No. 648,999. Patented May 8, 1900.

W. RUTHVEN.

WASHING MACHINE.

(Application filed Mar. 22, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

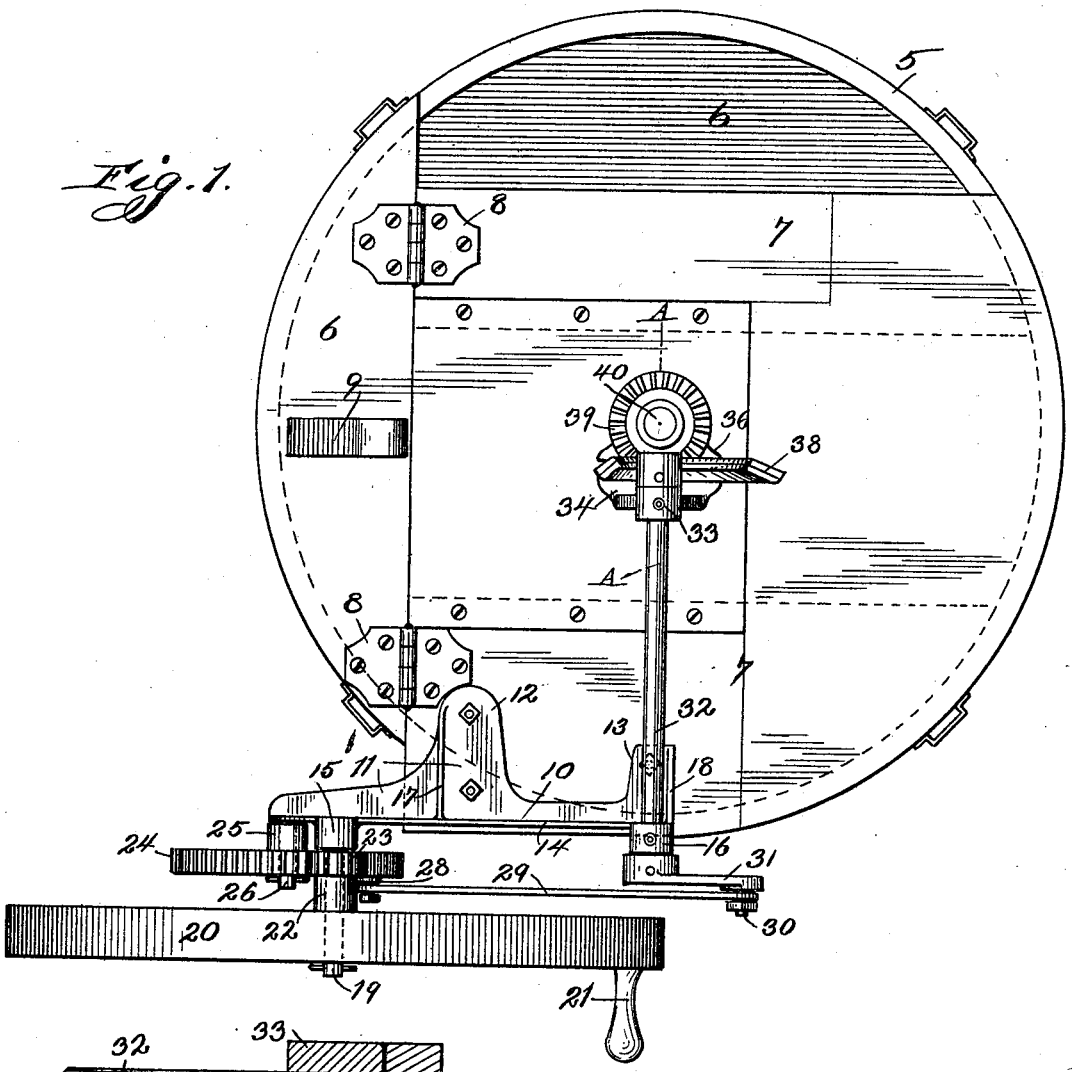
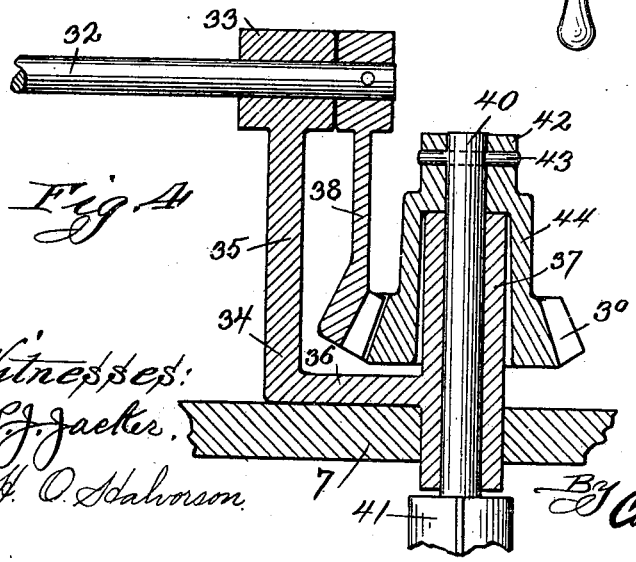


