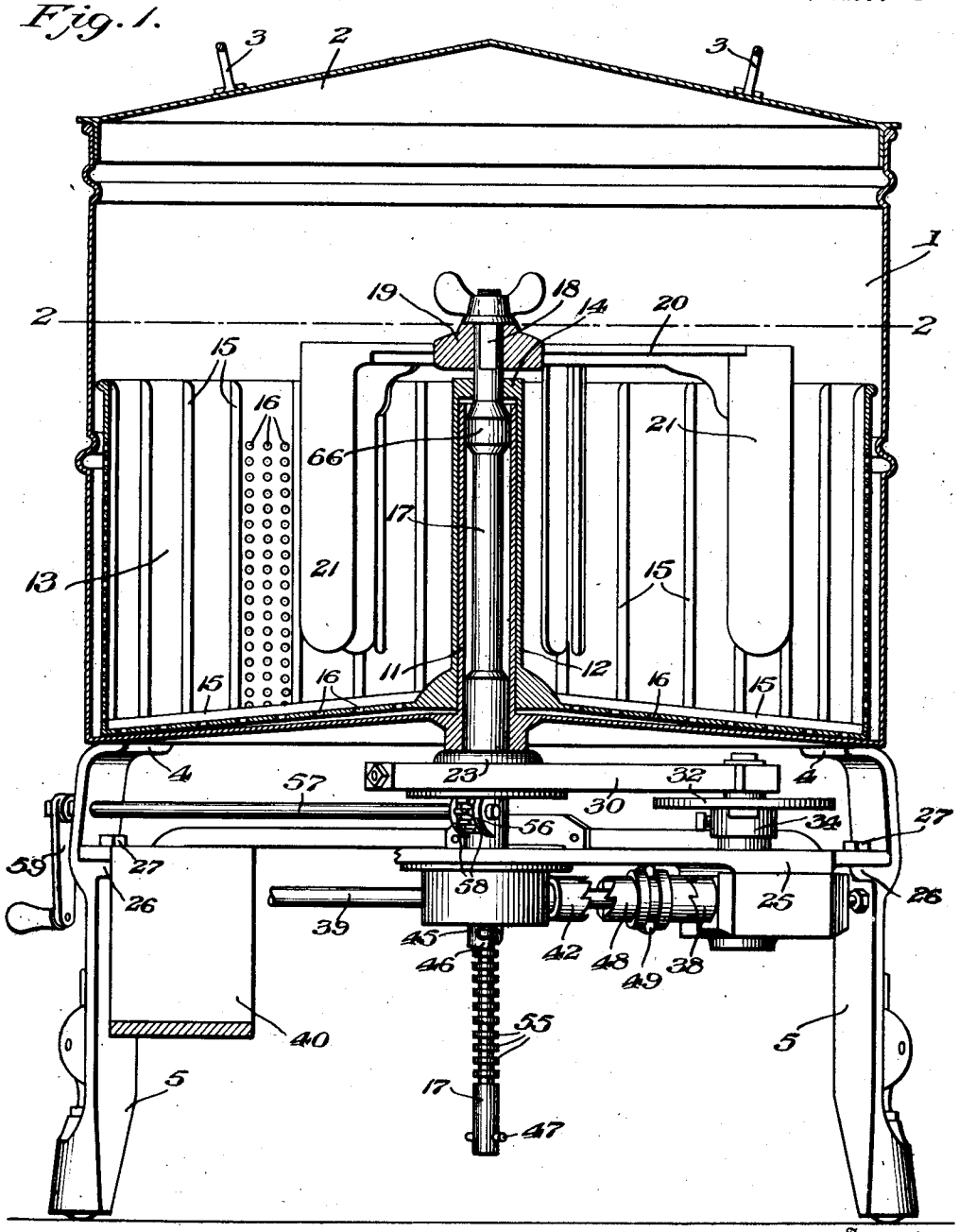
Dec. 25, 1928. 1,696,718

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WASHING MACHINE

Filed July 25, 1925 3 Sheets-Sheet 1

Fig. 1.



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Filed July 25, 1925 3 Sheets-Sheet 2

Fig. 2.

