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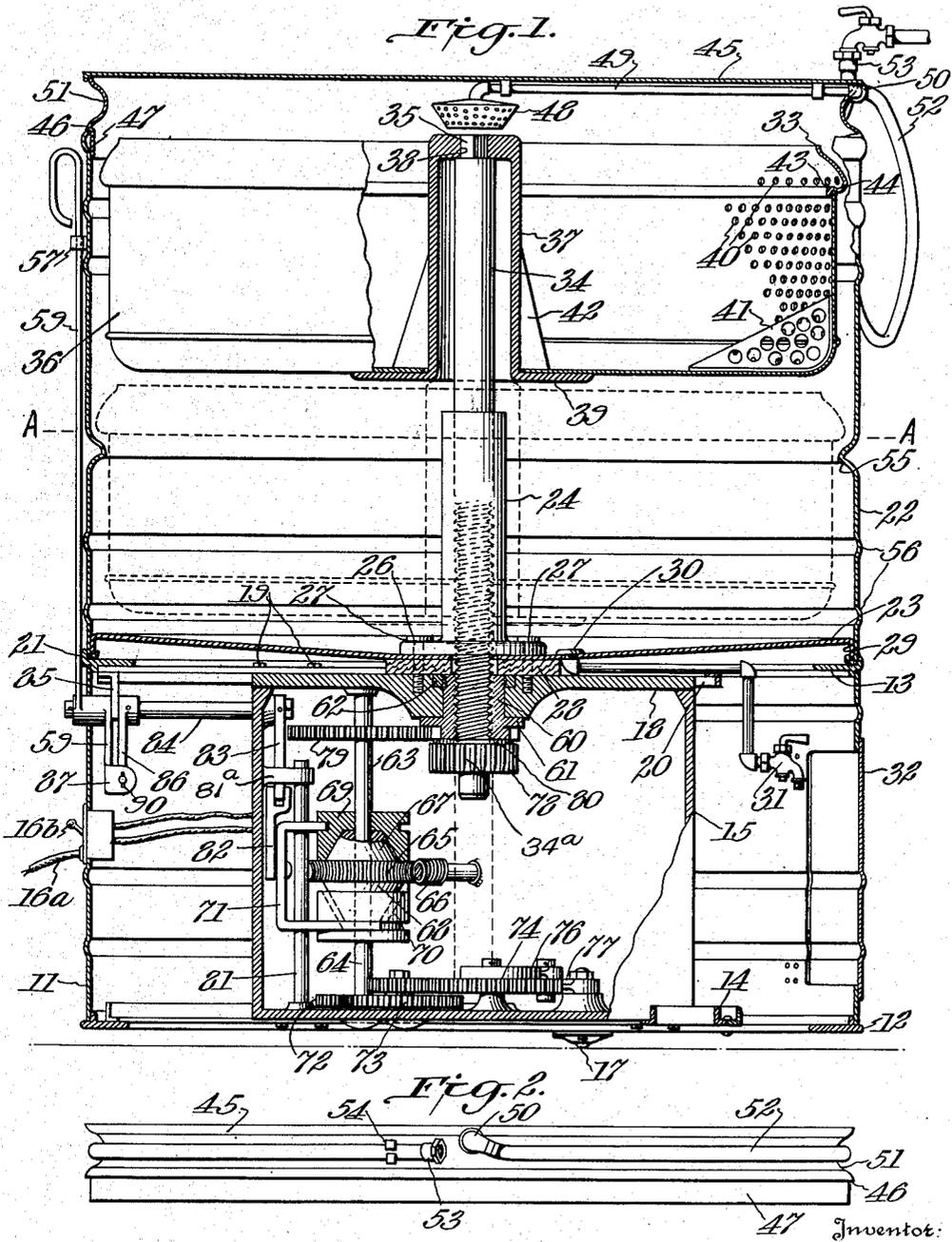
A. A. ALDRIDGE

2,101,634

WASHING MACHINE

Filed Oct. 2, 1926

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Fig. 3.