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

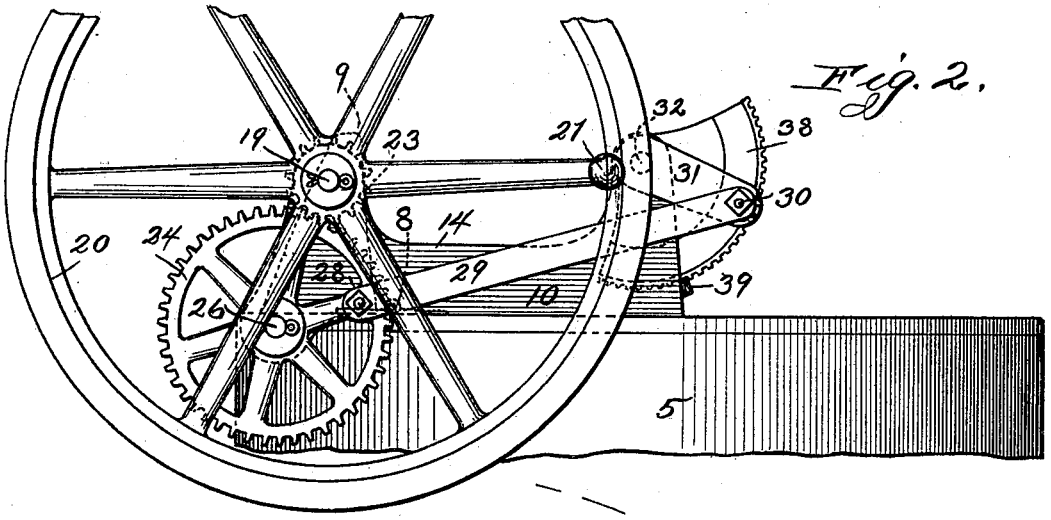
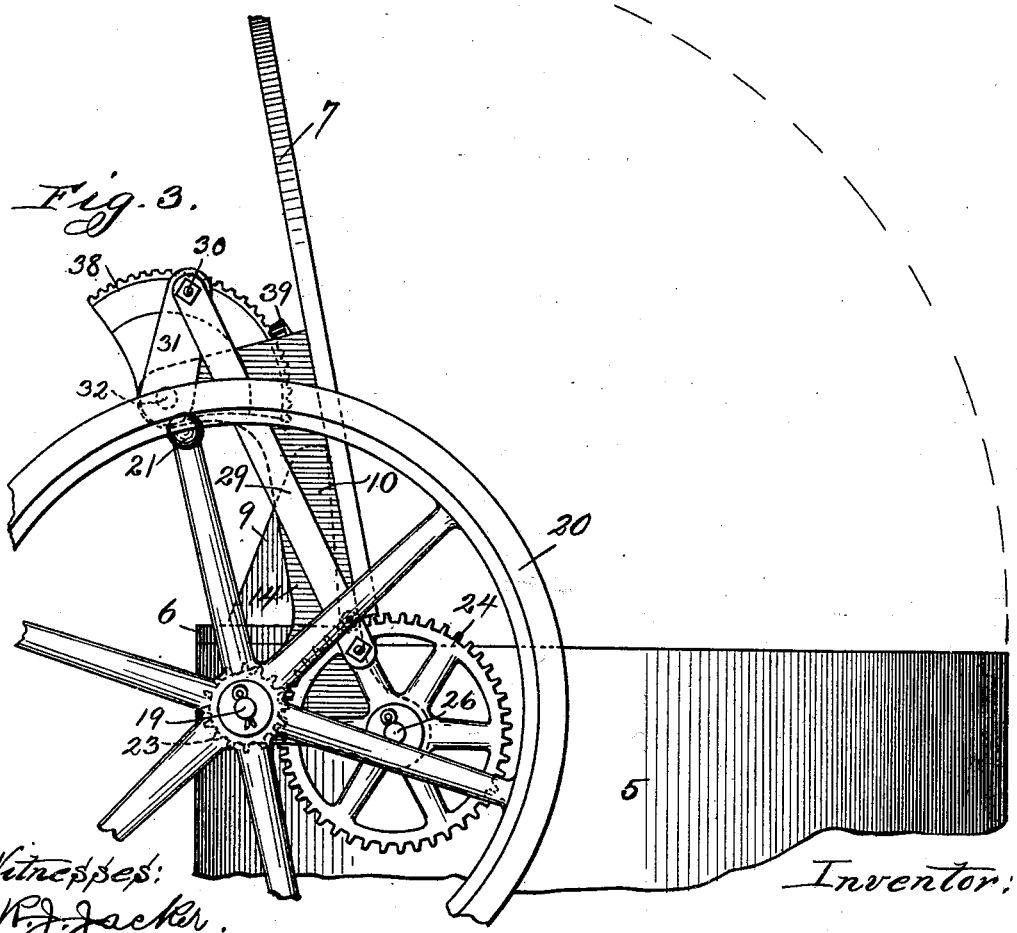


