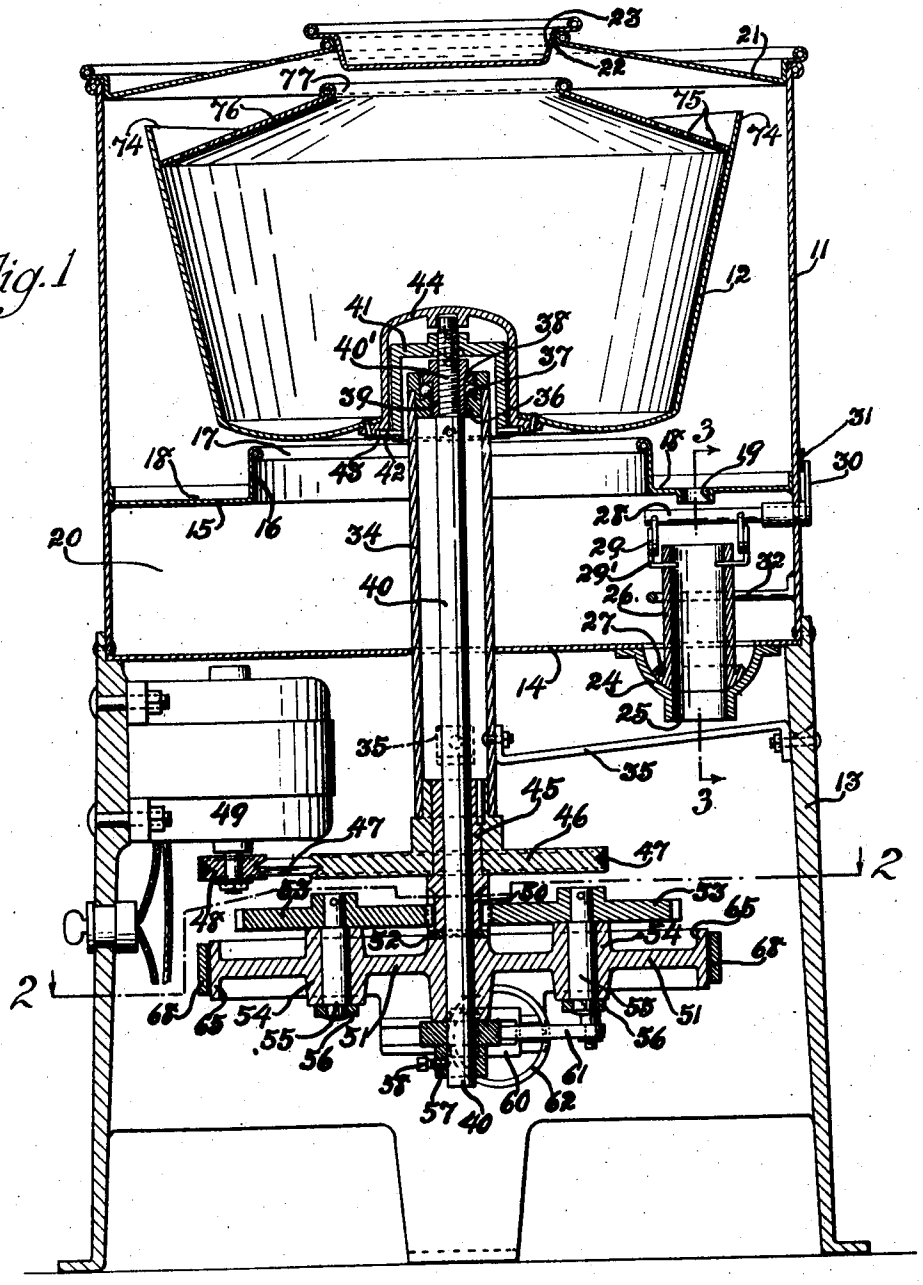
Sept. 6, 1932. L. DE VRIES 1,876,210

WASHING MACHINE

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Fig. 1



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Fig. 2

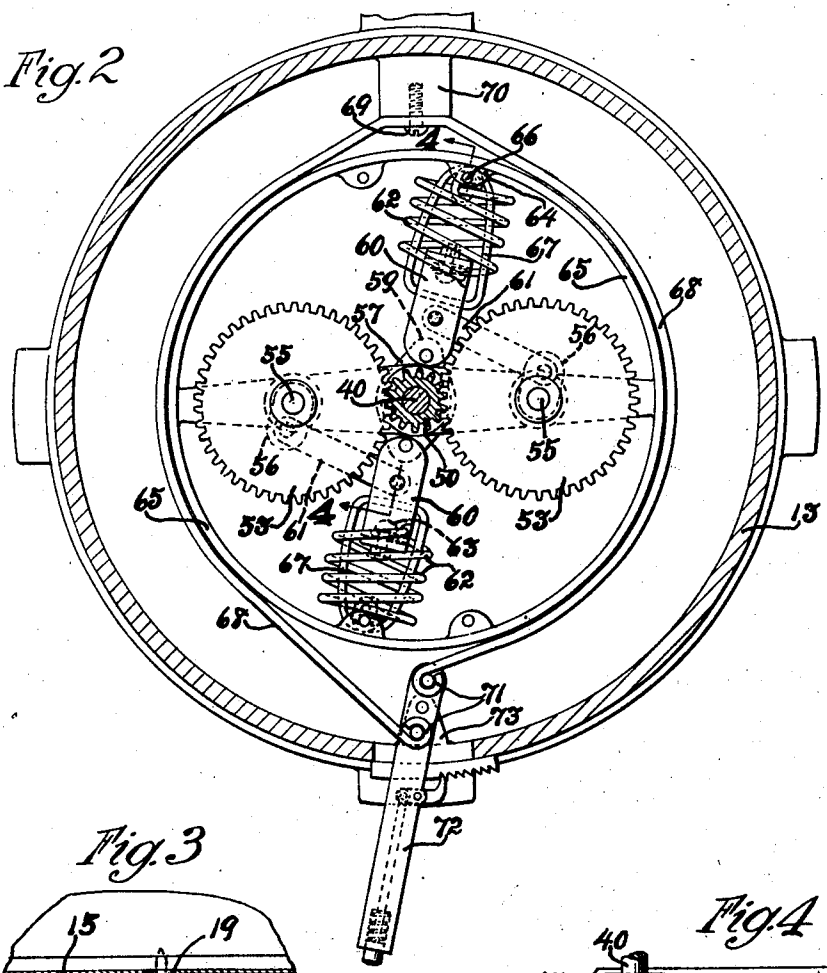


Fig. 3

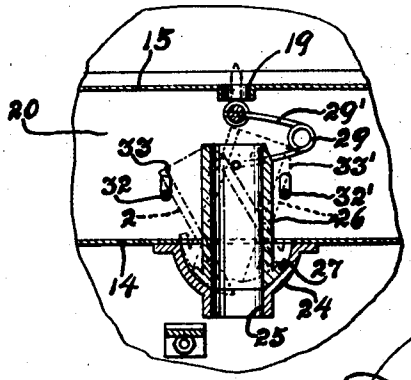


Fig. 4

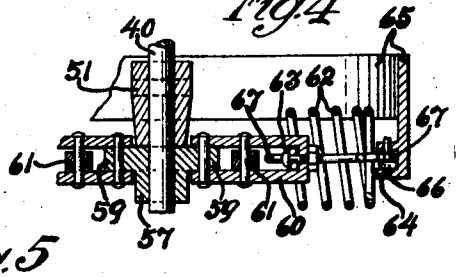
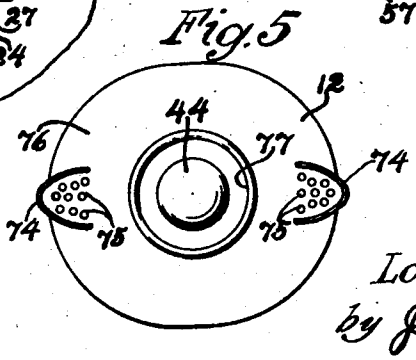


Fig. 5



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UNITED STATES PATENT OFFICE

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WASHING MACHINE

Application filed January 2, 1930. Serial No. 417,912.

This invention relates to improvements in washing machines.

One of the main objects of this invention is to provide a washing machine having one tub with means for oscillating it to wash the clothes and for rotating it to rinse the clothes. Another object is to provide such a machine with an upright shaft and a tub carried on its upper end, and means mounted on the lower part of said shaft for operating it and the tub and also to function as a counter balance, like a fly wheel, and reduce vibration of said shaft and connected parts. A further object is to provide a washing machine comprising a storage chamber and a rotary tub thereover, and adjustable means for directing wash water from the tub into the chamber for storage, also for directing water from the tub entirely out of the machine, as during the rinsing operation, and also for discharging the wash water from said storage chamber so it can be returned and reused in the tub. A still further object is to provide a washing machine with an improved bearing means.

