Feb. 25, 1958 W. REISCH 2,824,437

CLOTHES WASHING MACHINE

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FIG. 1

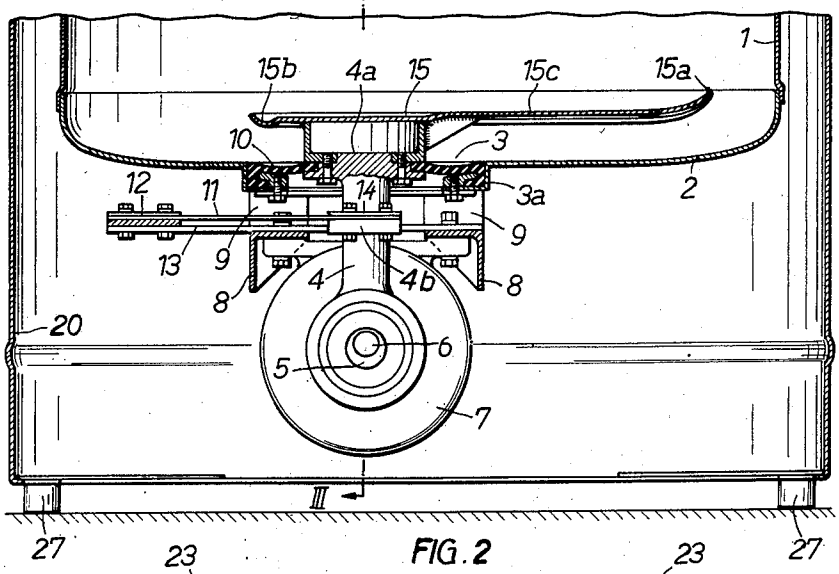
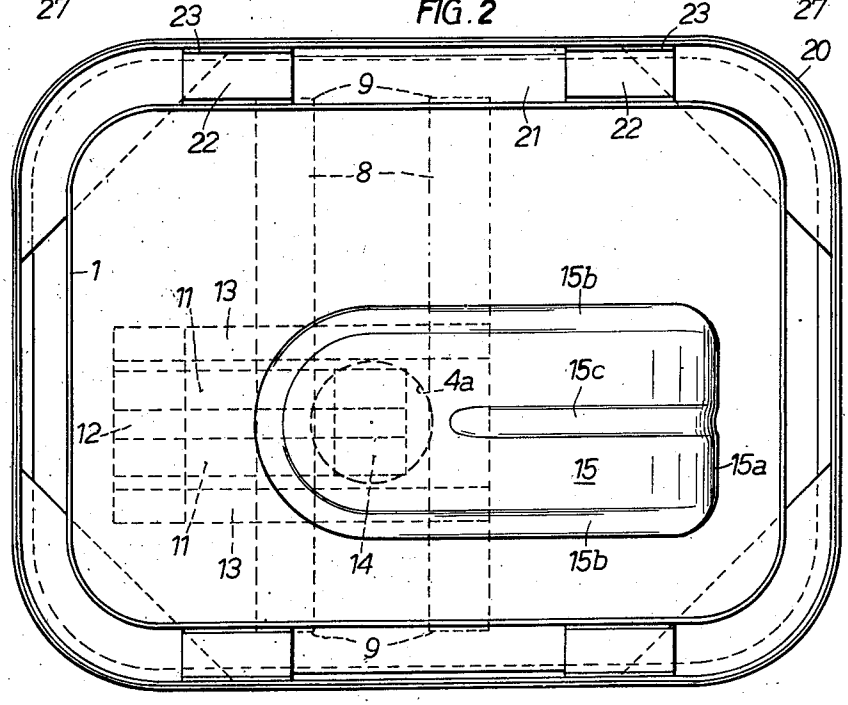


