

Oct. 6, 1931.

G. W. DUNHAM

1,825,942

WASHING MACHINE

Filed Sept. 4, 1926 3 Sheets-Sheet 1

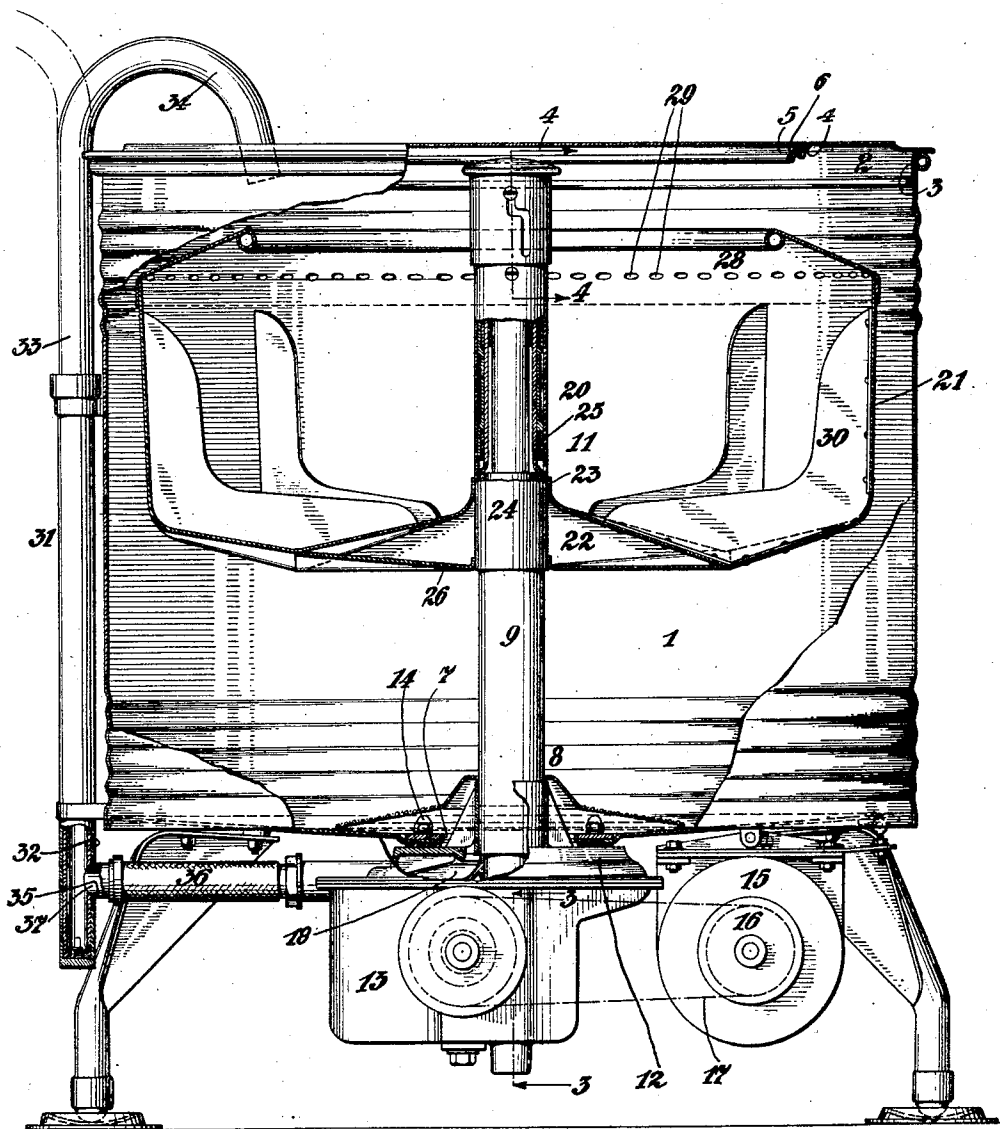


Fig. 1.