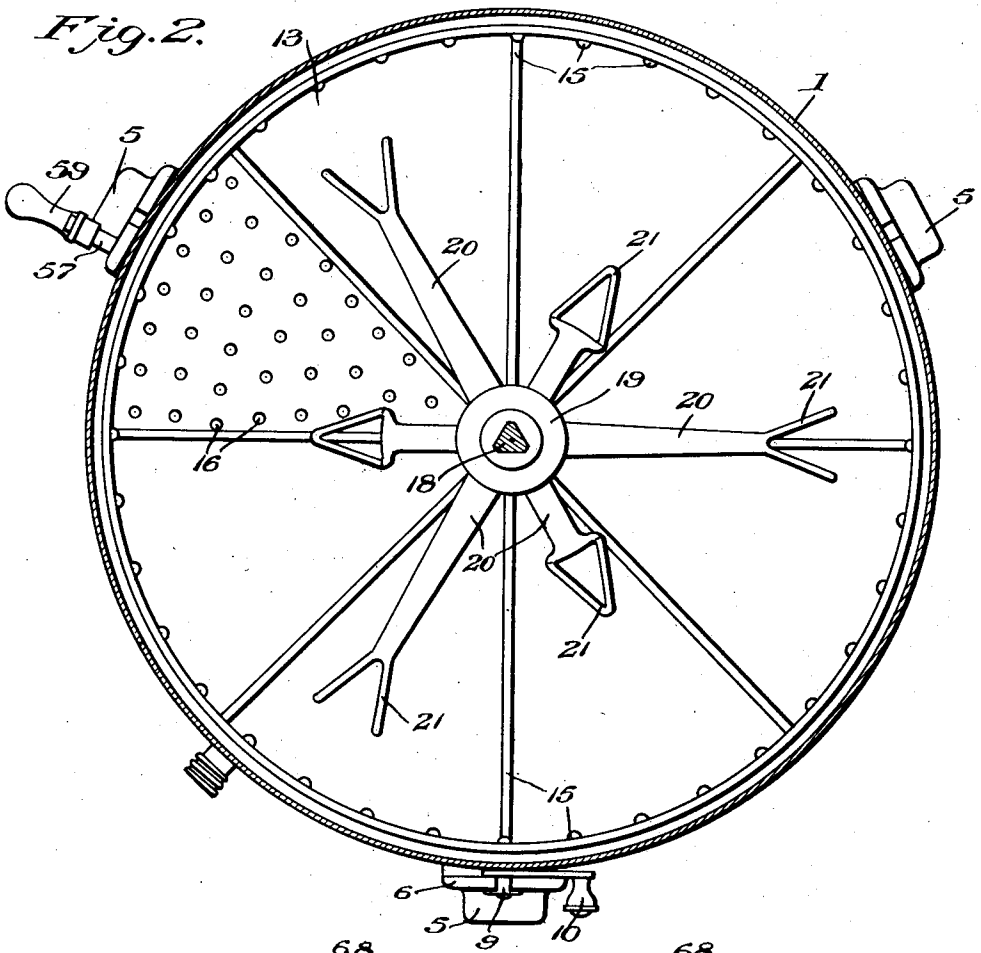


Fig. 3.

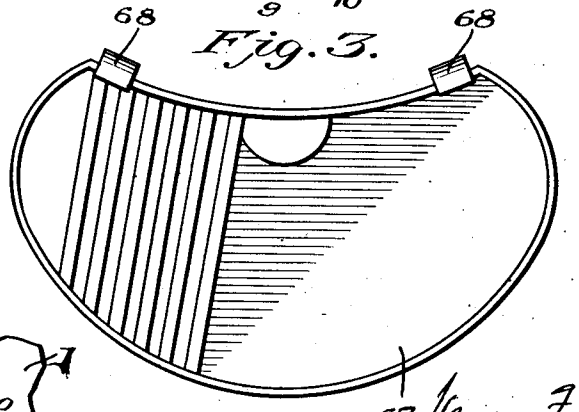
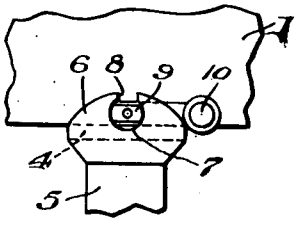


Fig. 4.



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Filed July 25, 1925 3 Sheets-Sheet 3

Fig. 5.