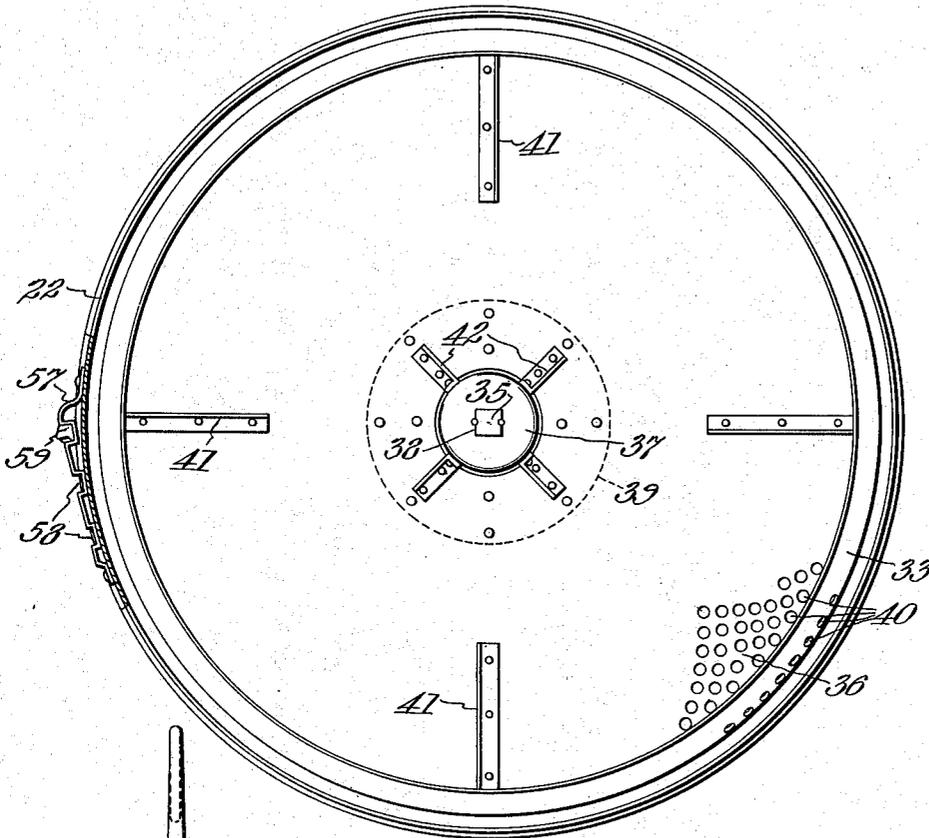


Fig. 4.

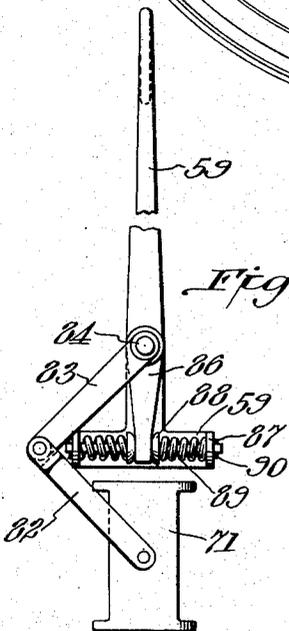
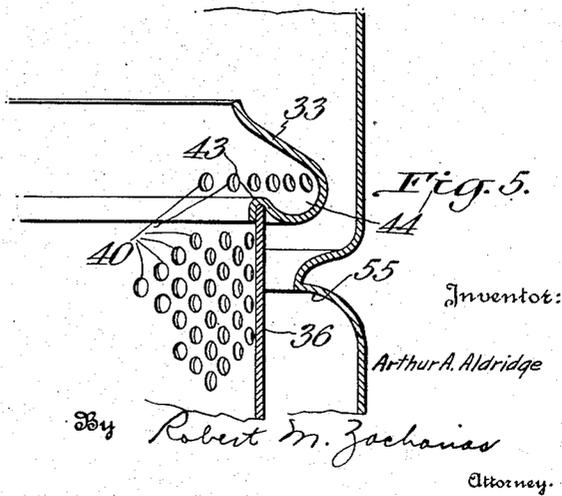


Fig. 5.



