J. H. BAIR.

WASHING MACHINE.

APPLICATION FILED DEC. 27, 1918.

1,350,353.

Patented Aug. 24, 1920.

FIG. I.

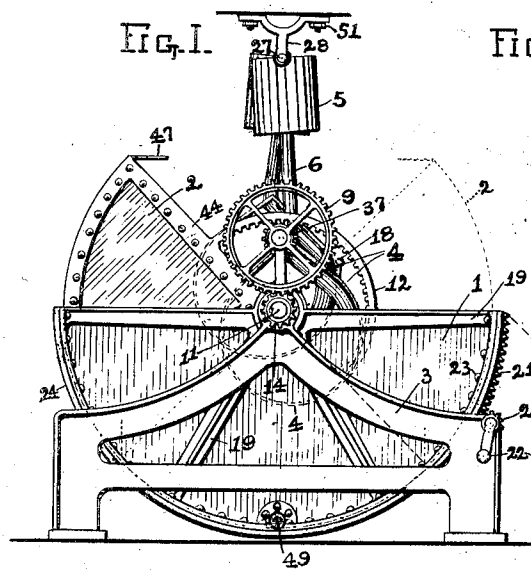


FIG. II.

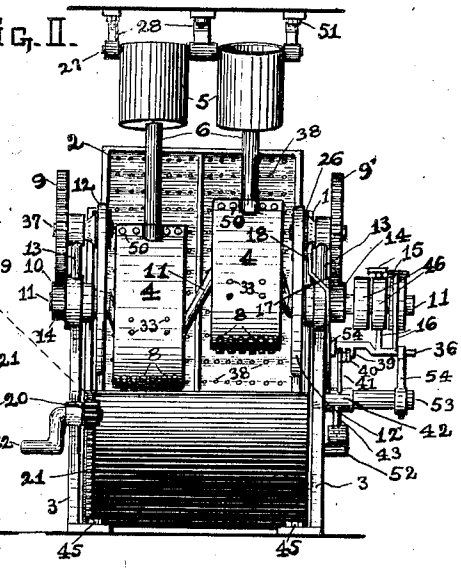


FIG. III.

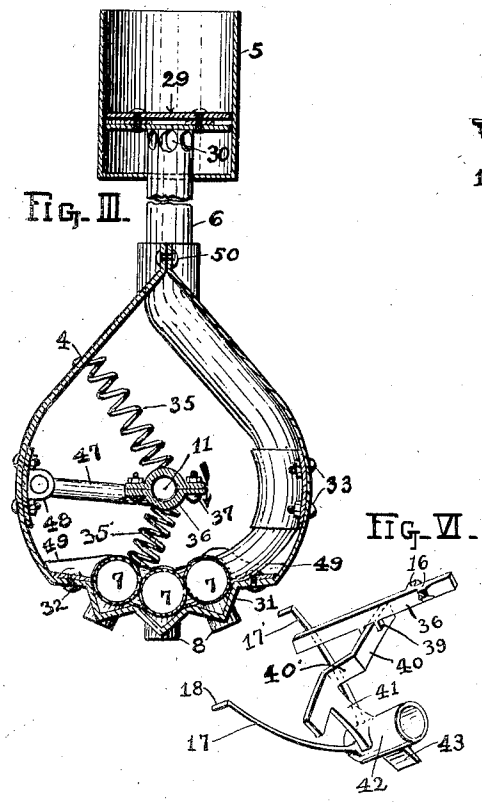


FIG. IV.

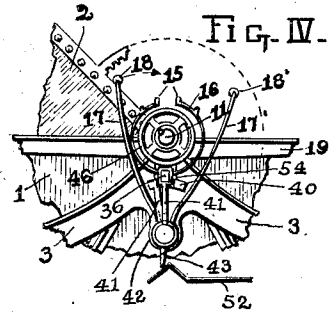


FIG. V.

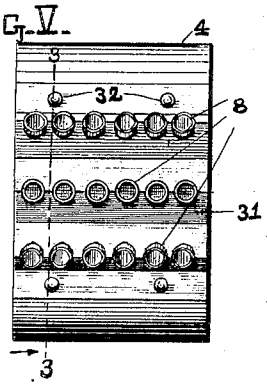


FIG. VI.

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UNITED STATES PATENT OFFICE.

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WASHING-MACHINE.

1,350,353. Specification of Letters Patent. **Patented Aug. 24, 1920.**

Application filed December 27, 1918. Serial No. 268,508.

To all whom it may concern:

Be it known that I, JOSEPH H. BAIR, a citizen of the United States, and residing in Haddonfield, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to laundry machinery and more particularly to the class known as washing machines, of the power driven type and adapted to do washing on a commercial scale.

The primary object of the invention is to afford a mechanism which combines in one simple organization means for performing several operations at a time on the mass of wash placed therein to be washed. These operations are, squeezing, rubbing, injecting water and air, swishing, separating and turning, aerating and suctioning.

Another object of the invention is to provide means for easily and quickly changing the water, and also for loading and unloading the machine with facility.

To this end, I provide the mechanism set forth in the accompanying drawings and description thereof. In the drawings:

Figure 1, is a side view of the machine shown in operative relation.

Fig. 2, is a front view showing both outer and inner tubs tilted so as to admit of easy loading and unloading.

Fig. 3, is an enlarged detail of one of the gryatory agitators, and its tank in which a piston is fitted.

Fig. 4, is a detail of the mechanism by which the pulleys are reversed at the end of the up-tilt of the inner tub.

Fig. 5, is a detail of the bottom of an agitator showing the suction pipes, and

Fig. 6, shows in perspective the shifting mechanism shown in Fig. 4.