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM RUTHVEN, OF CHICAGO, ILLINOIS.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 648,999, dated May 8, 1900.

Application filed March 22, 1900. Serial No. 9,704. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM RUTHVEN, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

My invention relates to certain new and useful improvements in washing-machines of the type where continuous rotary movement of the operating-handle is transformed into a reciprocating movement of the stirring-shaft; and it is intended, among other things, to produce a machine that shall run steadily and with as little of a jar as possible resulting from the continual reversal of the stirring-shaft.

My invention further relates to such a machine in which the weight of the operating mechanism is so distributed relative to the pivotal point of the lid of the tub to which it is applied that while the lid is held securely closed, yet it is so balanced that it can be opened readily without the necessity of directly lifting all the weight of the mechanism and so that after it is partly opened it will open automatically the rest of the way and be held open with the weight of the mechanism so located that the center of gravity thereof is still within the base of the tub, so as to prevent the tendency of the tub to tip over, which is found in the ordinary machines where the mechanism when the lid is opened has its center of gravity thrown out of the base of the tub, thus tending to decrease its stability.

To fully illustrate my invention, I annex hereto two sheets of drawings, in which the same numerals of reference designate identical parts in all the figures, of which—

Figure 1 is a plan view of my invention as attached to the tub. Fig. 2 is a side elevation of the same, the parts being in the position assumed when the tub is closed and the machine is ready for operation. Fig. 3 is a similar view, but with the lid of the tub raised; and Fig. 4 is a vertical section, on an enlarged scale, on the line A A of Fig. 1.

While I may employ my invention in connection with any desired shape of a tub, I preferably employ one the body 5 of which is of a circular shape and which is provided with a cover 6, the central portion of which is made up of the lid 7, which is pivoted at one side thereof by means of the hinges 8. The stop 9, which I preferably construct of a piece of scrap-iron curved into the shape shown in Figs. 2 and 3, is so located that when the lid is opened it rests against the stop, being held securely thereto by the weight of the mechanism to be described.

Securely bolted to the edge of the lid 7 is the bracket or framework 10, which consists of the horizontal flange 11, having the horizontal projections 12 and 13 thereon extending over the edge of the lid, to which the projections are similarly bolted, thus furnishing a support for the entire frame. This frame also has a vertical flange or web 14, which carries in either end thereof the bearings 15 and 16. The strengthening-flanges 17 and 18 are preferably provided, extending from the projections 12 and 13, respectively, to the vertical flange 14. The bearing 15 is in the form of a lug supporting the stub-shaft 19, on which is journaled the heavy fly-wheel 20, which may be provided with the handle 21 or which may be run by power, if desired. The hub 22 of this fly-wheel is provided with a small gear-pinion 23, which is preferably located next to the bearing-stud 15 and which meshes with the gear-wheel 24, the slightly-elongated hub 25 of which is mounted upon the stub-shaft 26, projecting from a portion of the flange 14, which extends below the horizontal web 11 in the position clearly shown in Fig. 2. The gear-wheel 24 is provided with an eccentric-pin 28, upon which is pivoted one end of the link 29, the other end of which is similarly pivoted to an eccentric or crank pin 30 on the crank-arm 31, secured upon the outer end of the rock-shaft 32, one end of which is journaled in the bearing 16, while its other end is journaled in the bearing 33, formed in the upper end of the bracket 34, which is secured in the lid of the tub near its center. The bracket 34 has the vertical web 35, which carries the bearing 33 and also the horizontal web 36, by which it is bolted or otherwise secured to the lid, and which is provided with the elongated vertical bearing 37, the lower end of which projects down through the lid of the tub, while the upper end thereof extends upward for some distance. Secured upon the inner end of the rock-shaft 32 is the segmental bevel-

