

March 23, 1954

J. B. KIRBY

2,672,744

WOBBLING BASKET TYPE CLOTHES-WASHING MACHINE

Filed June 28, 1947

2 Sheets-Sheet 1

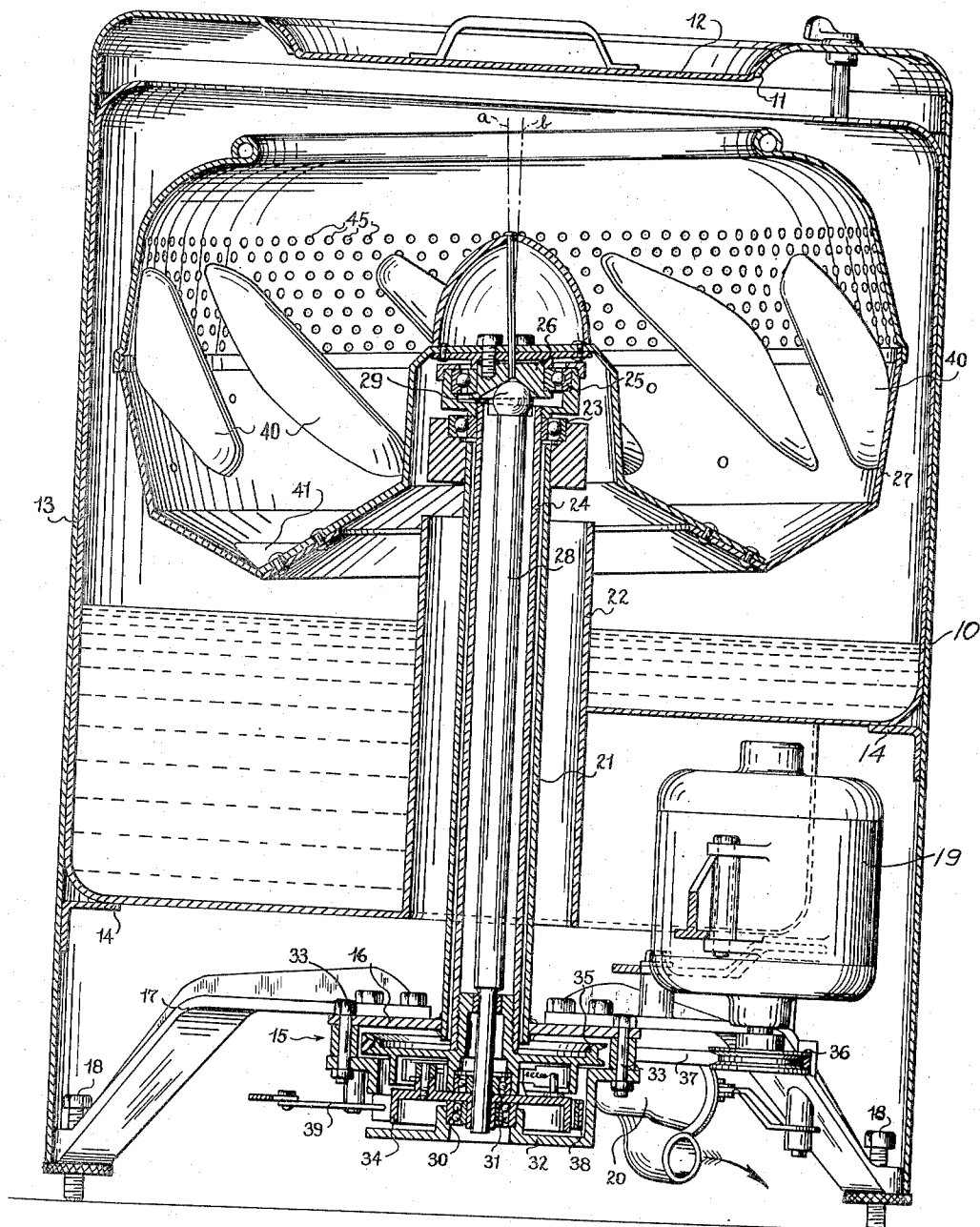


Fig 1

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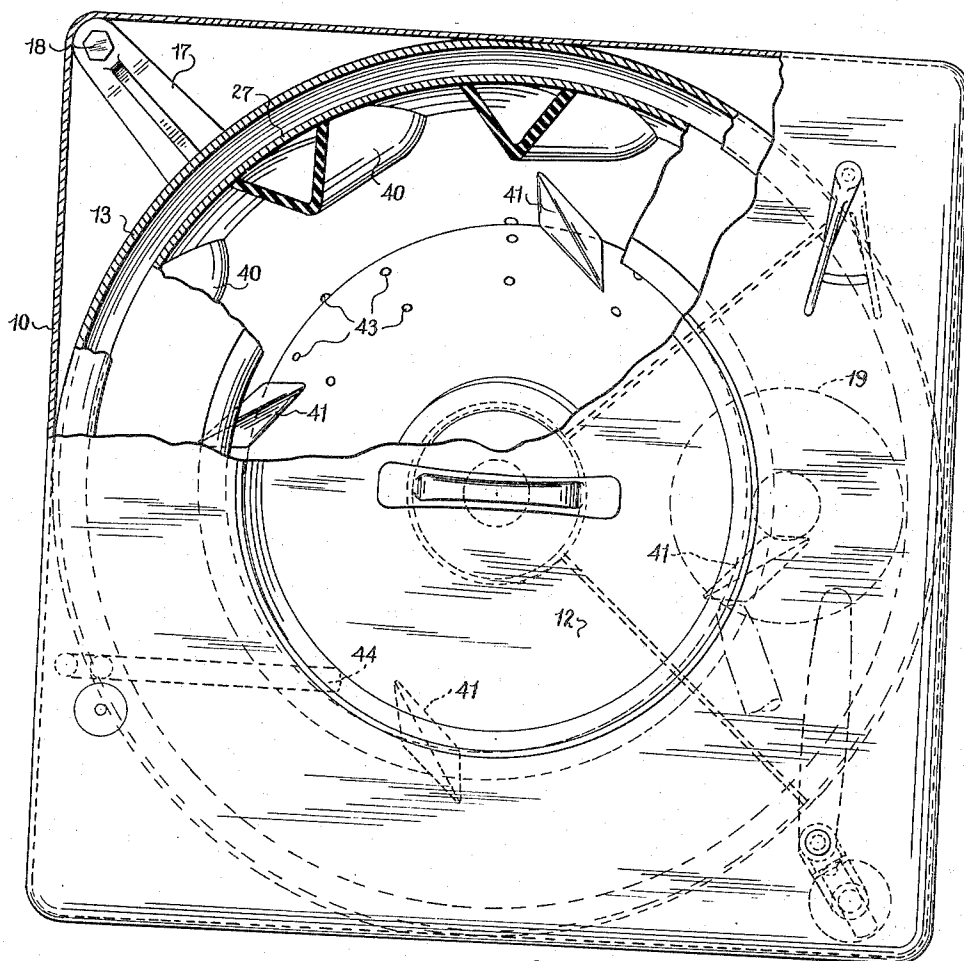


Fig. 2

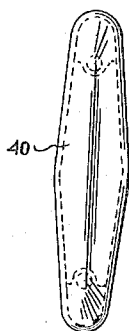


Fig. 3

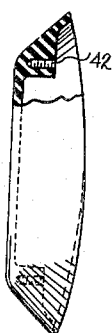


Fig. 4

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2,672,744

WOBBLING BASKET TYPE CLOTHES-
WASHING MACHINE

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Application June 28, 1947, Serial No. 757,773

4 Claims. (Cl. 68-152)

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This invention relates to washing machines and more particularly to a basket for a combined washing and extracting machine.

The principal object of this invention is to overcome tendencies to twist and tangle clothes being washed in a machine in which the basket containing the clothes is given either a wobbling or an orbital motion for washing.

Another object is to produce a roll-over action of the clothes during washing by imparting wobbling or orbital motion to the basket containing the clothes and water so as to cause the clothes to move circumferentially around the basket, and engaging the clothes and water by ribs carried either on the bottom of the basket or on the sides, or both, the ribs being so shaped and arranged as to overcome the tendency of the clothes to twist and tangle and, in addition, to force clothes and water radially outward along the basket and upwardly along the sides, thus producing a roll-over motion in the body of water and clothes being washed. This application is, in part, a continuation of my co-pending applications Serial No. 526,154, filed March 13, 1944, now Patent No. 2,520,366, and Serial No. 619,849, filed October 2, 1945.