FIG. 2



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FIG. 3

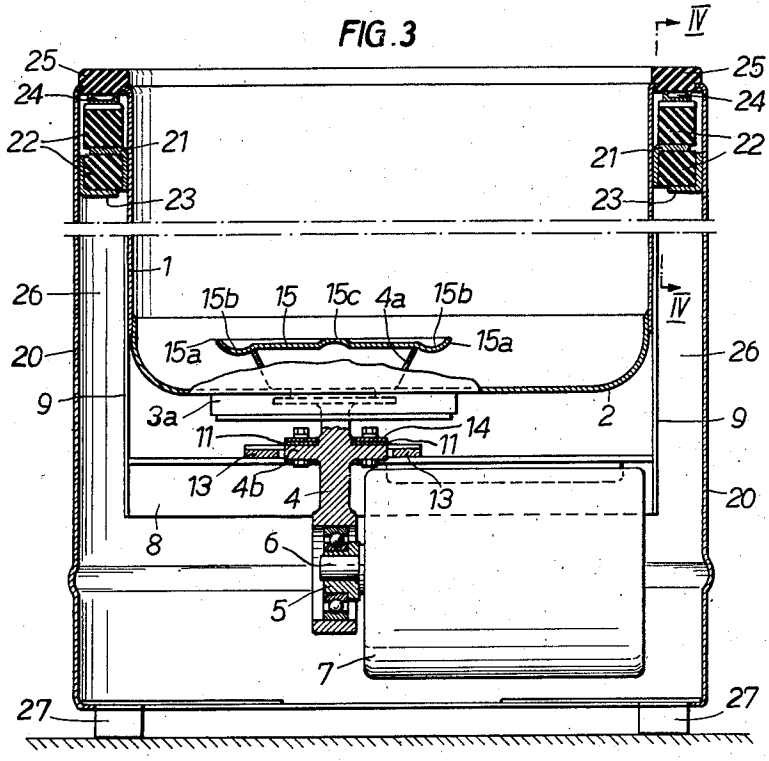
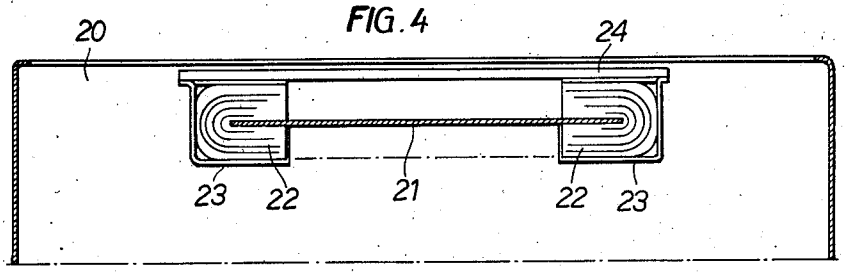


