Nov. 26, 1946. L. J. GOTTSCHALK 2,411,654

CLOTHES WASHING MACHINE

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Fig. 2

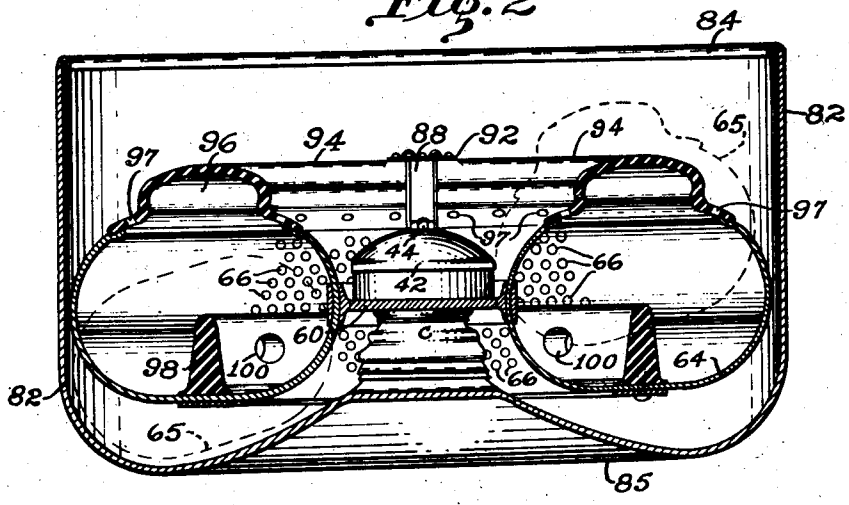
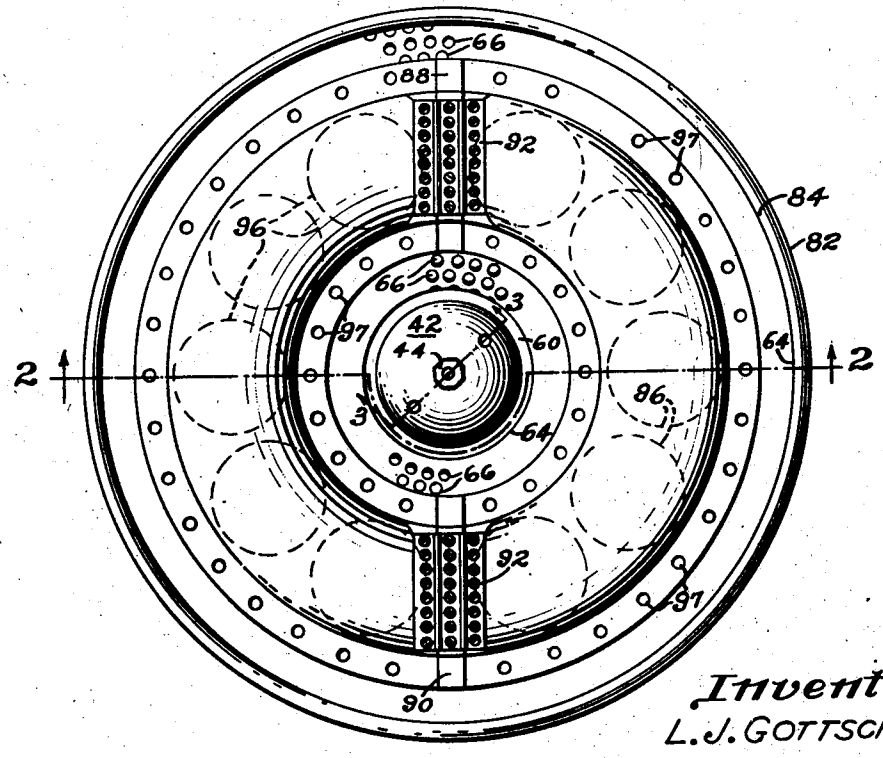