INVENTOR
GEORGE W. DUNHAM
BY *Albert M. Austin*
ATTORNEY

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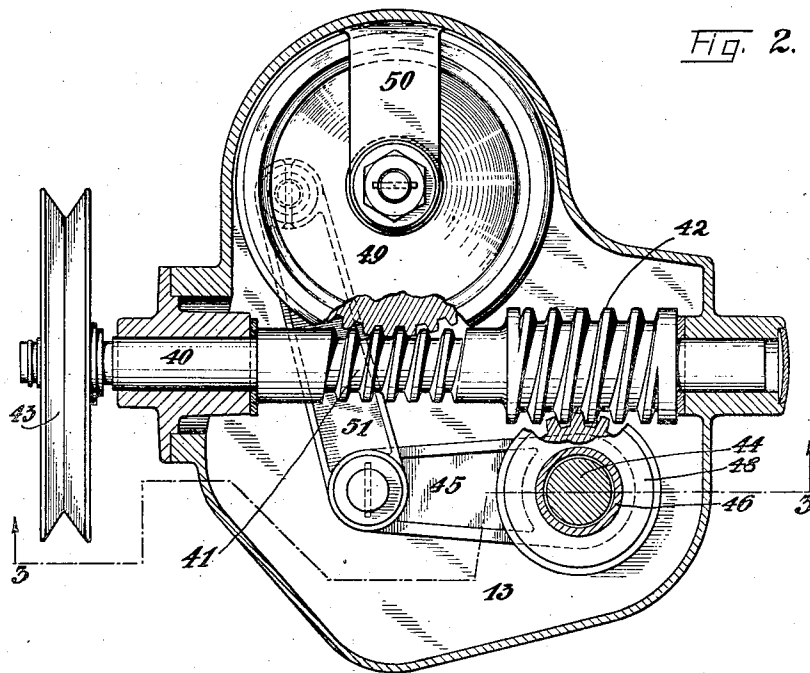
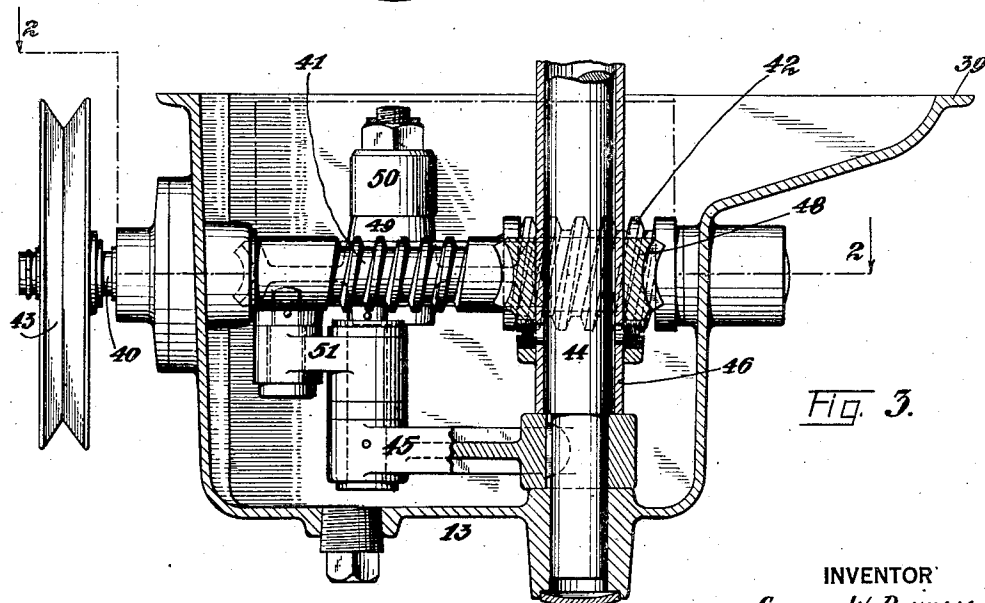
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3 Sheets-Sheet 2



INVENTOR
GEORGE W. DUNHAM
BY *Albert M. Austin*
ATTORNEY

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3 Sheets-Sheet 3

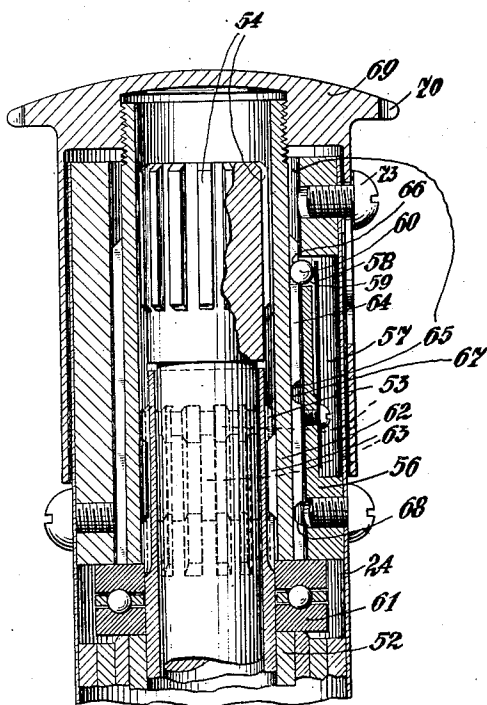


Fig. 4.