These and other objects and advantages are attained with this invention, as will become apparent from the following description, taken in connection with the accompanying drawings, in which

Fig. 1 is a vertical sectional view illustrating my invention in its preferred form of construction.

Fig. 2 is a horizontal sectional view thereof, taken on line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view of the adjustable valve mechanism, taken on line 3—3 of Fig. 1.

Fig. 4 is a vertical sectional view of the resilient oscillating means, taken on line 4—4 of Fig. 2.

Fig. 5 is a plan view of the tub, on a smaller scale than that shown in Fig. 1.

In the drawings my invention is illustrated in its preferred form of construction, comprising a housing for enclosing the movable members. This housing includes an upper casing 11 which encloses a tub 12 for containing the washing; and a lower frame 13 whereon said casing is mounted, and which houses the mechanism for driving the tub and operating the machine.

The casing 11 is preferably cylindrical in form, including a bottom or lower wall 14, and an intermediate wall 15 which has a central upturned flange or neck 16 providing a central opening 17 therein and forming an outer annular channel or gutter 18 having a spout or outlet means 19 thereon. Said walls 14 and 15 provide therebetween a storage chamber 20 for receiving and storing for reuse the soap water which is emptied out of the tub into the gutter and issues therefrom through spout 19. A removable cover 21 on top of the casing is preferably provided with an inspection opening and inlet 22 having a removable lid 23 thereon.

This machine is provided with adjustable outlet means or valve means, which is preferably cup-shaped or substantially in the shape of a ball and socket valve having a conduit combined therewith. This means includes a socket member 24 with an outlet spout 25 provided under bottom wall 14, and a tube or conduit 26 having an integral, spherically curved flange or ball-valve means 27 at its lower end to fit closely in socket member 24. A horizontal operating shaft 28 is connected to the upper end of said conduit, by means of a pair of springs 29 each having a pair of arms 29′, one arm being secured to said shaft and the other arm to said conduit. A handle 30 on the end of the shaft, at the outside of the casing, is movable along suitable index means 31 for adjusting the valve means into the various desired positions. A curved rod member or ring 32, inside the casing, limits the sidewise movement of the valve conduit and the handle.

For adjusting or setting the valve means, the handle 30 and thereby the valve means is placed in the first position, as indicated by dotted lines at 33 at the left-hand side in Fig. 3; whereby the ball-valve will be closed and the conduit will be tilted beyond reach or entry of fluid from spout 19; so that the wash or suds which are emptied from the tub into the gutter will flow through said spout 19 into the storage chamber 20 to be retained therein, so as to be handy for later use. By

setting the handle and thereby the valve means in the second position, as shown by the full lines at the center in Fig. 3, the fluid from spout 19 will flow through conduit 26 and out through the valve spout 25, to be conducted by a suitable hose to the outside of the machine or to a waste drain; this position of the valve means being especially adapted for use during the rinsing operation of the machine, to discharge the rinse water from the tub out of the machine. By placing the handle in the third position, as indicated by the valve in dotted lines at 33′ at the right-hand side in Fig. 3, the conduit is beyond reach of the flow of fluid from spout 19, and said conduit and the integral ball-valve means 27 are raised slightly from the outlet opening in socket member 24, said valve means being forced to the left of said opening, due to the nearness of the right-hand portion 32′ of ring 32 to the conduit while in central position, whereby said portion acts as a fulcrum and said spring 29 forces the upper end toward the right and the lower end of the conduit toward the left, as viewed in Fig. 3. The stored wash water or suds will thereby flow from the storage chamber 20, and may be led from outlet spout 25, by means of a suitable hose or otherwise, to a wash-boiler or the like, and may then be returned to the tub, so that the wash water can be used several times if desired.

This construction of my machine, including my form of gutter and valve means, enables one to conveniently store the soap water and to discharge the rinse water, and to retain the clothes in the tub during the entire washing operation, without any need of removing them until they have been washed, blued, rinsed, and spun dry.