FIG. 4

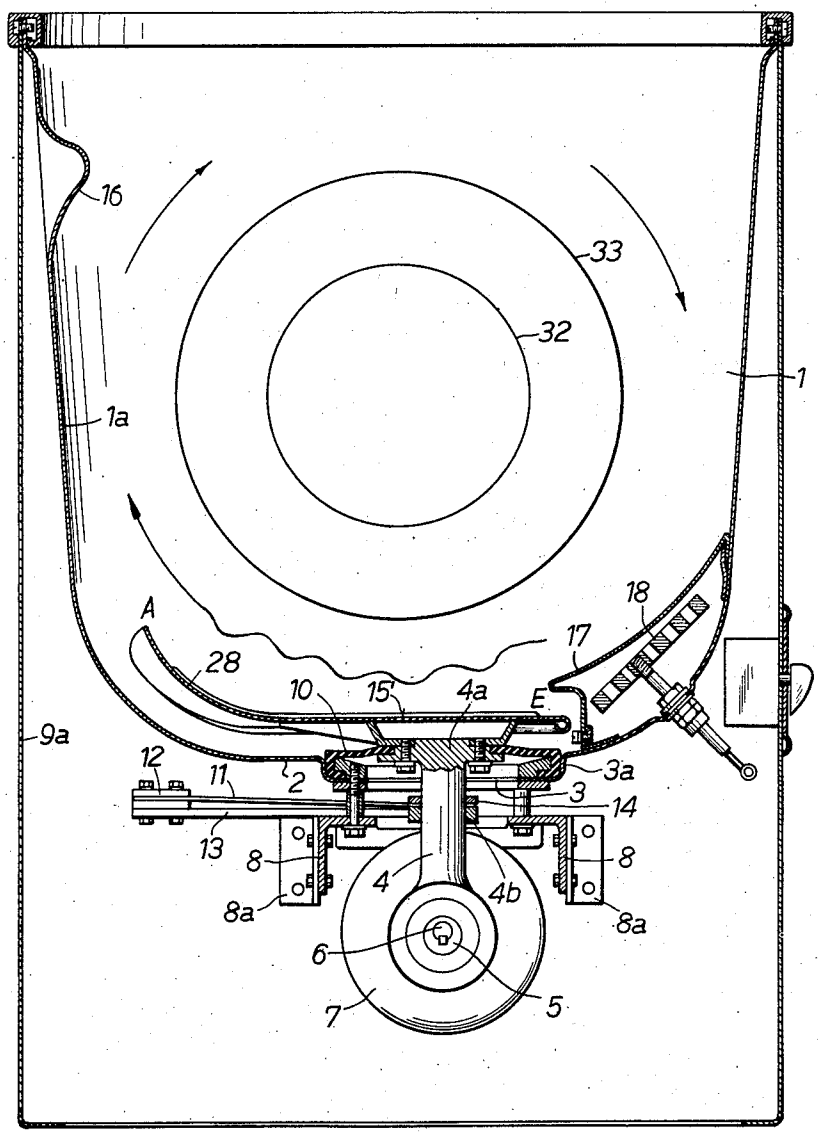


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FIG. 5



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FIG. 6

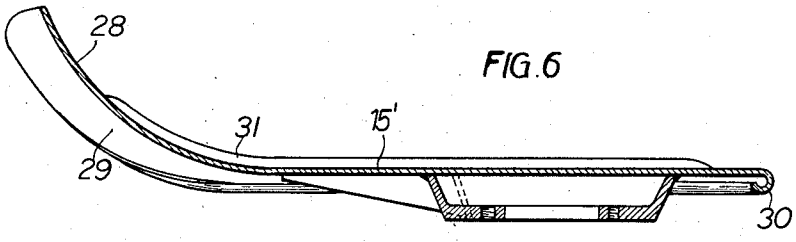


FIG. 7

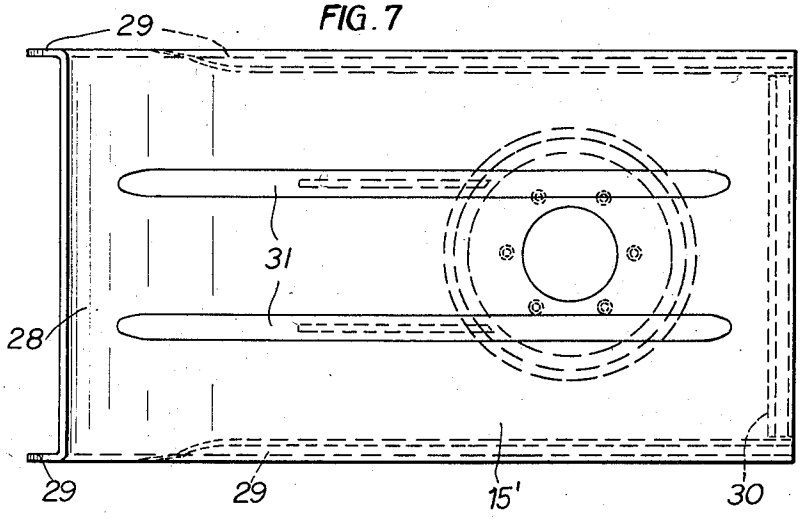
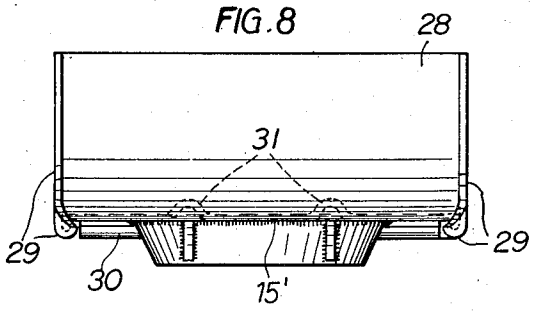


FIG. 8



United States Patent Office 2,824,437 Patented Feb. 25, 1958

2,824,437

CLOTHES WASHING MACHINE

Wilhelm Reisch, Frastanz (Vorarlberg), Austria

Application May 10, 1954, Serial No. 428,732
Claims priority, application Austria May 16, 1953
11 Claims. (Cl. 68—15)

This invention relates to washing machines of the type in which one or more oscillatory plates are arranged within the tank receiving the goods to be washed, in order to impart a circulating motion to the washing lye and to keep the washing goods in continuous movement.