Fig. 1



Inventor:
L. J. GOTTSCHALK

By John H. Ruckman

Attorney

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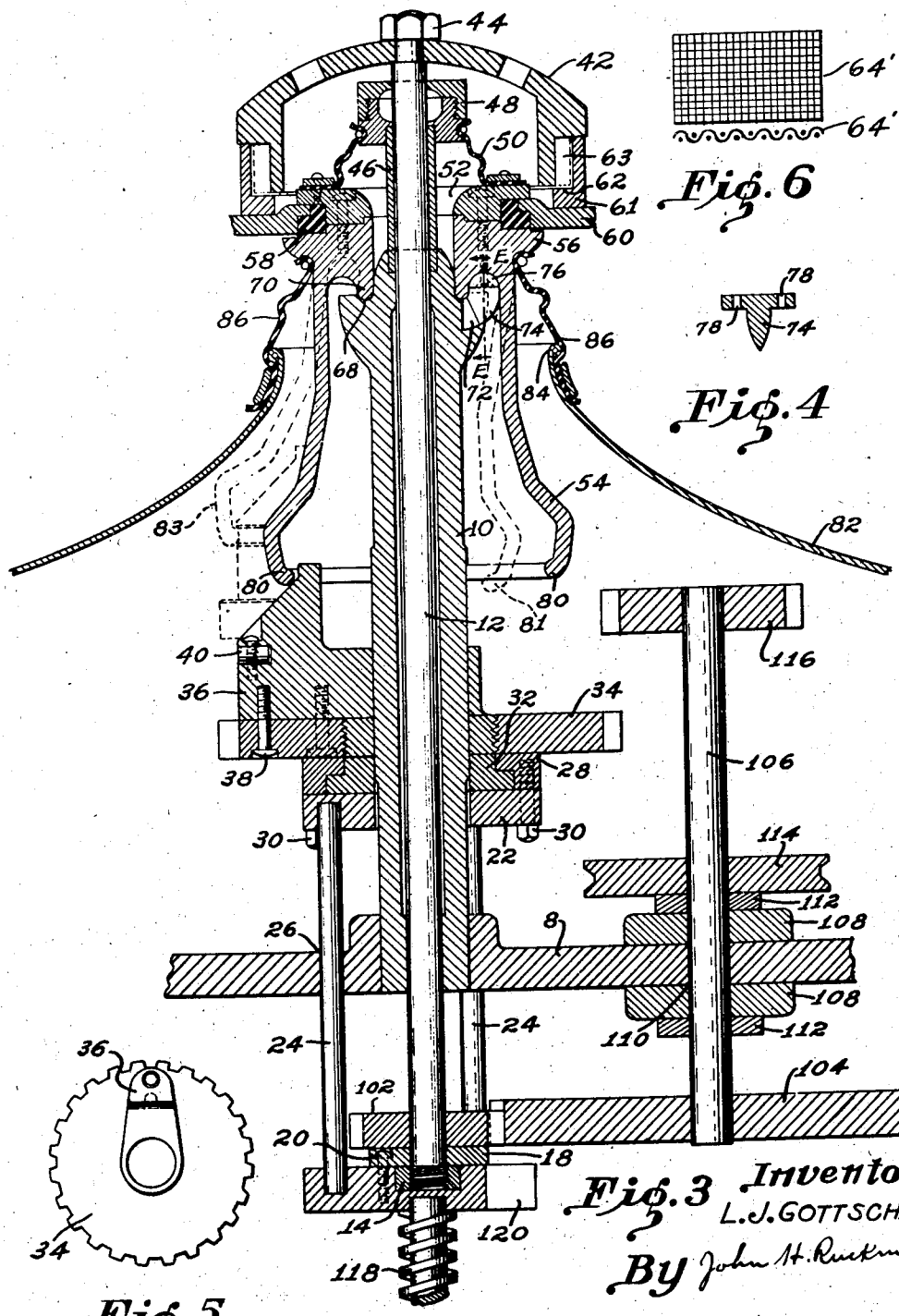


Fig. 3

Fig. 5

Fig. 6

Fig. 4

Inventor:
L. J. GOTTSCHALK
By John H. Ruckman
Attorney

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CLOTHES WASHING MACHINE

Lionel J. Gottschalk, New Orleans, La.

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16 Claims. (Cl. 68—23)

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My invention relates to washing machines. Included in the objects of the invention is the provision of means for supporting in a tub, a basket for holding articles to be washed in combination with means so constructed and arranged as to furnish a balanced and counterbalanced construction whereby wear and tear on such articles is kept at a minimum with an even distribution thereof, and whereby wear on the machine and noise thereof and power required for operation is kept at a minimum.

