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W. H. K. OELMANN

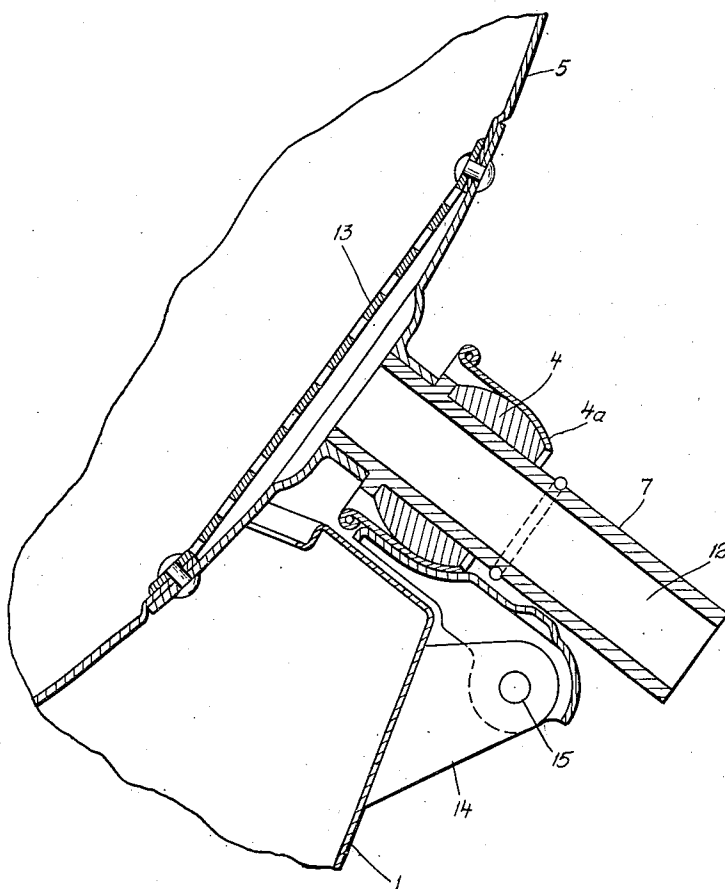
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WASHING MACHINE

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Fig. 2.



INVENTOR.

Willelm Hermann Karl Oelmann

BY

J. J. Hedlund
his ATTORNEY

UNITED STATES PATENT OFFICE

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WASHING MACHINE

Wilhelm Hermann Karl Oelmann, Berlin, Germany, assignor to Inventia Patent-Verwertungsgesellschaft, Schaffhausen, Switzerland, a corporation of Switzerland

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My invention relates to washing machines and more particularly to washing machines provided with a single drum for performing the complete washing and rinsing operation.

The object of the invention is to facilitate and simplify especially the rinsing operation, which requires the filling and emptying of the drum of the machine.

In accordance with the invention the shafts on which the drum is adapted to rotate are hollow so that the liquid may be supplied to and also removed from the drum through said hollow shafts. Moreover, the axis of rotation of the drum is inclined to the horizontal so that one hollow shaft, which may be used as an inlet, is above the other, which may be used as an outlet. Also, the bearing of the latter shaft is preferably pivotally mounted in such a way that the drum may be tilted up so that all liquid may be drained therefrom.

In the annexed drawings a preferred embodiment of a washing machine according to the invention is illustrated as an example.

Fig. 1 is a more or less diagrammatic drawing partially in cross section, of the complete washing machine;

Fig. 2 is a cross-sectional view of a portion of the device shown in Fig. 1 on an enlarged scale;

Fig. 3 is an end view of the left hand bearing of the drum; and

Fig. 4 is a cross-sectional view of a closure member for the outlet opening of the drum.

In the drawings the supporting stand of the washing machine is denoted with reference character 1. Stand 1 is carried by members 2 which may be formed as wheels, rollers, studs or the like. In the upper part of stand 1, two bearings 3 and 4 are arranged in which the washing drum, which in the embodiment illustrated is formed as a hollow ball 5, is rotatably supported by means of shafts 6 and 7. As shown in the drawings, especially in Fig. 1, bearing 3 has a higher position than bearing 4 due to which fact the shafts 6 and 7 of the drum will during normal operation be in an inclined position. The rotation of the drum is effected by means of an electric motor 8 mounted on stand 1. The transmission of power from the motor to the drum may be effected by a suitable gearing, as by means of the pinion 9 and gear 10. Shafts 6 and 7 are hollow and provided with axially extending channels or bores 11 and 12 respectively. In front of the entrance opening of channel 12 into the drum, a strainer 13 or the like is arranged. In the embodiment illustrated,

one of the bearings mentioned, in this case the bearing 4, is constructed in such manner that the drum 5 may be tilted to occupy a still more inclined position, as for instance shown in dotted lines in Fig. 1. To this end stand 1 is provided with an arm 14 which carries a pin 15 on which bearing 4 is pivotally mounted. The outer bearing member 4a within which the inner bearing member 4 is supported is suitably constructed in such manner that not only may the entire bearing be pivoted in a vertical plane around bolt 15, but the shaft 7 may have universal movement with respect to outer bearing member 4a. Due to the spherical shape of the right hand end, as seen in the figures, of outer bearing member 4a, the bearing will take up thrust as well as radial loads. The left hand bearing 3 is, as evident from Fig. 3, formed as an open journal-bearing in which the shaft 6 of the drum rests. This last mentioned shaft is suitably provided with a special handle 6a which may be of heat insulating material.

