

Feb. 5, 1935.

L. F. DUCKER
POWER WASHING MACHINE

1,990,272

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2 Sheets-Sheet 1

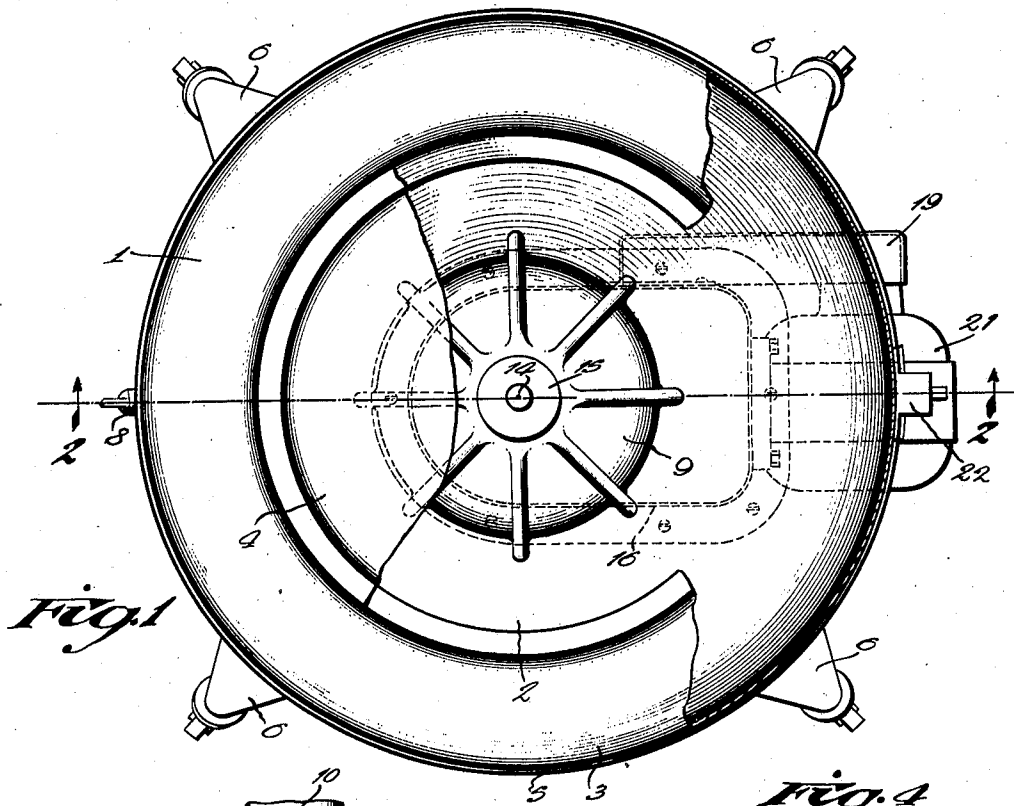


Fig. 1

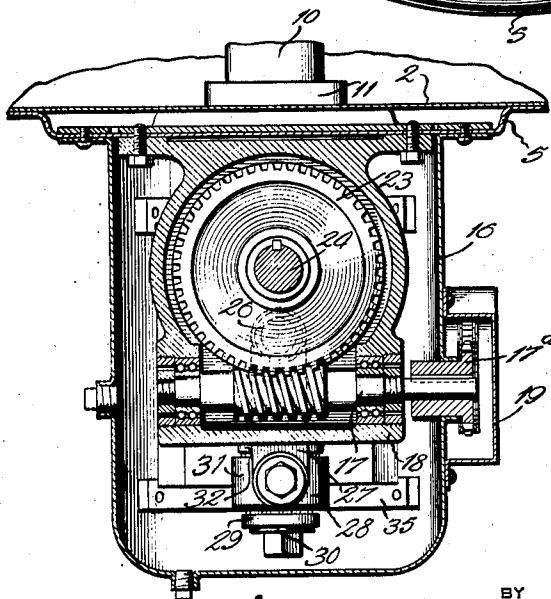


Fig. 3

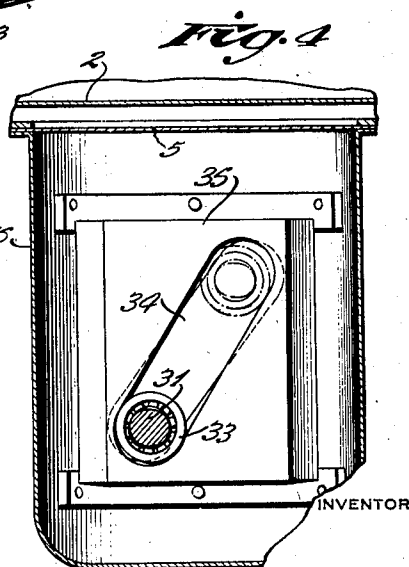


Fig. 4

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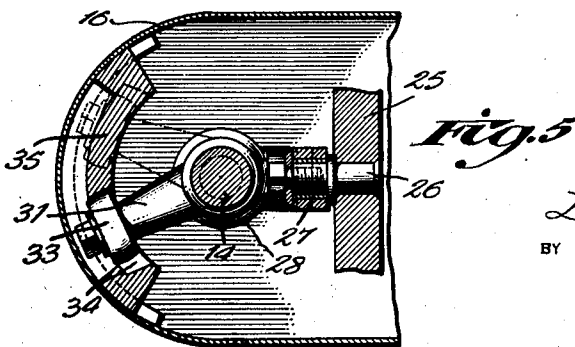
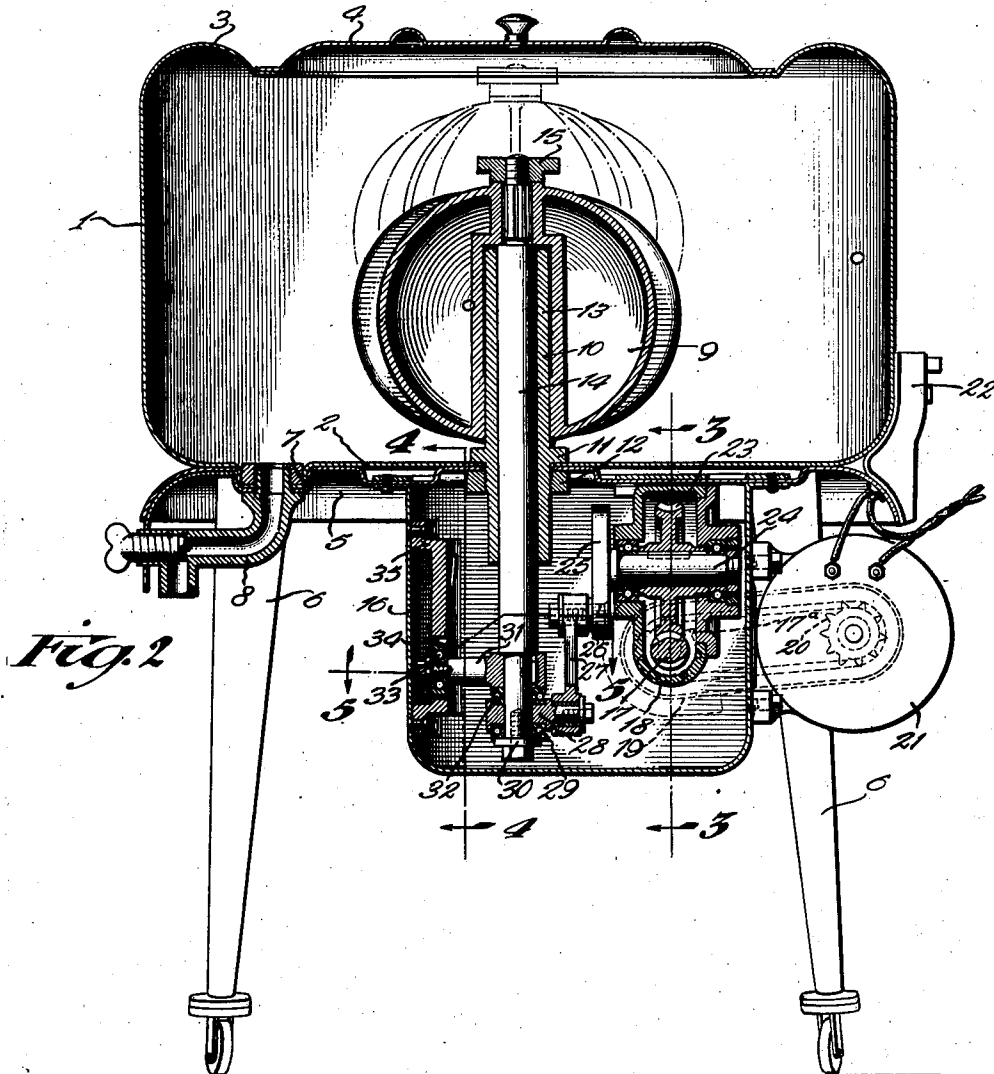
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POWER WASHING MACHINE

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2 Sheets-Sheet 2



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1,990,272

POWER WASHING MACHINE

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Application February 9, 1933, Serial No. 655,975

4 Claims. (Cl. 259—144)

This invention relates to improvements in washing machines primarily for household or domestic service and particularly to the structure of the impeller and the mechanism for operating the impeller.