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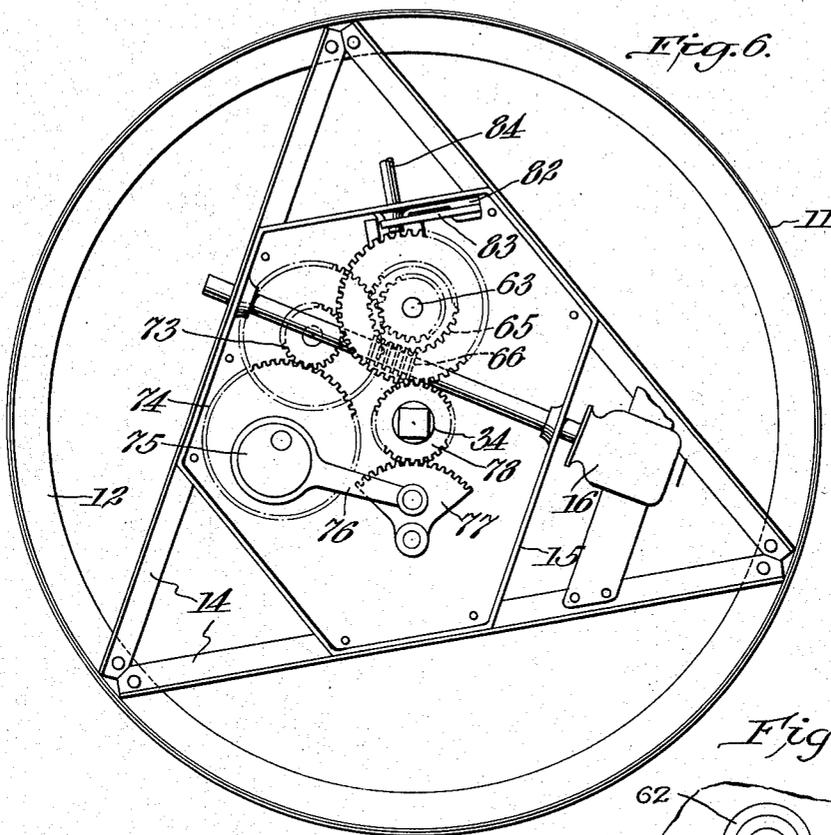


Fig. 6.

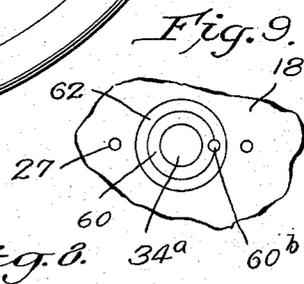


Fig. 9.

Fig. 8.

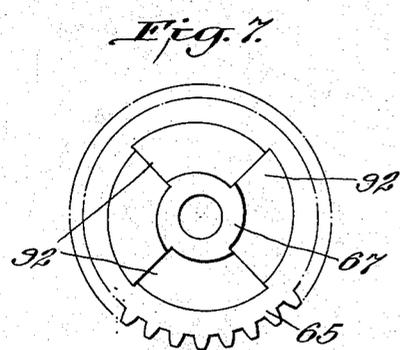
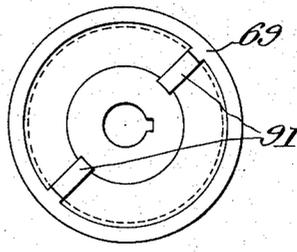


Fig. 7.



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UNITED STATES PATENT OFFICE

2,101,634

WASHING MACHINE

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Application October 2, 1926, Serial No. 139,118

21 Claims. (Cl. 68—18)

This invention relates to washing machines and particularly to clothes washing machines for household use.

One of the objects of the invention is to provide a machine by which the complete process of washing, rinsing and drying may be carried out without touching the clothes and without removing the lid of the machine. Another object of the invention is to provide suitable gearing by which a foraminous container, in which the clothes are placed, may be oscillated to effect the washing operation and then raised and rapidly rotated for centrifugal drying. A further object is to provide gearing for this purpose which is simple, efficient, and can be contained in a closed compartment which will form a lubricant reservoir, and can be readily assembled with the other parts of the machine. Still further objects are to provide a lid which can be readily handled, and will embody means for rinsing the clothes; to provide a clothes container which will insure equal distribution of the clothes about the container as it rises from the water; to provide for the removal of scum from the surface of the water, and to provide a machine in which the water will not splash against the container during the drying operation.