The members for driving the drum are arranged in such manner that when the drum is pivoted in the direction of the arrow x the transmission members, that is the cogged wheels 9 and 10, are disengaged from each other, and when the drum is pivoted back into the operating position they will again engage each other. The drum may be heated in any convenient manner, as by means of a burner 16. The drum may be filled with water from a cock 17 to which one end of a hose 18 is connected. The other end of pipe 18 is connected with a bent pipe 19 which may be loosely inserted through the opening in handle 6a into the bore 11 of hollow shaft 6. Below shaft 7 on the emptying side of the drum a bucket 20 is placed. The drum 5 is provided with an opening 21 which, during operation of the machine, is tightly closed by a cover 21a. Through this opening the material to be washed, is put into the drum and after the washing operation has been finished it is removed therethrough.

The right hand shaft 7 which serves as an outlet pipe is provided at its outer end with external threads 22 which are adapted to receive a closing member 23 formed with corresponding internal threads. Member 23 is also provided with ribs 24 in order to facilitate the gripping of same. The axial bore of member 23 is fitted with an end-packing 25 of leather or like material. The bore is further provided with a stopper 27 of rubber or similar material held in position by means of a screw bolt 26. To close the hollow shaft 7, stopper 27 first is pressed into channel 12 until the threads

on member 23 register with those on shaft 7, whereupon the member 23 is tightly screwed on the shaft, whereby stopper 27 is pressed further into channel 12 and finally a seal is effected by means of packing disc 25. The threads by means of which member 23 is screwed tight are pitched in such a direction that if the member is held still during rotation of the drum it will be unscrewed from the shaft.

10 The washing machine operates in the following manner.

The wash is inserted through the opening 21 in the wall of the drum, after which cover 21a is tightly closed. Simultaneously cold or warm water may be introduced through said opening, after which the contents of the drum, is boiled and/or treated by means of rotating the drum. The introduction of cold or warm water may, however also be effected through hose 18, bent pipe 19 and channel 11 from the cock 17. If the wash is to be rinsed after the washing operation has been completed, the member 23 is screwed off, which as already mentioned, may be effected by holding the same during rotation of the drum. Upon unscrewing the member 23 from thread 22 the rubber stopper 23 will not be totally removed. The opening of channel or bore 12 thus will remain closed despite the fact that the thread connection has been loosened. This is of great importance as it prevents the operator of the machine from being injured by escaping hot water. The complete opening of the passage 12 is effected by means of a short pull on the member 23 which removes the rubber stopper 27 from the bore 12. At the moment when the hot water escapes, the hand of the operator has been removed from the path of the escaping water. The water then flows as shown in the drawing into the bucket 20. The rinsing of the wash may be simultaneously started by opening water cock 17 whereby hot or cold water enters drum 5 in the manner previously described through the left hand hollow shaft 6, passes through the wash and escapes through the right hand shaft 7 to the bucket 20. Such rinsing may be effected when the drum is stationary or when it is rotating as the bent pipe 19 is loosely placed into the bore 11 and, due to its own weight and the weight of the hose 18, remains in this position and will not rotate with the drum. The connection between the water pipes 18 and 19 may be constructed in other ways; for instance member 19 may be connected with hollow shaft 11 by means of any known swivel joint. The rinsing operation may be continued in the manner described until the water leaving the hollow shaft 7 is clear and free from soap.

When the rinsing operation is finished, the drum may be completely emptied before or after the clean clothes are removed through the opening 21. Such emptying is effected by the operator removing members 18 and 19 and grasping a handle 6a and tilting the drum in the direction of arrow x. In this manner drum 5 is tilted to such position that the inner opening of bore 12 is at the lowest place of the interior of the ball-shaped container so that all the liquid therein will be completely drained into bucket 20.

A special advantage results from the fact that the axis of rotation of the drum 5 is inclined to the horizontal, inasmuch as the entrance for the rinsing water is above the outlet. This makes it possible to employ a loose connection between pipe 19 and hollow shaft 6 as there is no tendency for water to leak out therebetween. If the inlet and outlet were at the same level, as they would

be if the axis were horizontal, the inlet would be submerged when the liquid level in the drum rose sufficiently high for discharge to take place through the outlet, and it would be necessary to provide a liquid tight rotatable coupling between pipe 19 and hollow shaft 6. By doing away with the necessity of such a coupling, the present invention simplifies the device and reduces its cost.