In the accompanying drawings which illustrate the preferred embodiment of the invention:

Figure 1 is a vertical sectional view through a combined washing and extracting machine provided with a basket arranged in accordance with this invention;

Figure 2 is a top-plan view of the machine shown in Figure 1 with parts broken away to show the basket and the ribs;

Figure 3 is a front elevation of one of the ribs shown in Figures 1 and 2; and

Figure 4 is a side elevation of the same with parts in section.

Referring to the drawings, the machine illustrated includes a housing 10, generally rectangular in shape, having an opening 11 in the top, closed by lid 12. A tub 13, secured to the housing in any desired manner, is supported in part by brackets 14. The housing 10 and the tub 13 are supported at the lower edge of the housing 10 on a base indicated generally at 15. The base includes a central plate 16 to which are bolted a plurality of legs 17, the outer ends of the legs carrying feet or connecting means of any desired type to engage or be connected to any supporting surface, such as the adjustable studs at 18. The base 15 supports, in any convenient manner, a driving motor 19, a pump 20 and a central pedestal 21 which extends upwardly through a central circular wall 22 of the tub 13.

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The pedestal 21 carries at its upper end a bearing 23 within which is journaled the upper portion of a hollow shaft 24. The upper end of the hollow shaft 24 carries, above the bearing 23, an inclined bearing 25 within which is journaled a hub 26 fixed to the center of the bottom of a combined washing and extracting basket 27. By reason of the inclination of the bearing 25, the axis of the basket 27, indicated at "a" in Fig. 1, is inclined slightly with respect to the vertical axis through the center of the pedestal 21 and hollow shaft 24, indicated at "b" in Fig. 1.

A central shaft 28 is connected to the hub 26 of the basket 27 by a universal joint 29 so as to prevent relative rotation between the basket 27 and the shaft 28, while permitting relative pivotal movement therebetween. The lower ends of the shaft 28 and the hollow shaft 24 are supported through suitable bearings 30 and 31 by a bottom plate 32 which is bolted to the plate 16, as shown at 33. A brake drum 34 is fixed to the lower end of the shaft 28, and a pulley 35 is fixed to the lower end of the hollow shaft 24. A driving pulley 36 on the motor 19 is belted to the pulley 35 by a belt 37, and a contractible brake band 38 surrounds the brake drum 34 and is arranged to be contracted by an operating lever 39 supported on the base 15 to hold the brake drum against rotation.

In the operation of the machine, the motor 19 is energized to rotate the hollow shaft 24 at a relatively high speed, preferably about 600 R. P. M. To impart a washing motion to the basket 27, the brake band 38 is tightened on the drum 34 so that the central shaft 28 is held against rotation, thereby preventing the basket 27 from rotating about its own axis "a." As a consequence, the hollow shaft 24 rotates the inclined bearing 25 with respect to the basket 27, thereby imparting to the basket a rapid wobbling motion, or a circumferentially progressing jiggling motion at the rate at which the shaft 24 is rotated. Preferably, as disclosed in my co-pending application Serial No. 619,849, filed October 2, 1945, the downward acceleration of the bottom portion of the basket which is moving downwardly at any instant exceeds the acceleration of gravity, so that the clothes and water are thoroughly agitated. The present invention, however, is not limited to any particular speed of operation or particular rate of acceleration of the tub bottom.

The circumferentially progressing wobbling motion imparted to the basket 27 imparts forces to the clothes and water contained in the basket tending to move the body of clothes and water circumferentially around the basket in the direc-

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tion of rotation of the hollow shaft 24. The various forces imparted to the clothes and water including the friction of the contents against the side and bottom of the basket, tend, however, to tangle and twist the clothes so as to prevent proper washing action in the absence of any means to counteract such tangling and twisting.