It is an object of the invention to improve the washing effect by creating a pulsating circular motion of the washing lye and by providing an oscillatory plate shaped to prevent the tendency of balling of the washing goods, which is detrimental to the fabrics, by a particular shape of the oscillatory plate to guide the flow of the washing lye and to favor a floating movement of the washing goods above the plate.

The invention particularly consists in the provision of a washing machine having at least one oscillatory plate disposed at a relatively short distance from an interior wall of the tank for the washing goods, particularly from the tank bottom, which plate is connected to drive means imparting a pulsating movement and at the same time also a rocking movement with respect to the opposite tank wall. The drive means preferably is so chosen that the oscillatory plate is subjected to approximately 1400 oscillations per minute which corresponds to the usual number of revolutions of small electric motors.

The invention offers the advantage that by means of the movement of the oscillatory plate cooperating with the opposite wall of the tank not only a pulsating movement of the washing lye favoring the loosening of the particles of dirt is obtained, but also a continuous circulating flow of said lye by which the particles are carried away and at the same time a rolling or turning over of the washing goods is effected.

According to a preferred embodiment of the invention the oscillatory plate is carried by a connecting rod of the drive means so as to be offset towards one side of the rod and disposed in proximity to the bottom of the tank for the washing goods. By this there is created a pumping action by the oscillatory plate whereby the washing lye is discharged at the end of the oscillatory plate opposite the rod. At this end of the oscillatory plate there is provided an inwardly projecting bulged rib for guiding the washing lye current as well as the washing goods.

Further details of the invention result from the following description of two embodiments, reference being had to the accompanying drawings, in which,

Fig. 1 is a fragmentary vertical section through a washing machine according to the first embodiment.

Fig. 2 a plan view of the machine.

Fig. 3 a transverse section along the line III—III of Fig. 1.

Fig. 4 shows the elastic suspension of the tank for the washing goods in a partial section along the line IV—IV of Fig. 3.

Fig. 5 is a vertical section through the second embodiment of the washing machine according to the invention.

Fig. 6 is a longitudinal section through the oscillatory plate used in this machine.

Fig. 7 is a plan view of the oscillatory plate.

Fig. 8 is a front view of the plate according to Fig. 6.

Referring to Figs. 1 to 3, the tank 1 receiving the washing goods has a bottom wall 2 which is provided with a relatively large aperture 3. This latter is traversed by the connecting rod 4 of an eccentric 5 mounted directly on the shaft 6 of an electric motor 7. This electric motor is fixed to angle irons 8 which are carried by brackets 9 welded to the tank 1 for the washing goods.

The slightly enlarged head 4*a* of the connecting rod 4 is sealed by an elastic annular diaphragm 10 with respect to the edge of the aperture 3 in the tank bottom.

The aperture is surrounded by an angle ledge 3*a*; the outer edge of the diaphragm 10 is clamped to the angle ledge 3*a* and the inner edge of the diaphragm is clamped to the head 4*a* of the connecting rod.

The connecting rod 4 is resiliently guided by two blade springs 11 disposed substantially parallel to the bottom of the tank, or horizontal, which springs are fixed with their one ends by means of a clamping plate 12 to the free ends of rails 13 carried by the angle irons 8. The other ends of the blade springs 11 are fixed to lugs 4*b* of the connecting rod 4 by means of clamping plates 14. The blade springs 11 allow the connecting rod 4 to execute the movements produced by the eccentric 5, resulting in a combined pulsating up and down motion and simultaneously in a rocking motion about the clamping point 14 of the connecting rod.

The top of the head of the connecting rod carries an oscillatory plate 15 which, in its central position of rest, as shown in Fig. 1, is situated substantially parallel to the bottom 2 of the tank, and at a relatively small distance (e. g. about 30 mm.) from this bottom. The edge 15*a* of the oscillatory plate is bent upwardly against the interior space of the tank receiving the washing goods.