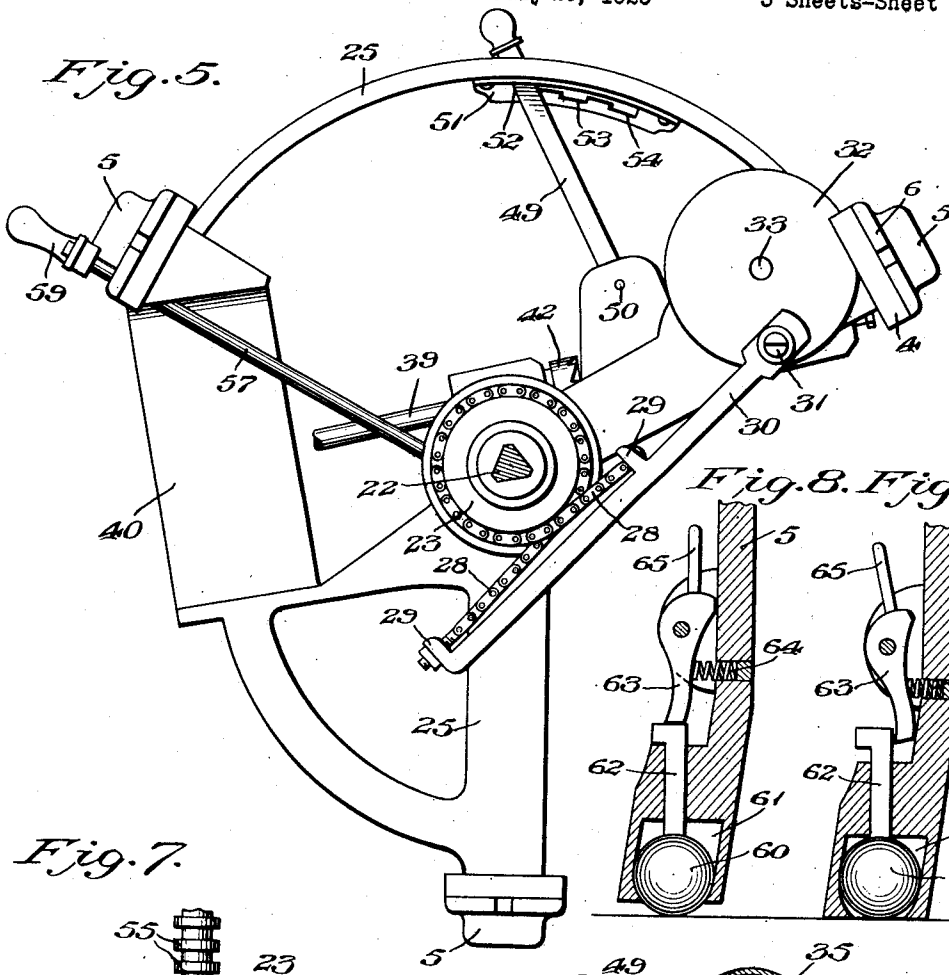


Fig. 8. Fig. 9.

Fig. 7.

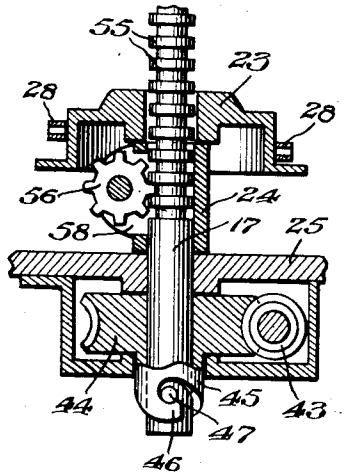
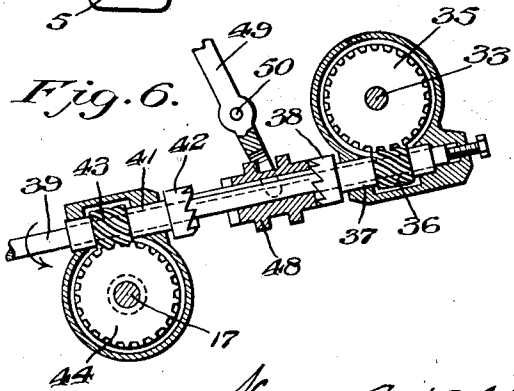


Fig. 6.