In accordance with the present invention, the basket 27 is provided internally with ribs or protuberances which engage the clothes and water as the same move circumferentially with respect to the basket and impart forces to the clothes and water counteracting the tendency to twist and tangle the clothes. Preferably, the ribs are arranged not only to overcome the twisting and tangling tendencies, but also to impart forces to the clothes and water producing a roll-over motion during the washing action. In the illustrated embodiment, a plurality of ribs 40 are secured to the inner side wall of the basket 27 and are arranged at an inclination with their upper ends advanced circumferentially with respect to their lower ends in the direction of rotation of the hollow shaft 24. As shown, the hollow shaft 24 is arranged to be rotated in a counterclockwise direction when viewed from above, and the ribs are positioned so that their sides form inclined surfaces extending upwardly in a counterclockwise direction. The particular angle of inclination of the ribs is selected to suit the speed of relative motion of the clothes and water with respect to the basket 27 which is induced by the washing motion, which in turn depends upon the rate of rotation of the hollow shaft 24, the inclination of the inclined bearing 25, and to some extent the diameter of the basket 27. In the preferred embodiment, with a speed of rotation of the shaft 24 of about 600 R. P. M., an inclination of bearing 25 to the horizontal of about 4°, and a diameter of the basket 27 of about 22 inches, it has been found that the best results are secured with the ribs 40 inclined at an angle of about 38° to the axis "a" of the basket.

Ribs 41 are also shown arranged on the bottom of the basket to assist the ribs 40 in producing a roll-over motion of the contents of the basket. The ribs 41 are inclined with respect to the radii of the basket 27 so that their outer ends are advanced circumferentially with respect to their inner ends in the direction of rotation of the shaft 24. As illustrated, the ribs 41 are inclined at the angle of about 38° to the radii with the approximate dimension and speed mentioned above. It is to be understood that either ribs on the side wall of the basket such as the ribs 40, or ribs on the bottom such as the ribs 41, or both, may be used in any particular installation.

As illustrated in Figs. 3 and 4, the ribs 40 may be constructed conveniently as hollow castings V-shaped in cross-section and provided with threaded openings 42 for the reception of studs or the like extending through the wall of the basket. It is to be understood, however, that the inner projecting surfaces provided by the ribs 40 and 41 may be constructed in any desired manner.

During the washing action in the type of machine illustrated, the clothes and water are caused to travel circumferentially about the basket 27 in the direction of the rotation of the hollow shaft 24, although at a much lower rate of speed. Sufficient water or other washing liquid is maintained in the basket to provide the proper action of the clothes. In the disclosed embodiment this is about one gallon of water for each

pound of clothes. As the mass of clothes and water move circumferentially over the bottom ribs 41, the inclination of these ribs imparts a force to the clothes and water tending to move the lower portion of the mass radially outward. Similarly, as the mass of clothes and water move against the side ribs 40, the inclination of these ribs imparts forces to the clothes and water tending to cause the outer portion of the mass to move upwardly. The movement of the contents of the basket 27 outwardly along the bottom and upwardly along the sides causes the entire annular mass contained in the basket to continue to move radially inwardly at the top and downwardly about the central portion of the basket. This roll-over motion, which is combined with the circumferential movement of the contents of the basket, keeps the clothes being washed separated from each other and tends to prevent twisting and tangling.

The action of the ribs 40 and 41 also combines with the movement of the basket 27 during washing to improve the washing action. In the machine illustrated in which the axes "a" and "b" intersect at a point within the height of the basket 27, preferably near the geometric center of the basket, each portion of the side wall of the basket describes an elliptic path during wobbling motion of the basket. Similarly, each point in the bottom of the basket has a substantial component of vertical reciprocation during the wobbling movement. Thus the ribs 40 tend to lift the outer portion of the mass of clothes and water and the ribs 41 tend to throw the lower portion of the mass radially outward, both of these forces being applied in a direction to assist the roll-over motion.

The action of the ribs 40 and 41 also tends to reduce the velocity of circumferential movement of the mass of clothes and water about the tub, since the ribs apply forces to the mass which, in the absence of other forces, tend to rotate the same circumferentially about the basket 27 in the opposite direction to the rotation of the shaft 24. Preferably, the ribs are constructed and arranged as described herein so that the mass of clothes and water rotate circumferentially in the direction of rotation of the shaft 24 with a roll-over movement as described above.

In the machine illustrated, the construction and operation of which are more fully disclosed in my co-pending application Serial No. 619,849, filed October 2, 1945, the basket 27 is provided with holes 43 in its bottom portion through which the washing fluid escapes to the tub 13 during the washing action. The proper quantity of washing fluid is maintained in the basket 27 by pumping the same from the tub 13 into the basket 27 through a conduit such as the pipe 44 during the washing action.