The means provided for supporting the tub comprises a hollow column or tube 34 mounted with bracket bars 35 at the center of the machine. On its upper end said tube carries the lower ball race member 36, held stationary thereby, which supports the circle or ring of balls 37 whereon travels the upper ball race member 38 provided with a sleeve 39 which extends into the lower member 36 and into the ring of balls 37. Said sleeve has the upper part 40′ of a shaft 40 threaded and secured therein to rotate therewith, and a cap 41 is threaded and secured to said part 40′, over said sleeve, to rotate therewith. Pins 42 project from the lower opposite sides of said cap, to fit in grooves or slots 43 cut in the bottom flange of a hood or cap 44 provided in the bottom or lower part of tub 12; whereby said tub is rotatable with shaft 40 and cap 41, but may be readily lifted therefrom.

The means provided for operating the shaft 40 and thereby the tub comprises a sleeve 45 which rotatably embraces the shaft and has a drive wheel 46 splined or secured thereon and driven by a belt 47 actuated by a pulley 48 secured on the shaft of a motor or power supplying member 49. A gear pinion 50 is formed on the lower end of said sleeve, and a supporting bar or supporting member 51 is rotatably mounted therebeneath on shaft 40, a bearing ring 52 being preferably placed between said bar and pinion. A pair of gears 53 is rotatably mounted on hubs 54 provided on said bar, on opposite sides of said pinion, to be driven by said pinion. Said gears are secured to axle members or stub shafts 55 which extend through said hubs and which have arms or cranks 56 secured to their lower ends.

The operating means for my washing machine comprises means for oscillating the tub, and for producing such oscillation smoothly and yieldably. This means preferably includes a collar 57 secured to the lower end of shaft 40, as by a set screw 58, and having a pair of opposite ears 59 thereon, to each ear being pivoted the legs of a yoke or U-shaped member 60. Each yoke has a link 61 pivoted with one end therein and with the other end to one of the crank arms 56 on said stub shafts 55. A coil spring 62 has one end secured within the bight portion of said yoke, by a bolt 63, and has the other end secured between a pair of lugs 64 provided on a cylindrical flange or band 65 integral with the outer ends of supporting bar 51, a pin 66 being suitable to secure said end between said lugs. An oblong closed link 67 has one end also mounted by said pin between said lugs, and its other end moves freely between the legs of yoke 60. Said link prevents any over-extension of the spring, especially after the latter has become worn or weakened, and also avoids letting the tub oscillate through a sufficient arc to get on dead center if either of the pair of springs has become weak or broken.

The above disclosed provision and arrangement of the two oppositely positioned yokes and links and springs provides a spring controlled equalizing or compensating mechanism; whereby the load between the two gears 53 is equalized; and during the reversal of motion at the end of each crank arm stroke during oscillation of the tub, it also aids in absorbing the momentum and in producing a smooth reversal of motion of the tub.

In rotating the tub, for spinning the clothes dry, the motor drives pulley 48, belt 47, wheel 46 and the therein splined sleeve 45 with its integral gear 50; and said gear moves with it the two gears 53 meshing on opposite sides thereof and being mounted on bar 51 which carries with it the links 61, yokes 60, springs 62, and collar 57 which is secured by set screw 58 on shaft 40, consequently also rotating said shaft and the tub carried thereon. During the rotation of said tub and elements said bar 51 carries with it said cylindrical flange

65 which is surrounded by a stationary brake band 68, said band during that time being disposed loosely around said flange to permit free rotation of the flange therein. Such rotation, at a comparatively high speed, is utilized for spinning the clothes dry in the tub, after the washing and the rinsing, etc., operations have been completed.

For washing the clothes the tub is oscillated, about one-third of a revolution, and at a lower rate of speed than that used in rotating the tub for the drying operation. Such oscillation is readily effected in this machine, and for that purpose I have provided the brake band 68, which may be supported at its central portion by a fastening element 69 and a lug 70 provided in frame 13, and which has its ends 71 pivoted to an operating lever or brake lever 72 fulcrumed on a lug 73 provided in said frame, substantially as indicated in Fig. 2. By tightening the brake band, the supporting member 51 is held stationary, and the rotation of pinion 50 and gears 53, will by the crank arms 56 and links 61 reciprocate yokes 60, to oscillate collar 57 with the shaft and the tub thereon, and with a smooth oscillatory movement.

As disclosed above, the tub is rotated for spinning the clothes dry, and for that purpose it is made slightly oval and is provided with curved flanges or lips 74 which project above the elongated portions of the tub. Perforations 75 are provided in the top member or cover 76 of the tub, within the confines of each of said curved flanges, and a central opening 77 is formed in said cover. Said flanges or lips are made sufficiently high to retain any wash water that may splash through the perforations while the tub is being oscillated, at the comparatively slow speed during the washing operation, and to enable the return thereof into the tub. During the continuous rotation of the tub for spinning the clothes dry, and at the comparatively high rate of speed, the centrifugal force drives the water over said flanges or lips, into the gutter 18, and to flow out through spout 19 thereon.