An important object of the invention is to provide a machine of this character embodying a tub in which is supported a foraminous torus or anchor-ring shaped basket for holding clothes and other articles to be washed in combination with means for causing a progressive circular undulating motion of the basket continued around through 360° without rotation of the basket with this motion based on a point having a central position with relation to an annular wall with which the basket is provided. The accepted definition of the term anchor-ring according to Geometry of Solids is: "Anchor-ring is a surface generated by the revolution of any closed plane curve, as a circle or ellipse, about an axis outside its body." See for instance Standard Dictionary.

Another object is to provide means for preventing free rotation of the basket during the undulating motion.

Another object is to provide a closure for the top of the basket so that articles while being washed will be entirely enclosed in the basket.

Another object is to provide the closure with a series of inverted downwardly open suction cups whereby the articles in the basket during the undulating motion thereof will be subjected to an up and down surging action of the washing liquid contained in the tub. These cups are permanently fixed to the top of the basket and are termed suction cups because they exert suction in the basket during a portion of the undulating motion thereof.

Another object is to provide a shiftable device whereby one position of said device will cause the basket to have a relatively slow undulating motion for washing the articles therein and another position of said device will cause the basket to have a relatively high speed rotary motion for drying the articles by centrifugal action after the washing liquid has been drained from the tub.

Another object is to provide means for excluding the washing liquid from the operating mechanism of the machine while at the same time permitting the undulating motion of the basket.

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Another object is to provide a basket of such shape and construction as will best serve for holding the articles to be washed therein.

Another object is to provide means for subjecting the articles while being washed to a mild tumbling and rubbing action not injurious to delicate fabrics.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. The invention, however, both as to organization and method of operation, together with additional objects and advantages thereof, will be best understood from the following description of a specific embodiment thereof, when it is read in connection with the accompanying drawings in which,

Fig. 1 is a top plan view of the machine.

Fig. 2 is a view in vertical section on the line 2—2 of Fig. 1 showing the tub and basket portion of the machine.

Fig. 3 is a vertical section on an enlarged scale taken on the line 3—3 of Fig. 1 and showing operating mechanism for the machine.

Fig. 4 is a view in vertical section on the line E—E of Fig. 3 and showing a lug.

Fig. 5 is a top plan view on a reduced scale showing a gear and cam carried thereby and with these detached from the machine.

Fig. 6 is a detail view for indicating that when desired the basket may be made of rust-proof woven wire.

Referring to the construction shown in the accompanying drawings in order to illustrate the principles involved in this invention, the numeral 8 designates a base plate which may be supported in any suitable manner. A hollow post 10 is secured at its lower end to the plate 8 and extends upwardly therefrom as shown in Fig. 3. A shaft 12 extends up through the post 10, there being a collar 14 screw threaded on the lower end of the shaft. This collar is held in a recess in a plate 16 by a collar 18 secured to the top of the plate by screw bolts 20. The plate 16 is connected with a plate 22 by three upwardly extending rods 24 which pass slidably through openings 26 in the base plate 8. The lower and upper ends of these rods are firmly secured to the plates 16 and 22 respectively. A flanged collar 28 is secured to the top of the plate 22 by screw bolts 30. The flange of the collar 28 rotatably holds the flange of a flanged ring 32 around which a gear 34 is secured by screw threads. A cam member 36 is secured to the upper side of the gear 34 by screw

bolts 38, a roller 40 being mounted in the periphery of the cam. The gear 34 carrying the cam 36 is on account of the construction just described capable of rotating freely around the fixed post 10.

A cap member 42 is secured to the upper end of the shaft 12 by a nut 44. A tube 46 is secured to the upper end of the post 10 and loosely surrounds the shaft 12. A stuffing box 48 is secured to the upper end of the tube 46 and is inside of the cap member 42. A flexible sleeve 50 is secured at its upper end to the box 48 and at its lower end is secured to a flanged ring 52 which in turn is secured to the upper end of a bell shaped member 54. This latter member near its upper end is provided with an annular flange 56. Between this flange and the flange of the ring 52 is held a ring shaped water proof bearing 58 which may consist of laminated synthetic rubber. An annular basket attaching member 60 surrounds the bearing 58. Secured to the member 60 there is a flanged member 61 provided with internal gear teeth 62 with which external gear teeth 63 on the depending flange of the cap 42 are adapted to mesh when this cap and the shaft 12 are in lowered position as shown in Fig. 3.