The basket 27, in the machine illustrated, is also provided with openings 45 arranged above the lower outwardly inclined side walls of the basket. The openings 42 and 44 permit the escape of the water from the basket 27 during the centrifugal extracting operation which the disclosed machine is adapted to carry out at the conclusion of the washing cycle. As disclosed in my aforesaid co-pending applications, the basket 27 is rotated for extracting water from the clothes by continuing to drive the hollow shaft 24 and releasing the brake band 38, so that the central shaft 28 is free to turn with the shaft 24. The inertia of the basket 27 and its contents, which resists the wobbling motion imparted to

the basket during the washing action, causes a torque to be imparted to the basket by relative rotation of the inclined bearing 25 and the hub 26, so that the basket is caused to spin about the axis "b" to extract centrifugally the water or other washing fluid from the clothes contained in the basket.

It is to be understood that the present invention in its broader aspects is not limited to any particular kind of washing or extracting actions, but instead is adaptable to any washing tub or basket in which the washing motion causes the clothes and water to progress circumferentially around the basket, such, for example, as the gyration movements disclosed in U. S. Patents 2,033,146 and 2,137,540. Many variations of form, proportions, and construction may be resorted to without departing from the scope of the invention as defined in the following claims.

What is claimed is:

1. In a washing machine a support, a container for articles including a side wall which is a surface of revolution and a bottom wall, mounting means for mounting said container on said support for wobbling about a center spaced from the lowermost portion of said bottom wall a distance less than the maximum radius of said side wall, driving mechanism for wobbling the container about said center to impart a washing motion to the articles to be washed and to impart forces on such articles tending to progress the same circumferentially around the container, and rib means on the interior of said container arranged at acute angles to planes containing the axis of the container and intersecting said rib means, said rib means imparting a force on the articles to be washed tending to progress them circumferentially around the container in the opposite direction, one of said forces exceeding the other so that the articles to be washed having a resultant continuous circumferential movement around the container in one direction.

2. In a washing machine a support, a container means for articles including a side wall which is a surface of revolution and a bottom wall, mounting means for mounting said bottom wall on said support for wobbling about a center spaced from the lowermost portion of said bottom wall a distance less than the maximum radius of said side wall, driving mechanism for wobbling said bottom wall about said center to impart a washing motion to the articles to be washed and to impart forces on such articles tending to progress the same circumferentially around the container, and rib means on the interior of said container arranged at acute angles to planes containing the axis of the container and intersecting said rib means, said rib means imparting a force on the articles to be washed tending to progress them circumferentially around the container in the opposite direction, one of said forces exceeding the other so that the articles to be washed having a resultant continuous circumferential movement around the container in one direction.

3. In a washing machine a support, a container for articles including a side wall which is a surface of revolution and a bottom wall, mounting means for mounting said container on said support for wobbling about a center vertically spaced from the lowermost portion of said

bottom wall a distance less than the maximum radius of said side wall, driving mechanism for wobbling the container about said center to impart a washing motion to the articles to be washed and to impart forces on such articles tending to progress the same circumferentially around the container, said driving means being adapted to wobble said container at a speed whereby portions of said bottom wall have accelerations exceeding the acceleration due to gravity, and rib means on the interior of said container arranged at acute angles to planes containing the axis of the container and intersecting said rib means, said rib means imparting a force on the articles to be washed tending to progress them circumferentially around the container in the opposite direction, one of said forces exceeding the other so that the articles to be washed having a resultant continuous circumferential movement around the container in one direction.

4. In a washing machine a support, a container for articles including a side wall which is a surface of revolution and a bottom wall, mounting means for mounting said container on said support for wobbling about a center vertically spaced above the lowermost portion of said bottom wall a distance less than the maximum radius of said side wall, driving mechanism for wobbling the container about said center to impart a washing motion to the articles to be washed and to impart a first force on such articles tending to progress the same circumferentially around the center, and rib means on the interior of said container arranged at acute angles to planes containing the axis of the container and intersecting said rib means, said rib means imparting a second force on the articles to be washed tending to progress them circumferentially around the container in the opposite direction, said first force exceeding said second force so that the articles to be washed having a resultant continuous circumferential movement around the container in one direction.

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