Other objects of the invention and features of novelty will be apparent from the following specification, when read with the accompanying drawings, in which:—

Figure 1 is a view in vertical section of a machine embodying my invention, some of the parts being shown in elevation and the lower position of the container being indicated by dotted lines;

Fig. 2 is a view in side elevation of the lid of the machine shown in Fig. 1;

Fig. 3 is a plan view of the machine shown in Fig. 1, the lid being removed;

Fig. 4 is a view in side elevation of the control lever and other parts shown in Fig. 1;

Fig. 5 is an enlarged sectional view of details of the machine shown in Fig. 1;

Fig. 6 is a plan view of the gearing shown in Fig. 1, with the cover plate of the gearing compartment removed;

Figs. 7 and 8 are views in plan showing details of the clutch members and,

Fig. 9 is a fragmentary plan view, partly in section, showing details of parts of the machine shown in Fig. 1.

The embodiment of the invention shown in the drawings comprises a lower casing consisting of a cylindrical casing member 11 of the same diameter as the tub, a base ring 12 and a top ring

13 preferably flanged, to receive the edges of the member 11 and hold it in place. Three braces 14 are secured at their ends to the upper face of the base ring 12, as shown in Fig. 6, the braces being of angle iron and serving as a support for a gear box 15 and a motor 16, the gear box being secured to the braces by tap screws and the motor being mounted on the braces in any manner desired. A lead 16^a to a switch 16^b, which is mounted at any convenient point on the lower casing 11, is provided for supplying current to the motor. Attached to the base ring 12 are ball casters 17, preferably three in number, to facilitate movement of the machine from place to place. The gear box 15, which is preferably a casting, is open at the top and provided with a lid 18, and braces 20 of angle iron secured at their ends to the top ring 13 are arranged so that their flanges overlie the edges of the lid 18, and tap screws 19 pass downwardly through the braces 20 and the lid 18 to secure them to the top of the gear box.

A cylindrical tub or tank, of the same diameter as the lower casing 11 which houses the gear box, is supported upon the ring 13, the latter being formed with an annular flange 21 within which the tub fits. As shown, the tub comprises a wall portion 22, a bottom portion 23, and a central tubular shaft support 24 which has a flange 26 engaging the bottom portion 23. The parts are secured together by a plurality of cap screws 27 which pass downwardly through the flange 25, the bottom portion 23 and a fillet 28, preferably of wood, and are threaded into the lid 18 to prevent relative rotation of the tub and its support and provide a rigid support of the shaft support 24 from the base ring 12 through lower angle iron braces 14 and gear box 15. The bottom portion 23 is dished downwardly at its center and is formed with a downwardly extending peripheral flange 29 about which the lower edge of the wall portion 22 is curled. From the lowest point of the bottom portion 23, adjacent the flange 26, a drain 30 extends radially beyond the edge of the gear box where it is bent down and preferably terminates in a suitable valve 31 within the lower casing 11. It will be apparent that the valve 31 may be arranged outside of the casing, but it is preferable to place it inside and provide a door 32 in the casing to permit access to the valve and storage of a flexible hose which may be attached to the valve.

A driving shaft 34, terminating in a squared portion 35, is rotatably and reciprocally mounted in the shaft support 24, and carries the clothes

container 36, which has a hollow hub portion 37 which extends substantially to the top of the clothes container 36, and is provided with an opening 38 at its top to receive and form a driving connection with the squared portion 35 of the shaft well above the center of gravity of the container. The hub 37 is of sufficient diameter and length to receive the shaft support 24 when the container is moved to its lower position, and has a flange 39 at its lower end underlying and rigidly secured to the bottom of the container 36. The bottom and side walls of the container are formed with perforations 40, and four baffles or hurdles 41, similarly perforated, are secured in the angle between the bottom and side walls, being equally spaced circumferentially, as shown in Fig. 3, and with their free upper edge slanting radially outwardly and upwardly. Four triangular imperforate fins 42, for agitating the water, are secured in the angle between the bottom of the container 36 and its hub 37, being likewise equally spaced circumferentially but interposed between the baffles 41, as shown in Fig. 3. These fins 42 extend upwardly to approximately half the height of the hub 37 but their radial extent is much less as shown in Figs. 1 and 3.