gear 38, which meshes with a bevel gear-pinion 39, secured upon the upper end of the reciprocating shaft 40, which extends down into the tub through the bearing 37 and has secured upon its lower end the stirrer 41. The bevel gear-pinion 39 has the upper end formed with the collar 42, which fits snugly upon the shaft 40, to which it is secured, as by the pin 43, while the portion below the collar 42 is tubular, as shown at 44, and surrounds the upper end of the bearing 37, which thus serves as a bearing both for the shaft 40 and the gear-pinion 39.

The mode of operation of the complete device will be readily apparent. As the crank-arm 31 is considerably longer than the distance of the eccentric-pin 28 from the center of the gear-wheel 24, upon which it is located, the slow rotation of the gear-wheel 24, imparted to it by the gear-pinion 23, secured upon the driving-wheel, will impart the rocking movement to the shaft 32, and as the gear-segment 38 is in mesh with the bevel gear-pinion 39 constantly the continued rotary movement thus imparted to the driving-wheel 20 will be transformed into a reciprocating rotary movement imparted to the stirring-shaft 40.

By consideration of the location of the mechanism it will be seen that a very considerable portion of it is located beyond the pivotal point of the lid, so that while the lid is closed and the machine is ready for operation the weight of the mechanism will tend to hold the lid down, yet when the lid is open a considerable portion of the weight of the mechanism is balanced against the rest of it, so that in opening the lid it is necessary to lift only a small portion of said weight, thus making it possible to lift the lid with but little exertion. Moreover, as the lid is raised nearly to a vertical position the center of gravity of the mechanism is shifted, so that the weight of the mechanism tends to open the lid the rest of the way. It will also be apparent that inasmuch as the center of gravity is located close to the line of the hinges on the lid no matter what position the lid may be in the center of gravity of the mechanism always falls within the base of the tub and there is no tendency to tip the tub over in the direction in which the lid is turned.

It will be apparent that by means of the construction which I have devised a smooth and even movement will be given to the mechanism, and the weight of the large driving-wheel 20, which acts as a sort of a fly-wheel, serves to store up enough power so that the machine moves steadily in spite of the necessary continual reversal of the direction of movement of the stirring-shaft 40.

While I have shown my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of some modifications and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the prior state of the art.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a washing-machine, the combination with the bracket 10 upon the lid at the edge of the tub, of the stirring-shaft 40 journaled in said lid, a driving-wheel 20 journaled on said bracket, and connections for transforming a rapid rotary movement of said wheel 20 to the slower rotary reciprocating movement of said stirring-shaft 40, said connections comprising the gear-wheel 24 journaled on said frame and meshing with the gear-pinion 23 connected to said driving-wheel, a bevel gear-pinion 39 secured upon said shaft 40, the rock-shaft 32 journaled in said frame 10 and having the bevel-gear 38 at one end meshing with said bevel gear-pinion 39, and a crank-arm 31 at the other end, crank-pins 28 an 30 upon the wheel 34 and the crank-arm 31, respectively, and the link 29 connecting said crank-pins.

2. In a washing-machine, the combination with the bracket 10 mounted upon the lid at the edge of the tub, of the stirring-shaft 40 journaled in a bracket 34 mounted upon said lid, said bracket 34 having the vertical bearing 37 for the shaft 40, a driving-wheel 20 mounted on said bracket 10, a gear-wheel 24 journaled on said frame 10 and meshing with the gear-pinion 23 connected to said driving-wheel, a bevel gear-pinion 39 secured upon said shaft 40, a shaft 32 journaled in said frame 10 and in the bearing 33 on the bracket 34 and having the bevel-gear 38 at its inner end meshing with said bevel gear-pinion 39 and a crank-arm 31 at its outer end, crank-pins 38 and 40 upon the wheel 24 and the crank-arm 31, respectively, and a link 29 connecting said crank-pins, all operating substantially as and for the purpose described.

