counterbalancing means for an automatic washing machine as set forth in claim 7 wherein said last mentioned means comprises a shaft member disposed within said guide channel means and engagable therewith for free movement therein, roller means journalled on the shaft means and engagable with the guide channel means for free movement therealong, arm means carried by said weight members for connecting said weight members to said shaft members, said arm means extending through the slot for suspending the weight members radially spaced from the guide channel means, and bushing means carried by the arm means for engagement with the slot for facilitating the movement of the counterweight means along the guide channel means.

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