Referring now to Fig. 2, it will be seen that the attaching member 60 is provided with a peripheral flange to which the inner wall of a foraminous torus or anchor-ring shaped basket 64 is firmly secured. This basket may be constructed of any suitable sheet material provided with perforations 66. In place of sheet material, I also contemplate making the basket of rust-proof wire mesh as indicated at 64' in Fig. 6. In such case the interstices in the mesh serve as perforations for producing a foraminous basket.

Referring now to Fig. 3, the post 10 near its upper end is provided with an annular groove 68 for receiving an annular downward projection 70 of the bell member 54. It will now be understood that the member 54 constitutes a support for the basket and that the wall of the groove 68 serves as a bearing. The groove 68 contains a recess 72 for receiving a tapered lug 74 secured to the member 54 by screw bolts 76 passing through openings 78 in the upper portion of said lug. The purpose of this lug is to fixedly gear the support 54 to said bearing and prevent rotation of the said support when the cam 36 is in raised position while at the same time permitting undulating motion of the basket now to be referred to. The lower end of the bell member 54 is provided with an internal annular flange 80 adapted to be engaged by the roller 40 of the cam 36 when the plate 16 and the assembly carried thereby is lifted. Referring to Figs. 2 and 3, it will be understood that an annular tub 82 provided at its top with a bead 84 is fixedly supported in such position that it will contain the basket 64 without the latter striking the wall and bottom of the tub when the basket is given a progressive circular undulating motion continued around through 360° without rotation of the basket, this undulating motion being based on a point C located centrally with relation to the inner annular wall of the basket. One of the tilted positions of the basket during its progressive motion is indicated by the dotted line 65 in Fig. 2. The position of the flange 80 is indicated at 81 in Fig. 3. The dotted line 83 in Fig. 3 indicates the position of the flange 80 at the time when the basket has been undulated around to a diametrically opposite position from that indicated in Fig. 2 by the dotted line 65.

In Fig. 2, the numeral 85 indicates the bottom extremity of the annular tub. A flexible sleeve 86 has its lower end clamped beneath the bead 84 of the tub, the upper end of this sleeve being secured around underneath the flange 56. The two sleeves 50 and 86 permit easy undulating motion of the basket when the cam 36 is in lifted position and these sleeves together with the stuffing box 48 constitute means for excluding washing liquid from the shaft 12 and mechanism associated therewith.

The basket as indicated in Fig. 1 is provided with two diametrically opposite posts 88 and 90 which are secured to the walls and bottom thereof and these posts have hinges 92 secured thereto. These hinges serve for attachment of two opposite leaves 94 of a closure adapted to close the top of the basket so that the articles in the basket are entirely enclosed therein. The two leaves when lifted permit clothes, etc., to be placed all the way around in the annular basket. The leaves are provided with inverted downwardly open suction cups 96 which constitute a series thereof all the way around the top of the basket. A series of perforations 97 are formed around the periphery of the cup ring.

The intermediate concentric portion of the basket bottom has secured thereto as shown in Fig. 2, an upstanding ring like projection 98 provided with openings 100, the top of this projection being rounded. This projection causes the articles to be subjected to a combined and mild tumbling and rubbing action which is not severe enough to injure delicate fabrics during the undulating motion of the basket. Furthermore, during this motion, the suction cups cause the washing liquid to surge up and down through the articles.

Referring to Fig. 3, a gear 102 is rigidly secured to the shaft 12 near its lower end and this gear meshes with a gear 104 when a shifting mechanism has caused the plate 16 and mechanism carried thereby to be in lower position as shown. The teeth of the gear 104 are chamfered on their upper edges in order to be more easily meshed with the teeth of the gear 102 which are chamfered on their lower edges. In this position of the assembly carried by the plate 16, the gearing 104, 102 causes the shaft 12 to be rotated at a comparatively high speed for rotating the basket through the cap 42 at this speed in order to dry the articles by centrifugal action when the washing liquid has been drained from the tub. The basket during the centrifugal action is given only horizontal rotary motion and not its undulating motion.