The side wall of the container 36 is substantially cylindrical except adjacent its upper edge where the wall is extended outwardly and downwardly, forming an edge 43, as shown in Fig. 5, and then curved back to form a scum trough 44, the diameter of the upper edge of the container being of slightly less diameter than the body of the container.

The side wall may be formed integrally, if desired, but is preferably formed in two parts as shown, the trough portion 44 and the wall which curves inwardly above it being formed as a separate part 33 with its lower edge curled over the top of the side wall of the container proper or otherwise suitably secured thereto. The trough portion 44, below the edge 43, is not perforated but the recurved wall has a row of perforations just above the level of such edge.

A lid 45, having a flange 46 resting upon the top edge of the tub and a downwardly extending flange 47 to fit therein, is provided with a centrally disposed frustro-conical sprinkling head 48 on its under side, the nozzle being connected with a conduit 49 permanently installed in the lid and extending through the edge of the lid where it is provided with a nipple 50. The edge of the lid 45 is bent in to form an annular channel 51 to receive a flexible hose 52, attached at one end to the nipple 50, and provided at its other end with a connection 53 for attachment to a faucet. A spring clip 54 is secured to the lid within the channel 51, so that, as shown in Fig. 2, the hose 52 may be wrapped about the lid and its free end secured by said clip.

At a point slightly below the water line and also below the position of the scum trough 44 when the container 36 is in lower position, an annular baffle ridge 55 is formed by curving in the side wall of the tub to present a downwardly and inwardly facing concave surface. When the container 36 is elevated and rotated for centrifugal drying the water level falls below this surface and water striking the side wall will be directed inwardly without splashing against the bottom of the container. The tub is also formed with a plurality of circumferential ribs 56 which, with the baffle ridge 55, serve to stiffen the structure, and a strap 57 is secured to the outside of the tub adjacent its upper edge and is formed with three

notches 58 to receive a control lever 59 in its various positions.

The lid 18 of the gear box 15 is thickened at its center and acts as a bearing for a gear nut 80 which is threaded on the shaft 34, and is retained in place in the lid by a flange 61 which engages the lower face of the lid and a retaining collar 62 threaded upon and secured by key 60^b from rotation on the upper end of the nut and countersunk in the top of the lid. Mounted in the lid and base, respectively, of the gear box 15 are alined shafts 63 and 64 having their adjacent ends rotatably mounted in a worm gear member 65, adapted to be driven by a worm 66 on the shaft of the motor 16 which projects through the wall of the gear box. Upper and lower frustro-conical clutch members 67 and 68 are rotatable with the worm gear 65, and are formed for engagement with clutch member 69 or 70, splined to the shafts 63 and 64, respectively, and operated to and from clutching engagement by a yoke 71.

When the yoke 71 is raised to engage clutch members 68 and 70, the lower shaft 64 will be continuously rotated by the motor, and through a gear 72 thereon and reduction gears 73 and 74, which are mounted on the base of the gear box 15 will drive an eccentric 75, mounted on the gear 74, and a cooperating pitman 76, to oscillate an arcuate rack member 77. A gear 78 is mounted on the lower end of the driving shaft 34, and when the shaft is in its lower position such gear is in mesh with the arcuate rack member 77, the teeth of the gear being slightly beveled at their lower ends to facilitate engagement with the teeth of the rack member.

Secured to the upper shaft 63 is a gear 79 continuously in mesh with the teeth of the gear nut 60, and when the yoke 71 is lowered to engage the clutch members 67 and 69, the shaft 63 and gear 79 will rotate the nut 60, which is threaded upon the lower threaded portion 34^a of the shaft 34, and by reason of its threaded engagement with the driving shaft 34, will raise the shaft 34, together with the clothes container 36 and the gear 78 until they reach the full line position shown in Fig. 1. A disk 80 of friction material, is interposed between the adjacent faces of the gear nut 60 and the gear 78, being preferably loosely carried on the shaft 34, and supported by the gear 78, and when the container 36 has reached its uppermost position it will be rapidly rotated, being driven by the gear 79, gear nut 60 and the clutching engagement of the friction disk 80 with the gear 78. The raising of the container 36 is readily effected because of the resistance of the water and the inertia of the container and its contents, though the container will attain some rotative movement before the clutching engagement between gear nut 60 and gear 78. It will be apparent that under the action of the gear nut 60 and the threaded driving shaft 34, the gear 78 will constantly tend to rise, and the disk 80 will provide for slippage between nut 60 and gear 78 until the container attains the same speed as the nut 60.