In order to uniformly distribute the water entering through channel 11, a distributing member 28 is arranged inside the inner opening of said channel.

While I have shown and described one more or less specific embodiment of my invention, it is to be understood that this is for purposes of illustration only, and the scope of my invention is to be determined by the appended claims.

What I claim is:

1. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container bearings for said shafts in said frame located at different elevations so that the axis of rotation of said container is inclined to the horizontal, and means for rotating said container.

2. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, bearings for said shafts in said frame located at different elevations so that the axis of rotation of said container is inclined to the horizontal, means for introducing liquid into said container through the upper of said hollow shafts, and means for rotating said container.

3. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, bearings for said shafts in said frame located at different elevations so that the axis of rotation of said container is inclined to the horizontal, means for preventing flow of liquid through the lower of said hollow shafts, and means for rotating said container.

4. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, bearings for said shafts in said frame located at different elevations so that the axis of rotation of said container is inclined to the horizontal, means for introducing liquid into said container through the upper of said hollow shafts means for preventing flow of liquid through the lower of said hollow shafts, and means for rotating said container.

5. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, bearings for said shafts in said frame located at different elevations so that the axis of rotation of said container is inclined to the horizontal, means for rotating said container, and a liquid supply conduit loosely journaled in the upper of said hollow shafts whereby liquid may be introduced into said container while the latter is rotating.

6. A washing machine comprising a supporting frame, a closed container, shaft members secured

to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, bearings for said shafts in said frame located at different elevations so that the axis of rotation of said container is inclined to the horizontal, means for rotating said container, a liquid supply conduit having one end loosely journaled in the upper of said hollow shafts, said conduit being bent so that the other end extends downwardly, and a flexible hose connected to said other end, the weight of said conduit and said hose preventing rotation thereof when said container is rotating.

7. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, a bearing for one of said shafts horizontally pivotally mounted on said frame so as to be rotatable in a vertical plane, an open journal bearing on said frame for the other of said shafts whereby said container may be pivoted in a vertical plane, and means for rotating said container.

8. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, a bearing for one of said shafts horizontally pivotally mounted on said frame so as to be rotatable in a vertical plane, an open journal bearing on said frame for the other of said shafts, whereby said container may be pivoted in a vertical plane, a gear secured to said container, a driving motor mounted on said frame and having a driving pinion, said gear being adapted to engage said pinion only when the other of said shafts is in said open journal bearing.

9. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, a combined thrust and radial bearing for one of said shafts horizontally pivotally mounted on said frame so as to be rotatable in a vertical plane, an open journal bearing on said frame for the other of said shafts, whereby said container may be pivoted in a vertical plane, said open journal bearing being higher than said combined thrust and radial bearing whereby the axis of said container as determined by said shafts is inclined to the horizontal, and means for rotating said container.

10. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, a combined thrust and radial bearing for one of said shafts horizontally pivotally mounted on said frame so as to be rotatable in a vertical plane, an

open journal bearing on said frame for the other of said shafts, whereby said container may be pivoted in a vertical plane, said open journal bearing being higher than said combined thrust and radial bearing whereby the axis of said container as determined by said shafts is inclined to the horizontal, a gear secured to said container, a driving motor mounted on said frame and having a driving pinion, said gear being adapted to engage said pinion only when the other of said shafts is in said open journal bearing.

11. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, a combined thrust and radial bearing for one of said shafts horizontally pivotally mounted on said frame so as to be rotatable in a vertical plane, an open journal bearing on said frame for the other of said shafts whereby said container may be pivoted in a vertical plane, said open journal bearing being higher than said combined thrust and radial bearing whereby the axis of said container as determined by said shafts is inclined to the horizontal, means for introducing liquid through the upper of said shafts, means for preventing flow liquid through the lower of said shafts, and means for rotating said container.

12. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, bearings for said shafts in said frame located at different elevations so that the axis of rotation of said container is inclined to the horizontal, means for rotating said container, and a cap for preventing flow of liquid through the lower of said shafts, said cap and said shaft being formed with similar screw threads for securing said cap on said shaft, the direction of the pitch of said threads being such with respect to the direction of rotation of said container that the cap will be unscrewed when it is held stationary while the container is rotating.

13. A washing machine comprising a supporting frame, a closed container, shaft members secured to diametrically opposed points of said container, said shafts being hollow and communicating with the interior of said container, an arm horizontally pivotally mounted on said frame, an outer bearing member secured to said arm and having an inner spherical surface, an inner bearing member secured to one of said shafts and having an outer spherical surface cooperating with said inner spherical surface, an open journal bearing on said frame for the other of said shafts whereby said container may be pivoted in a vertical plane, and means for rotating said container.

WILHELM HERMANN KARL OELMANN.