The gear 104 is secured to the lower end of a shaft 106 which is freely rotatable in bearings 108 on the upper and lower sides of the plate 8 which has a bored opening 110 for passage of the shaft. This shaft is held in position by collars 112 secured thereto. Also firmly secured to the shaft 106 is a belt pulley 114 which may be driven from any suitable motor or source of power not necessary to show. Secured to the upper end of the shaft 106 is a gear 116 with which the gear 34 is brought into mesh when the plate 16 and assembly carried thereby is lifted by any suitable means the specific construction of which does not constitute a part of the present invention since the plate 16 might be lifted and lowered manually at the proper times. As one means for moving the plate 16 up and down, I have shown a jack screw 118, it being noted that this plate is cut away as indicated at 120 in order that it may move past the gear 104 both upwardly and downwardly. The jack screw may be operated through the medium

of the well known "torque" motor so designed as to make a predetermined number of revolutions in one direction and subsequently when reversed will revolve the same number of times in the opposite direction. The "torque" motor may turn a gear which is free to rotate in both directions but is prevented from any vertical movement. The central portion of this gear would have a bore threaded to freely fit in engagement with the screw portion of the jack 118.

The operation and advantages of this invention will be readily understood in connection with the foregoing description and the accompanying drawings and to a large extent have already been set forth. After the articles to be washed have been placed in the basket while the mechanism of the machine is in the position shown in Fig. 3, the "torque" motor is started to lift the jack screw 118 in the manner previously described. This operation disengages the gear 102 from the gear 104, disengages the gear teeth 63 from the gear teeth 62, engages the roller 40 of the cam member 36 with the lower end 80 of the bell shaped member 54 and engages the gear 34 with the gear 116 which is now rotated by means of the belt pulley 114 driven from any suitable source of power. On account of the gear 116 being smaller than the gear 34, the basket supported from the top of the bell member 54 will be given a relatively slow circular undulating motion of the character previously described in detail. After the material in the basket has been properly washed and rinsed, the "torque" motor will be started in reverse direction to disengage the gear 34 from the gear 116, disengage the roller 40 from the lower end 80 of the member 54, engage the gear teeth 63 with the gear teeth 62, and engage the gear 102 with the gear 104, all as shown in Fig. 3. With the pulley 114 operated from the source of power, the basket will now be rotated to dry the material therein by centrifugal action. On account of the gear 102 being smaller than the gear 104, the basket will be given a relatively high speed rotary motion. Upon stopping this rotary motion, the machine will be in condition for removing the washed and dried articles from the basket and then placing more articles therein to be washed.

I claim:

1. In a washing machine, the combination of a tub, a bearing mounted within said tub, a foraminous anchor-ring shaped basket, a support for said basket mounted on said bearing, means for giving said support and basket a progressive circular undulating motion on said bearing, and means positively gearing said support to said bearing for preventing any rotation of said support around its axis.

2. In a washing machine, the combination of a tub, a bearing mounted within said tub, a foraminous anchor-ring shaped basket, a support for said basket mounted on said bearing, means for giving said support and basket a progressive circular undulating motion on said bearing, said bearing containing a recess, and a tapered lug secured to said support and extending into said recess for positively gearing said support to said bearing for preventing any rotation of said support around its axis.

3. In a washing machine, the combination of a tub, a bearing mounted within said tub, a foraminous anchor-ring shaped basket having an annular inner wall, a support for said basket mounted on said bearing, means for giving said support and basket a progressive circular undulating motion on said bearing based on a point located centrally within said inner annular wall, and means positively gearing said support to said bearing for preventing any rotation of said support around its axis.

4. In a washing machine, the combination of a tub, a foraminous anchor-ring shaped basket supported in said tub, means for giving said basket a progressive circular undulating motion, a closure for the top of said basket whereby the articles being washed are enclosed in said basket, and a plurality of inverted downwardly open suction cups carried by said closure.

5. In a washing machine, the combination of a tub, a post secured to and extending up from the base of the machine into the interior of said tub, a bearing on the upper end of said post, a foraminous anchor-ring shaped basket supported on said bearing, and means for giving said basket a progressive circular undulating motion upon said bearing.