An object of the invention is to provide an impeller for washing machines preferably spherical in structure with a plurality of correspondingly shaped and equally spaced vanes or blades radiating from the sphere periphery in meridian lines thereon, and tapering toward the opposite poles to impart, when the impeller is in motion, a turbulent, whirling motion to the water or contents of the washing machine tub uniformly in a plane circumferentially about the impeller and more violent or harsher in a plane midway of the impeller or the height of the contents of the tub and from which the influence of the vanes varies and diminishes toward and subdues at the opposite ends of the sphere.

Another object of the invention is to improve the construction of the washing machine impeller and to compound its motion giving it oscillatory motion on a vertical axis and reciprocal axially.

Another object of the invention is to provide a simple, efficient, and compact transmission for operating an impeller simultaneously in oscillating and reciprocating motions and imparting the motion through a shaft extending vertically into the tub and through the bottom thereof.

Other features and advantages of the invention will be more fully set forth in the description of the accompanying drawings in which:

Figure 1 is a top plan view of the improved washing machine with a portion of the top of the tub and tub cover broken away to exhibit the oscillatory and vertically reciprocating spherical impeller or gyrator centrally within the tub.

Figure 2 is a section on line 2—2, Figure 1.

Figure 3 is an enlarged section on line 3—3, Figure 2.

Figure 4 is an enlarged section on line 4—4, Figure 2.

Figure 5 is a section on line 5—5, Figure 2.

Referring to the drawings 1 indicates a tub preferably of cylindrical form rounded at the juncture of the base 2 and annular side wall with an inwardly overhanging curved or rolled shaped rim 3 terminating with an annular horizontal flange or ledge for supporting a cover 4. The tub is supported upon and secured to a table 5, the table having legs 6, preferably four in number, and the legs at their lower ends carrying castors.

The table preferably is of sheet metal form

having a downwardly flaring rim to give it the necessary rigidity as well as adding ornamental value to the structure. The bottom of the tub and table are each formed with a depressed boss nested together to form an outwardly extending nipple 7 to which a tub draining faucet 8 is secured.

An impeller 9 is journaled centrally within the tub upon a vertical journal sleeve 10 fixed to the bottom of the tub and to the table and projecting downwardly therethrough. The journal sleeve is provided with an annular flange 11 which seats and clamps against the inner side of the tube bottom and is rigidly secured by a nut 12 screw-threaded upon the journal sleeve and bearing against the under side of the table.

This method, aside from rigidly supporting the journal sleeve, provides for making a water tight joint.

The impeller comprises a spherical shell, preferably of a non-corrosive metal having a counter-bored hub 13 interior and integral therewith telescopically engaged over the journal sleeve 10 and keyed to a vertical shaft 14, journaled within the bore of the sleeve and engaged therethrough, the shaft having a shouldered engagement with the hub within the bore thereof and clamped thereto by a nut 15 screw-threaded upon the upper end of the shaft, the nut bearing against the upper end of the shell. The upper end of the shaft within a reduced diameter portion of the bore of the hub is castellated or longitudinally grooved for keying the same to the hub to rotatively couple the shaft to the shell.

The shell preferably is provided with a plurality of uniformly spaced radial vanes or blades disposed as in meridian lines vertically and tapering toward the opposite poles of the shell for gyrating the contents of the tub in alternate or diverse directions when oscillating the shell, the impellment of the contents being horizontal and intermediate of the top and bottom of the tub forcing the water or washing outwardly away from the impeller and due to the tapering form of the vanes or blades imparts a more subdued to no action toward the poles of the shell avoiding upward splashing of the water from the upper side and avoids injury or rubbing action upon the washing which may lodge beneath the impeller or be engaged thereby, the impeller being vertically reciprocated as well as oscillated.

The spherical shape of the lower end of the impeller in a downward stroke or motion of the impeller imparts an outward pressure forcing or expressing the wash goods away from the axis of

the impeller leaving no opportunity for the goods clogging or otherwise impairing the operation of the impeller, or injury to the goods.

In an operation of the machine, the tub is filled with wash water and laundry to a level which will at least submerge the lower half or section of the impeller when in its lowermost position. The vanes of the impeller in an oscillating motion and the convex lower section of the impeller in a vertical reciprocating motion impel the wash water alternately in relatively transverse direction, producing a turbulent water which washes out the soil from the detergent treated fibers of the laundry and keeps the laundry in motion. The vanes extending radially from the spherical shell, or convex upper and lower sections, and tapering toward the poles thereof produce relatively different effects due to the varying degree of arc of movement for their linear measurement, as the point closest to the center moving the least and variable in width resulting from its tapering construction sweeps a greater area at the wider portion.