With this improved construction, by placing the operating mechanism at the lower end of the shaft 40, while the tub is at the top thereof, the weight of said mechanism is utilized to act as a fly-wheel and to counter balance the tub, thereby greatly reducing the vibrations of the various parts of the machine. Vibrations are further reduced and smooth running provided, by arranging the drive gears 53 at opposite sides of the shaft 40 and by providing the oppositely arranged spring controlled equalizing mechanism therebetween and linked thereto, for equalizing the load thereon.

What I claim as my invention and desire to secure by Letters Patent is:

1. Driving mechanism comprising a shaft, a supporting member on the shaft and rotary elements supported, thereon, means on the shaft for driving said rotary elements, equalizing mechanism including members driven by said rotary elements and connected with the shaft for oscillating it, and means on said members for resiliently absorbing momentum at the end of each oscillatory stroke.

2. Driving mechanism for a machine comprising a rotatably suported shaft operating means including elements mounted in balanced relation around said shaft to reduce vibrations of the parts of the machine and to move with the shaft for rotating it, said elements including oscillating means also means for resiliently absorbing the shock at the end of each oscillatory stroke, and means for retaining part of said elements stationary for said oscillating means to function and to oscillate said shaft.

3. Driving mechanism comprising a shaft, gears carried by the shaft, and equalizing mechanism including yokes, driven by said gears and connected with the shaft for oscillating it, and spring means on said yokes for absorbing momentum at the end of each oscillatory stroke.

4. Driving mechanism comprising a shaft, operating means including elements movable along with the shaft for rotating it, said elements including spring controlled equalizing means and members to drive the same for oscillating the shaft, and brake means for retaining other of said elements stationary during the oscillatory movements.

5. Driving mechanism comprising an upright shaft carrying a member on its upper end, stationary means including an upright sleeve and bearing means thereon wherein said shaft is rotatably carried at its upper end, a supporting member through which said shaft extends, gears carried on said member in balanced relation with respect to said shaft, a pinion on said shaft in mesh with said gears for driving them, a pair of balanced equalizing means connected with the lower end of the shaft to actuate it, means for oscillating said equalizing means and shaft by rotation of said gears, said supporting member being movable in unison with said shaft while it is being rotation, and means connected with said stationary means for holding said supporting member stationary while said pinion and gears rotate for the oscillation of said shaft.

6. Driving mechanism comprising a shaft, means for rotatably supporting said shaft, operating means mounted in balanced relation around the lower end of the shaft and rotatable therewith for rotating the shaft, said means including a member through which said shaft extends and gears carried rotatably by said member, spring controlled means actuated by said gears for resiliently

oscillating said shaft, driving means for driving said gears and said member and said spring controlled means together for rotating said shaft, and brake means for holding said member stationary while said gears and said spring controlled means oscillate the shaft.

7. Driving mechanism comprising a shaft and means for rotatably supporting it, operating means mounted in balanced relation around said shaft and including a supporting member wherethrough said shaft extends rotatably, gears carried rotatably by said member, a pinion rotatable on said shaft to drive said gears, spring controlled equalizing means secured to the shaft to actuate it, driving means to drive said pinion and thereby rotate said balanced operating means including said gears and spring control means for rotating said shaft, and brake means for holding said member stationary while said pinion drives said gears and said spring control means to oscillate said shaft.

8. Driving mechanism comprising a rotatably supported shaft, operating means mounted in balanced relation around said shaft and including a supporting member through the central part of which said shaft rotatably extends, gears rotatably carried in spaced relation by said member, a pinion rotatably mounted on said shaft to drive said gears, resilient equalizing means including a collar secured to said shaft and yoke means pivotally connected to said collar and having spring means thereon for connecting them with said supporting member for absorbing the shock and equalizing the end stroke during oscillation of the shaft, driving means to drive said pinion and rotate said operating means with said equalizing means and shaft in unison, and brake means for holding said member stationary while said pinion drives said gears and said equalizing means to oscillate said shaft, said brake means being readily releasible for changing the oscillatory motion of the shaft to a rotary motion.

In testimony whereof I have signed my name to this specification.

LOUIS DE VRIES.