6. In a washing machine, the combination of a tub, a post secured to and extending up from the base of the machine into the interior of said tub and having an annular groove in its upper end the wall of which provides a bearing, a foraminous anchor-ring shaped basket, a support for said basket having an annular projection mounted in said groove, and means for giving said basket a progressive circular undulating motion upon said bearing.

7. In a washing machine, the combination of a tub, a hollow post secured to and extending up from the base of the machine into the interior of said tub, a shaft extending up through said hollow post, a bearing on the upper end of said post, a foraminous anchor-ring shaped basket, a support for said basket mounted on said bearing, said support being hollow and extending below said tub in spaced relation around said post, a gear rotatable around said post, a cam member carried by said gear means whereby said gear and cam member and shaft may be simultaneously raised and lowered, said cam member when raised being brought into engagement with the lower end of said support, means for rotating said gear when in its raised position to give said basket a relatively slow progressive circular undulating motion for washing articles in said basket, means for rotating said shaft when in its lowered position, and means operated by said shaft in its lowered position for giving said basket a relatively high speed rotary motion for drying the articles by centrifugal action.

8. In a washing machine, the combination of a tub, a post secured to and extending up from the base of the machine into the interior of said tub, a bearing on the upper end of said post, a foraminous anchor-ring shaped basket, a support for said basket mounted on said bearing, said support being hollow and extending below said tub in spaced relation around said post, a gear mounted around said post, a cam member carried by said gear and adapted to engage the lower end of said support, and means for rotating said gear around said post to give said basket a progressive circular undulating motion for washing articles in said basket.

9. In a washing machine, the combination of a tub, a foraminous anchor-ring shaped basket supported in said tub, and means for giving said basket a progressive circular undulating motion based on a point located centrally within said ring.

10. In a washing machine, the combination of a tub, a foraminous anchor-ring shaped basket supported in said tub, means for giving said basket a progressive circular undulating motion based on a point located centrally within said ring, and means for preventing any rotation of the basket support during the undulating motion.

11. In a washing machine, the combination of a tub, a foraminous anchor-ring shaped basket, a support for mounting the basket in said tub, means for giving said support a gyrating motion, and means associated with said support whereby said gyrating motion is translated into a progressive circular undulating motion of said basket based on a point located centrally within said ring.

12. In a washing machine, the combination of a tub, a foraminous anchor-ring shaped basket supported in said tub, means for giving said basket a progressive circular undulating motion based on a point located centrally within said ring, and means for causing the washing liquid to surge up and down through the articles being washed during said undulating motion.

13. In a washing machine, the combination of a tub, a foraminous anchor-ring shaped basket supported in said tub, means for giving said basket a progressive circular undulating motion based on a point located centrally within said ring, and a plurality of inverted downwardly open suction cups around the top of said basket for causing the washing liquid to surge through the articles being washed during said undulating motion.

14. In a washing machine, the combination of a tub, a foraminous anchor-ring shaped basket supported in said tub, operating means for said basket, and a shiftable device in said operating means which in one of its positions causes said basket to have a progressive circular undulating motion based on a point located centrally within said ring for washing the clothes and which in another of its positions causes said basket to have a rotary motion for centrifugally drying the clothes.

15. In a washing machine, the combination of a tub, a hollow post secured to and extending up from the base of the machine into the interior of said tub, a vertically slidable shaft extending up through said hollow post, a bearing on the upper end of said post, a foraminous anchor-ring shaped basket, a support for said basket mounted on said bearing, means for giving said basket a progressive circular undulating motion around said bearing for washing articles in the basket when said shaft is in its raised position, a second bearing on the upper end of said support, and interengaging means between said basket and said shaft in its lowered position for giving the basket a rotary motion only around said second bearing for drying the articles by centrifugal action.

16. In a washing machine, the combination of a tub, a hollow post secured to and extending up from the base of the machine into the interior of said tub, a vertically slidable shaft extending up through said hollow post, a bearing on the upper end of said post, a foraminous anchor-ring shaped basket, a support for said basket mounted on said bearing, means for giving said basket a progressive circular undulating motion around said bearing for washing articles in the basket when said shaft is in its raised position, a second bearing on the upper end of said support, a cap secured to the upper end of said shaft, and interengageable means carried by said cap and said basket in its lowered position for giving the basket a rotary motion only around said second bearing for drying the articles by centrifugal action.

LIONEL J. GOTTSCHALK.