Owing to the pulsating up and down movement of the oscillating plate 15, the washing lye is imparted a pulsating movement with the frequency of the number of revolutions of the motor, e. g. 1400 R. P. M., by which a removing of the particles of dirt from the laundry is favored. The rocking movement of the connecting rod results in a corresponding swinging movement of the oscillatory plate 15 which is fixed to the head 4*a* of the connecting rod so as to be offset towards one side. The swinging movement of the plate creates a pumping action exerted on the washing lye, and particularly on the portion thereof situated between the oscillatory plate and the tank bottom 2, which pumping action imparts a continuous circulatory movement of the washing lye, which washes away the loosened dirt particles, as well as a rolling or turning movement of the goods to be washed. Owing to the bent up lip 15*a* of the oscillating plate the pumping action is improved and penetration of washing goods underneath the oscillatory plate is prevented. For avoiding too intensive secondary flows, the whole or part of the edge of the oscillatory plate 15 preferably is provided with a marginal groove 15*b* the concave side of which is turned towards the interior space of the tank. Besides, at least one additional groove 15*c* may be provided in the oscillatory plate, preferably extending along the longitudinal center line of the plate, which groove faces the tank chamber with its convex side.

In order to avoid the transmission of oscillatory movement from the tank 1 for the washing goods to the machine casing 20, the tank is elastically suspended. For this purpose, angle irons 21 are fixed (see particularly Figs. 3 and 4) to the outside of the tank 1, preferably at two opposite points thereof, the projecting legs of the irons being embedded each in two U-shaped, bent rubber buffers 22 which are clamped between the angle irons 23 and channel irons 24. Owing to the rubber buffers

22 the movement of the angle irons 21 and of the tank 1 in all directions is resiliently absorbed.

The space between the upper edges of the tank 1 for the washing goods and of the machine casing 20 is sealed by an elastic strip of rubber or the like 25, so that penetration of moisture into the intermediate space 26 is prevented.

The machine casing is placed on the floor by means of resilient supports 27.

As can be recognized from Fig. 2, the oscillatory plate 15 is not centrally disposed in the tank, but offset with respect to the tank relatively to the longitudinal middle axis thereof, and also relatively to its transverse middle axis, whereby the creation of the circulating flow of the washing lye is favored.

For purposes of illustration a substantially rectangular shape has been chosen for the tank and partially also for the oscillatory plate. It would be within the scope of the invention to make the tank for the washing goods and the oscillatory plate of any other suitable shape, e. g. oval or circular.

Also the sealing of the head 4*a* or of the connecting rod relatively to the bottom 2 of the tank, the guiding of the connecting rod 4, and the elastic suspension of the tank 1 for the washing goods in the casing 20, could be solved in any other way without being limited to the embodiment described and shown.

It is also possible to provide more than one oscillatory plate in the washing tank, and such plate can be disposed in proximity to the bottom of the tank as well as to a side wall thereof.

Referring to Figs. 5 to 8 showing a modification the bottom 2 of the tank 1 is again provided with an aperture 3 traversed by the connecting rod 4. The electric motor 7 is fixed to angle irons 8 which are connected with the casing 9 by the intermediary of brackets 8*a*. The tub walls can be provided with stiffening ribs such as those illustrated by concentric circles 32 and 33.

The slightly enlarged head 4*a* of the connecting rod is sealed with respect to the downwardly flanged edge of the aperture 3 by an elastic annular diaphragm 10; the exterior edge of the diaphragm is clamped against the bottom flange 3*a* and the interior edge is clamped to the head 4*a* of the connecting rod. The connecting rod 4 traverses two blade springs 11 extending substantially parallel to the tank bottom, which springs are clamped with one of their ends by means of clamping plates 12 to the free ends of rails 13 fixed to the motor carrying rails 8. The other ends of the blade springs 11 are clamped to lugs 4*b* of the connecting rod 4 by means of clamping plates 14.

The upper end (edge) of the head 4*a* of the connecting rod carries the oscillatory plate 15' situated substantially parallel to the bottom 2 of the tank, when in its central position of rest, and at a comparatively small distance from the latter. The bent up edge 28 of the oscillating plate assists in creating an improved pumping effect and penetration of the washing goods underneath the oscillating plate is prevented.

With respect to this pumping effect the end A of the oscillating plate 15' which is provided with a bent up edge 28 and projects far beyond the head 4*a* of the connecting rod, has to be regarded as discharge end, and the opposite end E of the shorter projecting part as entrance end. In order to obtain the desired course of the circulating flow of the washing lye (see the arrows), a bulged rib 16 is provided in the upper portion of that lateral wall 1*a* of the tank 1, which is situated in proximity to the discharge end A of the oscillatory plate 15'. The washing lye flowing upward from the discharge end is caused to deviate into the direction of circulation by this bulged rib as it may be clearly recognised from Fig. 5.