The yoke 71 is slidably mounted on a guide bar 81, which is mounted in the bottom of the gear box, and a bracket 81^a in the side of the gear box, and passes through the arms of the yoke. A link 82 connects the yoke 71 to a crank arm 83 on the inner end of a shaft 84 which is mounted in the wall of the gear box and a bracket 85 carried by the top ring 13 of the supporting frame. Inside of the bracket 85, the shaft 84 has another crank arm 86 secured to it, and the control lever 75

59 is loosely mounted upon the shaft 34 outside of the bracket 35, and has a widened portion below its pivot formed with inwardly bent perforated lugs 37 between which the crank arm 36 is received, as shown in Figs. 1 and 4. The lugs 37 each carry a plunger 38 having a shank passing through the lug and surrounded by a spring 39 between the lug and the enlarged head of the plunger to normally hold such head in contact with the crank arm 36, the inward movement of the plungers being limited by cotter pins 39, or other suitable means. It will be apparent that the lever 59 may be held in three positions by the notches 56 in the strap 57, and that the yoke 71 will be resiliently moved by it to engage clutch members 67 and 69, to hold the clutch in neutral position, or to engage clutch members 68 and 70.

As shown in Figs. 7 and 8, the driving clutches are so formed as to drive only in one direction and permit relative motion of the clutch parts in the event that the momentum of the container and its load tends to rotate the member 69 or 70 at a speed greater than that of the worm gear and the inner clutch members 67 and 68. To this end the clutch members 69 and 70 are each formed with two ribs 91 which are adapted to cooperate with ratchet teeth 92 formed on the inner surface of clutch members 67 and 68. The ribs 91 will engage the ends of the teeth 92 so that the members 67 and 68 may drive the member 69 or 70, but any tendency to transmit the drive in the opposite direction will cam the member 69 or 70 away from its cooperating inner clutch member, the yoke 71 and its operating means being yieldable by reason of the resilient connection afforded by springs 88.

The container 36 is normally in the lower dotted line position shown in Fig. 1, and after the clothes to be washed are placed therein and the tub has been filled with water to approximately the line A-A, the lid 45 is put in place and lever 59 moved to engage clutch members 68 and 70 so that the container 36 will be oscillated by the arcuate rack member 77 and its gearing. During this oscillating movement, the perforated baffles 41, by compressing the clothes and by resisting their movement so that the water will pass through them, will materially accelerate the washing action, and will assist the fins 42 in agitating the water and the clothes therein. The baffles and the fins define a tortuous path which the water and clothes must follow as they move within the container, and even during the oscillating washing movement the clothes will tend to distribute themselves evenly around the container.

During the comparatively slow oscillating movement of the container the ripples on the surface will splash the heavy scum over the edge 43 where it will be retained in the trough 44. When the container has been elevated and is rotated at high speed the centrifugal action will throw this scum through the perforations approximately level with such edge 43 and against the inner wall of the tub. When the washing operation is completed the control lever 59 is moved to disengage clutch members 68 and 70 and engage clutch members 67 and 69 to rotate gear nut 60, which will slowly raise the driving shaft 34, disengaging gears 78 and 77. When the shaft 36 and container 36 have been raised to effect a driving engagement between gear nut 60 and gear 78, through the interposed friction disk 80, the rotation of the container will be accelerated until it attains the same speed as gear

nut 60. The clothes may then be rinsed by admitting water to the sprinkler head 48, and the rotation of the container is continued for a sufficient time after the rinsing operation to effect the centrifugal drying of the clothes. As stated, the container 36, after disengagement of gear members 78 and 77, will attain slow rotative movement before it is raised out of the water and this slow continuous movement in one direction, coupled with the agitating effect of the fins 42 and baffles 41, will result in a substantially equal distribution of the clothes within the container, and after the container has risen above the surface of the water the baffles 41 will prevent any substantial change in such distribution as the rotation of the container is accelerated.