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UNITED STATES PATENT OFFICE.

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WASHING MACHINE.

Application filed July 25, 1925. Serial No. 46,003.

This invention relates to an improvement in washing machines.

The object of the invention is to provide a washing machine in which clothing and fabrics can be efficiently and rapidly washed, and all free water removed therefrom with a minimum of care, exercise, wear, tear, and handling of the same.

Another object of the invention is to provide such a washing machine in which the cleansing fluid may be forced through the fabric, while the latter is being constantly changed in position so as to expose all the portions thereof to the cleansing fluid.

A still further object of the invention is the provision of means within a washing machine for raising the clothing and fabrics out of the cleansing fluid and revolving the same at considerable speed so that all the adherent water will be removed from such fabrics by centrifugal force without removing the clothing from the washing receptacle, except to raise such clothing out of the water within the receptacle.

Another object of this invention is to provide mechanism within the washing machine for moving the clothes in and out and back and forth in a serpentine path through the water in the receptacle by an agitator in such a manner that they are pounded or buffeted by teeth carried on the agitator to loosen the dirt, the water passing through the fabric to wash out the dirt which has thus been loosened.

A still further object of the invention is to provide simple, strong, and reliable mechanism for washing and drying the clothes and which may be safe in the hands of careless, unskilled, and inattentive workers.

With these objects in view, this invention consists in a tank, within which is mounted a perforated spinning tub, and an agitator, having depending teeth, is mounted on a revolving shaft with the teeth extending into the spinning tub. Mechanism is provided and preferably operated by an electric motor for revolving the agitator in one direction and then back again in an oscillatory movement for washing the clothes within the spinning tub. Mechanism is also provided within the washing machine for elevating the shaft on which the agitator is mounted, which action causes that agitator and spinning tub to be raised sufficiently out of the water in the tank and the shaft is then revolved for rotating the agitator, which causes the rotation of the spinning tub by friction and throws the water outwardly from the clothes by centrifugal force, the spinning tub being perforated for allowing the water to pass therethrough.

In the accompanying drawings:

Fig. 1 is a vertical section partly in side elevation of the improved washing machine;

Fig. 2 is a horizontal section on the lines 2—2 of Fig. 1;

Fig. 3 is a detail plan view of the auxiliary soaping tank;

Fig. 4 is a detail side elevation of the cam for locking the tank to its sub-frame;

Fig. 5 is a plan view of the bottom frame with the tank removed and showing the operating mechanism;

Fig. 6 is a horizontal section through the operating shaft and gears;

Fig. 7 is a detail vertical section through the mechanism for raising and rotating the drying mechanism;

Fig. 8 is a vertical section through the lower end of one of the legs; and

Fig. 9 is a similar view showing the roller in its upper position.

The numeral 1 indicates the tank of our improved washing machine for receiving and containing the washing fluid, and the numeral 2 indicates a removable cover for the tank and having the handles 3 for facilitating the removal of the cover. The tank 1 is seated upon the inturned lugs 4 of the legs 5, there being preferably three of these legs, as shown in Fig. 2, and the lower edge of the tank is embraced by an upward extension 6, preferably integral with each of the legs 5 extending upwardly from each of the lugs 4, as clearly shown in Fig. 4. Each of the extensions 6 is provided with a hole 7, having a restricted channel 8 extending therefrom to the outer edge of the extension for receiving the elongated cam 9 secured to the handle 10 which is carried by the tank for locking the tank to the legs.

As shown in Fig. 1, the tank 1 is provided with a central sleeve 11 for vertically receiving the central sleeve 12 of the spinning tub 13, said sleeve 12 being provided with the inturned circumferential projection 14 so as to inclose and cover the sleeve 11 and for limiting the downward movement of the spinning tub 13 relative to the tank 1. The spinning tub 13 is provided with corrugations 15 extending inwardly around its sides and

extending radially over its bottom and between these corrugations, the said spinning tub is provided with the small perforations 16.

A shaft 17 extends upwardly through the sleeve 11 and is provided with a triangular portion 18 at its upper end for receiving the agitator 19. This agitator is provided with radiating long and short arms 20 provided with depending teeth 21, the said teeth being of V-shape throughout their length, as clearly shown in Fig. 2. The teeth 21 on the short arms 20 are reversed with the open side of the V facing the center, whereas the teeth on the long arms have the open side of the V facing outwardly.