3. In a washing-machine, the combination of the lid 7 carrying the bracket 34 consisting of the vertical flange 35 having the bearing 33 therein, and the horizontal flange 36 having the elongated vertical bearing 37 secured thereto, with the rock-shaft 32 mounted in the bearing 33, and terminating in the gear-segment 38, the stirring-shaft 40 mounted to rotate in the bearing 37 and having the gear-pinion 39 thereon meshing with the gear-segment 38 secured thereto by the collar 42 resting upon the upper end of the bearing 37, substantially as and for the purpose described.

4. In a washing-machine, the combination of the tub having the lid pivoted thereto and a stirring-shaft rotatably mounted in said lid, a framework secured to said lid, a drive-wheel mounted in said framework, and connections between said driving-wheel and the stirring-shaft for transforming the continuous rotary movement of said drive-wheel to a reciprocating rotary movement of said stirring-shaft, said connections being so arranged and ad-

justed that a considerable portion of the weight thereof is beyond the pivotal edge of the lid.

5. In a washing-machine, the combination of the tub having the lid pivoted thereto and a stirring-shaft rotatably mounted in said lid, a framework secured to said lid, a heavy drive-wheel journaled in said framework beyond the pivotal edge of the lid, and connections between said drive-wheel and the stirring-shaft for transforming the continuous rotary movement of said drive-wheel to a reciprocating and rotary movement of said stirring-shaft.

6. In a washing-machine, the combination of the tub having a lid pivoted thereto and a stirring-shaft rotatably mounted in said lid, a framework secured to said lid and extending beyond the pivotal edge thereof, a heavy drive-wheel mounted in said framework and having the gear-pinion 23 connected thereto, a gear-wheel 24 mounted in said framework beyond the pivotal edge of the lid and beneath the gear-pinion 23 with which it meshes, and connections between said gear-wheel 24 and the stirring-shaft for transforming the continuous rotary movement of said gear-wheel into a reciprocating rotary movement of the stirring-shaft.

7. In a washing-machine, the combination of the tub having a lid pivoted thereto and a stirring-shaft rotatably mounted in said lid, a framework secured to said lid and extending beyond the pivotal edge thereof, a heavy drive-wheel mounted in said framework and having the gear-pinion 23 connected thereto, a gear-wheel 24 mounted in said framework beyond the pivotal edge of the lid and beneath the gear-pinion 23 with which it meshes, and connections between said gear-wheel 24 and the stirring-shaft for transforming the continuous rotary movement of said gear-wheel into a reciprocating rotary movement of the stirring-shaft, said connections comprising the link 29 connected to an eccentric-pin on the wheel 24 and to a crank-pin 30 on the crank-arm 31 secured to the shaft 32 journaled in the frame 10 and having the gear-segment 38 on its outer end meshing with the bevel gear-pinion 39 secured to the upper end of the stirring-shaft, substantially as and for the purpose described.

8. In a washing-machine, the combination of a tub having a lid pivoted thereto, and a stirring-shaft rotatably mounted in said lid, a framework having the horizontal web 11 secured to the edge of the lid, the vertical web 14 carrying the stub-shafts 19 and 26 upon which are mounted the driving-wheel 20 and the gear-wheel 24 respectively and the bearing 16, and driving connections between said drive-shaft and the stirring-shaft comprising the gear-pinion 23 secured to the drive-wheel 20 and meshing with the gear-pinion 24, the link 29 connected to the eccentric-pin upon the wheel 24 and to a crank-pin upon the crank-arm 31 secured to the horizontal rock-shaft 32 journaled in the bearing 16 and having its inner end with the gear-segment 38 secured thereto meshing with the gear-pinion 39 secured to the upper end of the stirring-shaft.

9. In a washing-machine, the combination of a tub having a lid pivoted thereto, and a stirring-shaft rotatably mounted in said lid, a framework having the horizontal web 11 with the projections 12 and 13 by which it is secured to the edge of the lid, the vertical web 14 carrying the stub-shafts 19 and 26, the bearing 16, and the webs 17 and 18 connecting said horizontal and vertical webs, a drive-wheel 20 mounted in said framework beyond the pivotal edge of the lid, a gear-pinion 23 connected to the hub of said wheel 20 which is mounted upon the stub-shaft 19, the gear-wheel 24 mounted in the stub-shaft 26 meshing with the pinion 23, a link 29 connecting the crank-pin 28 upon the gear-wheel 24 with a crank-pin 30 upon the crank-arm 31 secured to the horizontal rock-shaft 32 journaled in the bearing 16 and having the bevel-segment 38 secured to its inner end and meshing with the bevel gear-pinion 39 secured upon the upper end of the stirring-shaft 40, substantially as and for the purpose described.

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