When it is desired to lower the container from its upper position to the washing position, the clutch control lever 59 may be moved to neutral position to throw out the clutch, and the container 36, nut 60, and gear 78 may be rotated by hand in the direction opposite to that in which they moved during the drying operation, and by arresting the movement of the container and pressing down upon it such downward force aided by the force of gravity will continue the rotation of nut 60 and gear 78 until gear 78 engages the arcuate rack member 77. It will also be apparent that, when the clutch is operated to effect oscillation of rack member 77, the teeth of gear 78 can mesh with the teeth of the rack member 77 when they are moving in the same direction.

It will be apparent that the complete operation of washing, rinsing and drying can be carried out without removing the lid of the tub. The construction of the machine is such that it can be economically manufactured and comprises few parts in addition to the necessary gearing. The tubular shaft support is rigidly supported from the base ring to effect great stability and a minimum of vibration, and the gearing is completely enclosed thereby avoiding all possibility of accident and permitting effective lubrication. It will be understood that other clutch structures might be used and that other changes might be made in the size of parts and details of construction without departing from the scope of the invention which is defined in the following claims.

What is claimed is:—

1. In a washing machine, the combination of a tub, a perforated container for the clothes to be washed, means for elevating said container within said tub and rotating it for centrifugally drying the clothes, a removable lid for said tub, and means carried by said lid for supplying water for rinsing the clothes while said lid is in place on said tub.

2. In a washing machine, the combination of a tub, a perforated container mounted for rotation therein and adapted to receive the clothes to be washed, a removable lid for said tub, means operable to move said container within the lower part of the tub for washing the clothes, means for elevating said container and rotating it for centrifugally drying the clothes, and means permanently carried by said lid for supplying rinsing water to the clothes while the lid is in place on said tub.

3. In a washing machine, the combination of a tub, a perforated container for the clothes to be washed, means for rotating said container within said tub for centrifugally drying the clothes, a removable lid for said tub having an annular peripheral channel, a conduit carried by said lid for supplying water to the clothes while said lid

is in place on said tub, a flexible conduit connected to said first conduit and means for securing said flexible conduit within said peripheral channel.

5 4. In a washing machine, the combination of a support, a tub thereon, a nut rotatably carried by said support, a perforated container for the clothes to be washed, a driving shaft supporting said container and supported by and having threaded engagement with said nut, and means for rotating said nut to elevate said container within said tub, said shaft and said container having driving engagement to transmit rotary movement.

15 5. In a washing machine, the combination of a tub, a perforated container, a shaft supporting said container, a nut mounted for rotation but held from vertical movement and having threaded engagement with said shaft, means for rotating said nut to elevate said container and its shaft, and means on said shaft for cooperation with said nut to transmit rotary motion from said nut to said shaft.

25 6. In a washing machine, the combination of a tub, a perforated container, a vertically disposed driving shaft supporting said container and having a gear thereon, gearing adapted to positively engage said gear to oscillate said container, gearing for frictionally driving said gear to rotate said container continuously in one direction, power means, and means for alternatively connecting said power means to one or the other set of gearing.

30 7. In a washing machine, the combination of a tub, a perforated container within said tub, a vertically disposed driving shaft supporting said container and having a gear thereon, a nut mounted for rotation but held from vertical movement relative to said tub and having threaded engagement with said shaft whereby rotation of said nut will raise said shaft and said container within said tub, gearing in mesh with said gear in its lower position, and means for alternatively driving said gearing or said nut.

45 8. In a washing machine, the combination of a tub, a perforated container having a centrally disposed hub projecting upwardly from the bottom of the container, outwardly projecting fins on said hub, radially disposed baffle plates within said container, and means for oscillating said container.

50 9. In a washing machine, the combination of a tub, a perforated container having a centrally disposed hub projecting upwardly from the bottom of the container, outwardly projecting fins on said hub, perforated baffle plates secured within the container and circumferentially spaced in staggered relation with said fins, and means for oscillating said container.