The impeller is actuated by a transmission mechanism housed within a casing 16 fixed to and depending from the under side of the table completely enclosing the transmission gearing for rotating and reciprocating the shaft 14 in a lubricant tight compartment from which there is no opportunity for the lubricant to be conveyed or carried into the tub owing to the vertical position and upstanding height of the journal sleeve within the tub.

17 indicates a worm shaft horizontally journaled in ball bearings mounted in a bracket 18 dependently secured to the under side of the table and within the casing 16. One end of the shaft extends beyond one of the journals in said bracket and has a sprocket wheel 17^a keyed thereon. The sprocket wheel 17^a has an extended hub engaged through and journaled in a bearing flange formed in the transmission casing with the sprocket wheel exterior of the transmission casing and housed within a guard or casing 19 fixed to the exterior side of the transmission casing. The guard or cover 19 also encloses a second sprocket wheel 20 and a chain connecting the sprocket wheels 19 and 20. The sprocket wheel 20 is fixed upon the end of a motor shaft to an electric motor 21 mounted upon the exterior of the transmission casing 16.

22 indicates an electric switch fixed upon the tub and rim of the table for motor circuit control. The worm of the worm shaft 17 is in mesh with a worm wheel 23, housed within the bracket 18 and keyed to a shaft 24 journaled in bearings mounted in the bracket 18. A crank wheel 25 is fixed to one end of the shaft 24 carrying a crank pin 26 connecting with a pitman or link 27. The opposite end of the pitman or link 27 connects a rest pin extending from a collar 28 swivelled upon the lower end of the impeller shaft 14 and sustained by an anti-friction bearing 29 confined upon the shaft by a washer or head 30 fixed to the end of the shaft. A crank arm 31 is keyed upon the impeller shaft 14 above the collar 18 and bearing against an anti-friction bearing 32 about the shaft 14 intermediate the collar 28 and arm 31. The outer end of the crank arm 31 journals a roller 33 riding within an inclined slot or guide way 34 in a bracket 35 fixed to the interior side of an end wall of the transmission casing 16.

The inclination of the elongated slot or guide-way 34 as the impeller shaft and its crank arm 31 are reciprocated vertically shifts the crank arm 31 thereby oscillating the shaft with each revolution of the crank wheel. The impeller therefore is continuously oscillated, raised and lowered within the tub and this compound action of the impeller distributes a gyrating or whirling influence uniformly to the batch or contents within the tub and to a degree spirally.

Having described my invention, I claim:

1. In a washing machine, a tub, a driving shaft extending inwardly into the tub and an impeller within the tub fixed upon said shaft, means for simultaneously oscillating and reciprocating said shaft and impeller as a unit, said impeller constituting a spherical shell having a plurality of blades each radially extending from the periphery of the shell along a meridian line thereof, longitudinally tapering toward the opposite poles of the shell and merging with the contour thereof, the blades at a spacing apart for agitating the contents of the tub upon oscillating said impeller about its vertical axis, and the lower hemisphere of the impeller agitating the contents of the tub in directions transversely to that of the blades upon reciprocating said impeller.

2. In a washing machine, a tub, a driving shaft extending inwardly into the tub and an impeller within the tub fixed upon said shaft, means for simultaneously oscillating and reciprocating said shaft and impeller as a unit, said impeller constituting a spherical shell having a plurality of blades each radially extending from the periphery of the shell in the direction of its vertical axis and relatively spaced apart for agitating the contents of the tub upon oscillating said impeller about its vertical axis, and the lower hemisphere of the impeller agitating the contents of the tub in directions transversely to that of the blades upon reciprocating said impeller.

3. In a washing machine, a tub, an impeller journaled within the tub to oscillate about and reciprocate upon a vertical axis, means for simultaneously oscillating and reciprocating said impeller, said impeller constituting a spherical shell having a plurality of blades each radially extending from the periphery of the shell along a meridian line thereof, longitudinally tapering toward the opposite poles of the shell and merging with the contour thereof, the blades at a spacing apart for agitating the contents of the tub upon oscillating said impeller about its vertical axis, and the lower hemisphere of the impeller agitating the contents of the tub in a direction transversely to that of the blades upon reciprocating said impeller.

4. In a washing machine, a tub, an impeller journaled within the tub to oscillate about and reciprocate upon a vertical axis, said impeller constituting a spherical shell having a plurality of blades each radially extending from the periphery of the shell in a direction of its vertical axis, and longitudinally tapering toward the opposite poles of the shell to merge with the contour thereof, the blades relatively spaced apart for agitating the contents of the tub upon oscillating said impeller, and the lower hemisphere of the impeller agitating the contents of the tub in a direction transversely to that of the blades upon reciprocating said impeller.

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