The shaft 17 is also provided with a triangular portion 22 intermediate its ends as shown in Fig. 5 for receiving and fitting into a similar shaped hole in the cap 23, mounted upon a sleeve 24 extending upwardly from the frame 25, which frame is secured to the lugs 26 on the legs 5 by means of the bolts 27. The cap 23 has two chains 28 secured thereto, as shown in Figs. 5 and 7, and these chains have their outer ends secured to lugs 29, on the bar 30. This bar 30 has a pivotal connection as at 31 to the eccentric 32 secured on the upper end of the shaft 33. The shaft 33 extends upwardly through a sleeve 34, shown in Fig. 1, and is provided with a worm gear 35 secured to its lower end, which worm gear meshes with a worm 36, mounted on the sleeve 37, the latter having a clutch member 38 fixed to its outer end. A driving shaft 39 extends through the sleeve 37 and is preferably driven by an electric motor (not shown) but which is adapted to be seated on the shelf 40, which is a part of the frame 25.

As shown in Figs. 6 and 7, a sleeve 41, having a clutch element 42 on the outer end thereof corresponding to the sleeve 37 and clutch 38, is also mounted loosely on the driving shaft 39 and the sleeve 41 has a worm gear 43 secured thereto and meshing with a worm wheel 44, loosely mounted on the lower end of the shaft 17. The worm wheel 44 is provided with a depending sleeve 45 having hooks 46 on its lower end for receiving and engaging a pin 47 extending through the lower end of the shaft 17, for the purpose which will be hereinafter described. A slidable clutch 48 is slidably keyed to the shaft 39 to revolve therewith and this clutch 48 is provided with clutch teeth on its outer ends for engaging either of the clutch elements 38 or 42. The clutch 48 is moved into engagement with either of these clutch elements by means of the shifting lever 49 pivoted as at 50 to the frame 25 and having a forked inner end for engaging the clutch 48. This shifting lever 49 extends through a longitudinal slot in a bracket 51, secured to the frame work 25, and has a handle on its outer end for moving the same. Notches 52, 53, and 54 are provided in the bracket 51 for receiving the shifting lever 49 and holding the clutch 48 in its respective positions.

For the purpose of raising the spinning tub 13, and agitator 19, out of the water for drying the clothes within this tub, the shaft 17 is provided throughout a portion of its length with circumferential rings 55 fashioned in the form of teeth and with which the pinion 56 is adapted to mesh, as shown in Fig. 7, said pinion being mounted on a rod 57 extending through ears 58 formed on the sleeve 24 and also through one of the legs 5 having a handle 59 on its outer end for turning the rod 57, and pinion 56 for raising and lowering the shaft 17 and its supported parts.

As shown in Figs. 8 and 9, each of the legs 5 is provided with a roller 60 in its lower end for the purpose of rolling the washing machine over the floor wherever desired. The roller 60 is held in a depression 61 and a pin 62 extends upwardly from this depression being slidable in a hole through the leg 5 and normally engaging the roller 60. A pawl 63 is pivoted to the leg 5 and is engaged by a spring 64 for normally holding it in its outer position where its lower end is fitted over the upper end of the pin 62, and holds this pin and the roller 60 in their lowermost position being the position shown in Fig. 8. A pin 65 may be used for moving the pawl 63 back against the action of the spring 64 so as to allow the pin 62 and roller 60 to move up into the position shown in Fig. 9 for allowing the lower ends of the legs 5 to be seated directly on the floor to prevent the washing machine from rolling about in its operating position.

The rollers 60 are only used when it is desired to move the washing machine from one place to another.

In operation, the tank 1 is partly filled with water and the fabrics to be washed are placed in the spinning tub 13, the parts being shown in their washing relation in Fig. 1. The lever 49 is moved into the center notch 53 in the bracket 51 so as to move the clutch 48 out of engagement with both of the clutches 38 and 42, and the electric motor is started. When the motor has gained its full speed, the lever 49 is moved over into the notch 52 so as to cause the teeth on the clutch 48 to engage the clutch element 38 for rotating this clutch element 38, its sleeve 37, worm 36, worm wheel 35, shaft 33, and eccentric 32, for moving the rod 30 back and forth and giving a turning action to the cap 23, which of course rotates the shaft 17 through the medium of its triangular connection 22 and operates the agitator 19 for rubbing the clothes about within the spinning tub 13 and against the corrugations 15 of said tub. It will be noted by referring to Fig. 5 that the shaft 17 will be rotated about a quarter turn in one direction and then back again an equal amount in the opposite direction, due to the chain connec-

tion between the cap 23 and the arm 30, which is moved by the eccentric 32.