60 10. In a washing machine, the combination of a tub, a perforated container mounted for rotation within said tub on a vertical axis, said container having an annular trough adjacent its upper edge, and means for rotating said container.

65 11. In a washing machine, the combination of a tub, a perforated container mounted for rotation within said tub on a vertical axis, said container having an annular trough depending therefrom adjacent its upper edge, and means for oscillating said container, raising said container and rotating said container at high speed to centrifugally force material from said trough.

70 12. In a washing machine, the combination of a tub, a perforated container rotatably mounted

within said tub and movable from a lower to an upper position therein, means for rotating said container when it is in its upper position, and an annular ridge projecting inwardly from the wall of the tub below the bottom of the container 5 when it is in its upper position.

13. In a washing machine, the combination of a tub, a perforated container rotatably mounted within said tub and movable from a lower to an upper position therein, means for rotating said 10 container when it is in its upper position, and an annular baffle projecting inwardly from the wall of the tub below the bottom of the container when it is in its upper position and having an inwardly and downwardly facing concave 15 surface.

14. In a washing machine, the combination of a base ring, a gear box supported on said base ring, a second ring supported on said gear box, a tub and a tubular shaft support disposed centrally therein and rigidly secured thereto, said 20 tub and support being supported on said gear box and said upper ring, a perforated container, a driving shaft therefor extending through said shaft support, and gearing within said gear box 25 for operating said shaft.

15. In a washing machine, the combination of a tub, a perforated container, a shaft supporting said container, a nut mounted for rotation but held from vertical movement and having 30 threaded engagement with said shaft, means for rotating said nut to elevate said container and its shaft, and means on said shaft movable into clutching relation with said nut by the elevation of said shaft, said container having a central 35 upwardly extending tubular portion, and said shaft having a driving connection with said tubular portion above the center of gravity of said container to transmit rotary movement thereto.

16. In a clothes washing machine, a water receptacle, a perforated clothes container mounted within said receptacle for oscillatory movement with relation thereto and having means arranged therein near the axis thereof to impart oscillatory movement to the clothes through the water 45 in said receptacle, and means for elevating said clothes container to lift the clothes therein out of the water in said receptacle.

17. In a clothes washing machine, a water receptacle, a perforated clothes container mounted 50 within said receptacle for oscillatory movement with relation thereto and having two sets of agitators arranged therein and movable therewith, one set of said agitators being arranged near the outer wall thereof and the other set of said agitators being arranged near the axis thereof, and 55 means for elevating said clothes container to lift the clothes therein out of the water in said receptacle.

18. In a washing machine, the combination of a tub, a perforated container having a centrally disposed hub projecting upwardly from the bottom thereof and having outwardly projecting fins thereon terminating short of the side wall of said container, a vertical shaft having a driving connection with and supporting said container from a point above the center of gravity of said container, and means for elevating and rotating said shaft.

19. In a machine for first cleansing and then 70 extracting adhering liquid from fabric articles, in combination, an upright shaft, means for oscillating and rotating said shaft, a sleeve having a socket for engaging said shaft, a container for fabrics carried by and concentric with 75

said sleeve and having a wall which is formed with apertures adjacent to its bottom, agitating means carried by said container interiorly of said wall and spaced inwardly therefrom, a casing surrounding and spaced from said wall and holding liquid in contact with said fabrics, and means for removing such liquid from said casing.

20. In a fabric cleansing machine, a container having a perforated side wall formed as a surface of revolution coaxial with a vertical axis, said container having an open top and also having a vertical internal hub which projects upwardly inside the wall of said container, liquid agitating vanes carried by and projecting from said hub, a liquid holding casing surrounding said container, a shaft extending through the

bottom of said casing and secured to the hub of said container, and means for selectively oscillating and rotating said shaft and container.

21. In a clothes washing machine, a water receptacle, a liquid holding clothes container mounted within said receptacle for rotatory and oscillatory movement with relation thereto and having two sets of agitators arranged therein and movable therewith, one set of said agitators being arranged on the side wall thereof and the other set of said agitators being arranged near the axis thereof, rotating means and oscillating means for driving said container, and means for elevating said clothes container and for connecting it to said rotating means for centrifugally extracting liquid from the clothes.

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