The operation of the machine is as follows: A large tub 1, forming a half cylinder, is pivotally mounted on a housing frame 3. This tub is normally held in a horizontal position, but may be up-tilted by means of a handle 22 having a pinion 20 thereon in gear with a rack 21 on the tub. Inside and conforming to it and being pivoted in common with it is another tub 2. These tubs are preferably constructed in the conventional way, having proper end frame work 44, with radially disposed braces 19 and planks 24 bolted to the frame by means of screws or rivets 23. The ends may be of wood or copper plates.

At the pivotal or axial point is a cross-crank shaft 11 having fast thereon at the respective sides pinions 11 and 14. These pinions 11 and 14 are respectively in mesh with gears 9 and 9′, which have small pinions 37 and 26 axially fast thereto and in mesh with internal racks 12 and 12′ on the inner tub 2. The intermediate gears 9 and 9′ and their respective pinions 37 and 26 are supported and have their bearing in an upward extension 13 from the main frame 3. The inner tub 2 has perforations 38 so that the water in the outer and inner tubs may freely communicate. The crank-shaft 11 has two or more agitators 4 thereon, connected with it by means of a bearing 36 on the end of an arm 47, pivoted at 48. The two parts of the bearing box are held together by means of bolts 37. There are two tension springs 35 and 35′ which hold the bearing 36 in about the same position in relation to the agitator 4, except when it is borne down on a thick mass of wash the springs allow it to yield the required amount to allow the crank 11 to rotate. The agitator 4 has at its bottom where it impacts on the wash a number of open spouts 8 projecting from the cross pipe 7, associated with a common pipe 6, which communicates with the piston 29. This piston is fitted in a bucket cylinder 5 which is pivotally suspended at 27 by a frame 29 held by bolts 51. The pipe 6 communicates with the bucket 5 by means of holes 30. As the shaft 11 revolves the agitator 4 performs a gyratory movement, moving the piston 29 up and down in the bucket 5. As it moves down the water in the bucket is forced out through holes 30 down the pipes 6 and 7 and from the nozzle 8, forcing the ejected water and air through the water and through the clothes, filling the water and clothes with bubbles which loosen the dirt equivalent to boiling. As the agitator 4 is tilted, piston 29 rises in the cylinder 5 sucking water and air, forming a suction on the spouts 8 which tend to adhere the clothes thereto. This carries the top ones up and forward until the end of the lift, when they are dropped and repelled by the gush of water from the nozzles 8 caused by the piston 29 moving down. As the agitators work in alternate relation to each other, it is preferable to have a partition between the respective agitators in tub 2.

As the operation proceeds the down end of the inner tub gradually rises and the wash is gradually moved toward the rising end, and the tendency is always to turn the inside wash outward. At the end of the up tilt of the inner tub, the belts are shifted and the operation is reversed. This takes place automatically in the following manner:

On the power end of shaft 11 are three pulleys 46, the middle of which is loose, and the end ones fast. An axially sliding bar 36 is held at the outer end by a support 54 fast on rod 53. On this bar 36 are two upright arms 16, having at their free end guard loops through which the drive belts pass. These guards are on adjacent pulleys so that one of the belts is on the loose pulley and the other on a fast one. One belt is straight and the other with a half twist. On bearing shaft 53 is mounted a shift mechanism 42, having below a projection 43 in contact with stiff spring 52. Projecting upward are three arms. The first, 42 has a curved angular sector 40 resting in the slot 39 of the sliding shift piece 36. The latter two 17—17′ extend upward also and have the free ends 18—18′ turned in into the path of the tub 2. As the tub 2 up tilts at the 18 end it abuts against 18 and carries arm 17 with it until lug 43 has been dragged over the hump of shifting spring 52, when arm 17 drops away from its contact with the up end of the tub and member 17′ with its turned in end 18′ drops against the down end side rim. The sector 40, resting in slot 39 of the slide 36 shoots through said slot and by means of the incline 40′ thereon, shifts 36 and the belts controlled thereby.

The agitator 4 is covered with a plate corrugated and indented at 31 to meet the requirements and fastened to the pipe 6 and supporting it by means of bolts 32, 33 and 50. The machine may be anchored to the floor by means of bolts 45. The outer tub 1 has connections 49 at either side by means of which hose may be attached, the one by means of which to put in water and the other to withdraw it. Water way be added and withdrawn while the washing operation proceeds.

Numerous departures from the exact construction described may be resorted to without affecting the spirit of the invention.

I claim:

1. In a washing machine the combination of an agitator, an ejection and suction device constituting an oscillating sliding guide for the agitator, and means for imparting motion of translation in a curved path to the agitator.

2. In a washing machine the combination of an agitator having outlet and inlet openings, an oscillating piston and cylinder constituting a guide for the agitator and passages coöperating with said openings, and means for moving said agitator in a circular path.

3. In a washing machine the combination of an agitator having outlet and inlet openings, a piston and cylinder and passages communicating with said openings, and means for imparting gyratory movement to the agitator.

4. In a washing machine the combination of an agitator having outlet and inlet openings, a piston and cylinder and passages communicating with said openings, means for operating said agitator including a crank, and a yielding connection interposed between the shaft of the crank and the agitator.

5. A washing machine comprising the combination of nested tub sections relatively movable about a horizontal axis, impact ejection and suction mechanism coöperating with the tub sections, and means for operating said parts including the gyration of said mechanism.

6. A washing machine comprising the combination of a tub element, an agitator adapted for ejection and suction and means for imparting oscillating motion to the tub section and gyratory motion to the agitator.

7. In a washing machine the combination of a crank shaft, an agitator carried by and with the crank and provided with outlet and inlet openings, a piston and cylinder operatively arranged in respect to the agitator for guiding it, an oscillating tub element coöperating with the agitator, and means for actuating the parts.

JOSEPH H. BAIR.