Thus, the agitator 19 will be given a vibratory movement within the tub 13 so that the clothes or fabrics will be moved back and forth within said tub. After the clothes have been washed, the lever 49 is thrown into the notch 54, which moves the clutch 48 into engagement with the clutch element 42 rotating such clutch element 42 with its sleeve 41, worm 43, worm wheel 44, and sleeve 45. The cap 23 is now stationary and since the sleeve 45 is loosely mounted on the shaft 17, it does not rotate this shaft so that it, as well as the agitator 19, is stationary. The handle 59 is now turned to rotate the pinion 56 for elevating the shaft 17 with the agitator 19 and spinning tub 13 sufficiently to raise this spinning tub out of the water in the tank 1. As shown in Fig. 7, the pinion 56 engages the ring teeth 55 on the shaft 17, raising said shaft until the hooks 46 on the sleeve 45, which is now turning, engage the pin 47 in the lower end of the shaft 17 forming a bayonet joint between the sleeve 45 and shaft 17, so that the shaft will now be rotated with the worm wheel 44, causing a rotation of the agitator 19, and a rotation of the spinning tub 13, due to its frictional contact with the enlargement 66 on the shaft 17, and this action causes the water to be thrown from the fabrics by centrifugal force, the water running out through the perforations 16 into the tank.

A soaping tub 67 is shown in Fig. 3 and is provided with hooks 68 so that it may be hung onto the rim of the tank 1.

It will be seen that we have provided simple yet strong and efficient mechanism for washing the fabrics and then drying the same without removing them from the washing machine, and this mechanism not only thoroughly cleans the fabrics but it entirely removes all the water from the clothes after they have thus been washed, rendering the same entirely dry.

We claim:

1. In a washing machine, the combination of a casing, a container therein, an agitator associated with the container, a shaft operatively connected with and for rotating the agitator for washing fabrics in the container, means for elevating the shaft, means for operatively connecting the container with the shaft for causing an elevation of the container therewith, and rotating means for the shaft causing a rotation of the container in its elevated position only, for removing the adherent liquid from the fabrics.

2. In a washing machine, the combination of a casing, a perforated container therein, an agitator extending into the container for washing fabrics therein, a shaft operatively connected with and for rotating the agitator, said container being disconnected from the shaft in its lowered position, means for elevating the shaft, means for operatively connecting the container with the shaft for causing an elevation of the container therewith, said means connecting the container with the shaft in its elevated position only, and means for rotating the shaft for rotating the container and removing the adherent liquid from the fabrics.

3. In a washing machine, the combination of a casing, a perforated container therein, a shaft extending into said container, an agitator fixed on said shaft, and extending into the container for washing fabrics therein, means for elevating said shaft and container, means for rotating said shaft, said shaft being rotatable independently of the container in the lowered position thereof, and means for connecting said container with said shaft for causing a rotation thereof in its elevated position.

4. In a washing machine, the combination of a casing, a perforated container therein, an agitator extending into said container, a shaft for elevating said agitator and container, and for rotating said agitator in the lowered and elevated positions thereof, and means for connecting said shaft with said container, only in the elevated position thereof, said shaft causing a rotation of the agitator, only, in the lowered position and of the agitator and container in the elevated positions.

5. In a washing machine, the combination of a casing, a perforated container therein, a shaft extending into said container, an agitator secured on said shaft and extending into said container, means for elevating said agitator and container, means for connecting said shaft with said container, only in the elevated position thereof, and means for rotating said shaft causing a rotation of the agitator in the lowered position and of the agitator and container in the elevated positions.