A guide wall 17 of sheet metal is provided within the tank in front of the entrance end E of the oscillatory plate and slightly overlaps the edge of the latter. The guide wall 17 is fixed to the interior wall of the tank and may serve at the same time for covering the electric heater 18 provided for the heating of the washing lye.

The guide wall serves to deviate the washing lye in the direction of the circulating flow and to obtain that the rotating washing goods are guided on to the oscillatory plate 15' in a favorable direction so that the goods may float over the plate.

Owing to the overlapping of the entrance end of the oscillatory plate by the guide wall, it is impossible for the washing goods to penetrate beneath the oscillatory plate at this position.

The particular shape of the oscillatory plate 15' has as its purpose to prevent as far as possible the creation of secondary flows and the formation of balls which they might cause in the washing goods. As seen in Figs. 6 to 8, this is obtained in that the longitudinal lateral edges 29 and the front edge 30 on the entrance side of the oscillatory plate are rolled downwardly to form a hollow groove. These bent edges of the plate also guide the flow of the washing lye, substantially in the sense of the longitudinal direction of the oscillatory plate. The guiding of the stream of liquid is still favored by the upwardly bulged longitudinal grooves 31 provided in the oscillatory plate and extending parallel to its longitudinal axis, which grooves serve at the same time for stiffening the plate. For the use and the operation of the machine it is moreover very favorable to arrange the tank for the washing goods, as clearly visible in Fig. 1, so that it expands towards the top, e. g. by inclining the side wall of the tank. The advantages of this arrangement have been described in the beginning.

I claim:

1. A washing machine comprising a casing, a tank within the casing adapted to receive washing lye and goods to be washed, an oscillatory plate within said tank extending in proximity to the bottom of the tank and substantially parallel thereto, drive means for said plate including an eccentric, a connecting rod connecting said eccentric with said plate, blade spring means having one end fixed to said tank and the other end to said connecting rod, whereby movement of said eccentric is transmitted to said plate to produce a combined pulsating up and down movement and rocking movement of the plate.

2. A washing machine as claimed in claim 1, wherein the oscillatory plate is of rectangular elongated shape and said connecting rod being attached to said plate at a point longitudinally displaced from the mid-point of said plate.

3. A washing machine as claimed in claim 1, wherein the oscillatory plate is displaced with respect to the central vertical axis of the tank.

4. A washing machine as claimed in claim 1, wherein the washing tank is substantially of rectangular transverse section, said oscillatory plate being displaced relatively to the longitudinal central axis and the transverse central axis of the tank bottom.

5. A washing machine comprising a casing, a tank within the casing having bottom and side walls and adapted to receive washing lye and goods to be washed, an oscillatory elongated plate within said tank extending in proximity to the bottom wall of the tank and substantially parallel thereto, and drive means including an eccentric and a rod operatively connected to said eccentric and rigidly connected to said plate at a point longitudinally displaced from the mid-point of said plate to impart to said plate a combined pulsating up and down and rocking movement and to produce a pumping action creating a circulating flow of said washing lye in the tank, one end of said plate constituting a discharge end with respect to said pumping action and being bent upwardly towards the interior space of the tank.

6. A washing machine as claimed in claim 5, wherein said plate includes longitudinal and transverse edges and wherein the longitudinal edges of said oscillatory plate

and the transverse edge which leads with respect to the circulating flow of the washing lye are downwardly flanged.

7. A washing machine as claimed in claim 5, wherein said oscillatory plate is provided with at least one longitudinally extending channel groove.

8. A washing machine as claimed in claim 5, wherein that side wall of the tank disposed in proximity to the discharge end of said plate is provided with an inwardly bulged rib for guiding the washing lye and the wash goods in their circular flow.

9. A washing machine according to claim 6, wherein a guide wall is affixed to a sidewall of said tank adjacent the transverse leading edge of said oscillatory plate, said guide wall serving for directing the washing lye and the wash goods and overlaps said transverse leading edge of the plate.

10. A washing machine as claimed in claim 9, wherein an electric heater is provided for heating the washing lye, said guide wall ahead of the transverse leading edge of the oscillatory plate serving to enclose the heater.

11. A washing machine as claimed in claim 5, wherein said tank comprises upwardly diverging side walls.

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