6. In a washing machine, the combination of a casing, a container therein, a shaft extending into said container, an agitator fixed on said shaft and extending into said container, means for elevating said shaft, agitator and container, means for oscillating said shaft and agitator in their lowered positions for washing fabrics in said container, means for causing the rotation of said shaft and agitator in their elevated positions, said shaft being rotatable independently of the container in the lowered position thereof, and means for causing a connection between said container and shaft in their elevated positions for actuating the container to remove the adherent liquid from the fabrics.

7. In a washing machine, the combination of a casing, a container therein, a shaft extending into said container, an agitator mounted upon said shaft, means for elevating said shaft and container, a driving shaft,

means connecting said driving shaft with said first-mentioned shaft for causing an oscillation thereof to wash fabrics in the container in its lowered position, and means connecting said driving shaft with said first-mentioned shaft in its elevated position for causing a rotation of said shaft and container to remove the adherent liquid from the fabrics.

8. In a machine of the character described, the combination of rotary washing means, a rotary shaft operatively connected with said rotary washing means, said shaft having peripheral ring-teeth formed thereon, and a pinion in position to engage said ring-teeth for moving said shaft longitudinally.

9. In a washing machine, the combination of a casing, a shaft having means connected with said shaft for causing a laundrying operation of fabrics therein, a driving shaft having a clutch thereon, a sleeve having a clutch element for cooperating with said clutch, an eccentric operatively connected with said sleeve, a cap connected with the first-mentioned shaft, and means connecting said cap with said eccentric.

10. In a washing machine, the combination of a tank for containing a washing fluid, a container mounted therein, a shaft extending into the tank and having an agitator mounted thereon, a driving shaft having a clutch thereon, a sleeve having a clutch element for cooperating with said clutch, an eccentric connected with the sleeve, a cap connected with the first-mentioned shaft, and a flexible connection between the cap and the eccentric.

11. In a washing-machine, the combination of a tank for containing a washing liquid, a container mounted therein and having a central sleeve, a shaft extending into the tank positioned to engage the sleeve, an agitator mounted on the shaft for washing fabrics within the container, a cap connected with said shaft, a driving eccentric having flexible driving connection with the cap, a driving shaft and a clutch for connecting and disconnecting said driving shaft with the eccentric.

12. In a washing machine, the combination of a tank for containing a washing fluid, a perforated and corrugated container mounted therein and having a central sleeve, a shaft extending into the tank in position to engage said sleeve, an agitator secured to the shaft and extending into the container for washing fabrics therein, a cap connected with the shaft for rotating the same, a driving eccentric, a rod connected therewith, a chain for connecting said rod and cap, a sleeve having a clutch element thereon, gearing for connecting said sleeve with said eccentric for driving said eccentric, and a driving shaft having a clutch secured thereon for engaging said clutch element for actuating the first-mentioned shaft and agitator for washing the fabrics.

13. In a washing machine, the combination of a tank for containing a washing fluid, a perforated and corrugated container mounted therein and having a central sleeve, a shaft extending into the tank in position to engage said sleeve, an agitator secured to the shaft and extending into the container for washing fabrics therein, a cap connected with the shaft for rotating the same, a driving eccentric, a rod connected therewith, a chain for connecting said rod and cap, a sleeve having a clutch element thereon, gearing for connecting said sleeve with said eccentric for driving said eccentric, a driving shaft having a clutch secured thereon for engaging said clutch element for actuating the first-mentioned shaft and agitator for washing the fabrics, means for elevating the first-mentioned shaft, container, and agitator out of their washing positions, and means for connecting the first-mentioned shaft in its elevated position with the driving clutch for removing the liquid from the fabrics within the container by centrifugal force.

14. In a machine of the character described, the combination of a container, a rotary shaft extending into said container for rotary movement relative thereto, a laundrying means connected with the shaft, said shaft having peripheral ring teeth formed thereon, a pinion in position to engage said ring teeth for moving the shaft longitudinally, and means for operatively connecting the shaft with the container upon said longitudinal movement thereof.

15. In a washing machine, the combination of a casing, a shaft having means connected with said shaft for causing a laundrying operation of fabrics in said casing, a driving shaft having a clutch thereon, a sleeve having a clutch element for cooperating with said clutch, an eccentric connected with said sleeve, a cap connected with the first-mentioned shaft, and a flexible connection between the cap and eccentric.

In testimony whereof we affix our signatures.

HENRY F. KUHLMANN.
ELENORA KUHLMANN.