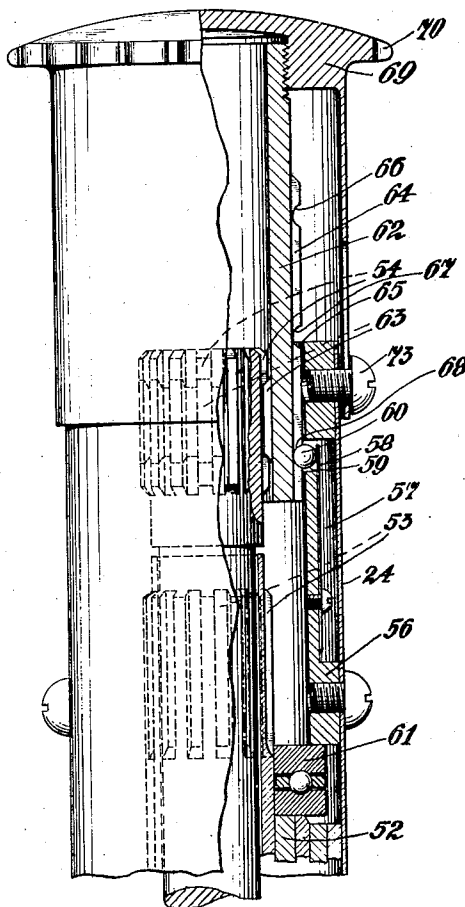


Fig. 5.

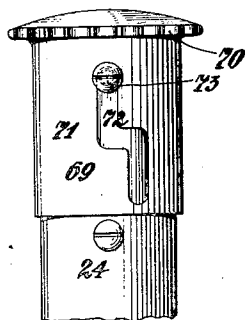


Fig. 6.

INVENTOR
GEORGE W. DUNHAM
BY *Albert M. Austin*
ATTORNEY

UNITED STATES PATENT OFFICE

GEORGE W. DUNHAM, OF UTICA, NEW YORK, ASSIGNOR TO WHIRLDRY CORPORATION,
OF NEW HAVEN, CONNECTICUT, A CORPORATION OF NEW YORK

WASHING MACHINE

Application filed September 4, 1926. Serial No. 133,678.

The invention relates to laundry machines, and, more particularly, to laundry machines of the type having a receptacle in which the laundry may be placed, and devices for agitating the laundry and laundry liquid for washing and for rotating the receptacle for centrifugal extraction of the laundry liquid.

My improved laundry machine comprises a receptacle, which may be of any well known type or of the type hereinafter described. The receptacle may be operated by a novel arrangement of gearing which gives an oscillating motion to the receptacle for washing and a continuous rotating motion for centrifugal extraction of the liquid from the receptacle, in a simple and efficient manner. Preferably the receptacle is of the imperforate type and is provided along its bottom and side walls with a series of blades or paddles for agitating the laundry when the receptacle is oscillated, the blades being so positioned that they do not tear or stretch the articles of laundry but permit limited movement of the laundry relative thereto, at the same time producing the necessary turbulence of the washing liquid and the tumbling of the laundry to cause all surfaces of the laundry to be exposed to the action of the washing liquid. Suitable means are also provided to circulate the washing liquid into the top of the receptacle during washing, the liquid overflowing and carrying the scum floating on the surface of the liquid with it.

A further feature of the invention is a novel form of clutch on the top of the receptacle for selectively connecting to the receptacle either mechanism for imparting oscillations thereto or mechanism for imparting continuous circular motion. According to the invention this clutch may be moved to certain positions for selectively washing and drying, and a neutral position for setting the receptacle at rest.

Various other objects and advantages of the invention will be obvious from the following particular description of one form of mechanism embodying the invention or from an inspection of the accompanying draw-

ings; and the invention also consists in certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the drawings in which one form of machine is shown for purposes of illustration:

Fig. 1 is an elevation of a washing machine with parts broken away to show details of construction thereof;

Fig. 2 is a section through the gear box along the line 2—2 of Fig. 3 showing the gearing arrangement;

Fig. 3 is a section through the gear box on the line 3—3 of Figs. 1 and 2, showing another view of the gearing arrangement;

Fig. 4 is a longitudinal section taken on the line 4—4 of Fig. 1 through the clutch showing the construction thereof, the clutch being in its lower position;

Fig. 5 is a side elevation of the clutch partly in section showing the clutch in its upper position; and

Fig. 6 is an elevation of the clutch showing the novel form of guide slot for preventing accidental shifting of the clutch from one operating position to another.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring now to the drawings, and, more particularly, to Fig. 1, the laundry machine shown for the purpose of disclosing the invention may comprise a tank 1 supported by the usual legs, and having a two part top. The top may comprise an outer annular ring 2 having its outer edge bent back on itself and then downwardly to form a depending flange 3 and having an inner flange 4 forming a seat in which may be seated an inner cover 5 having its edge bent back on itself and then downwardly to form a depending flange 6. The cover and outer ring may form a substantially smooth top which may be used as a table. The depending flanges 3, 4 and 6 of both the cover and outer ring may be provided with beads formed by curling the lower edges as shown.

The bottom of the tank 1 may have a cen-

tral opening 7, in which may be positioned a central assembly 8. The assembly may comprise a hollow pedestal 9 having a receptacle 11 journaled at the upper end thereof. At the lower end of the column may be placed a horizontally disposed centrifugal pump 12, at the bottom of which may be suspended a gear box 13. The pump may be secured to the bottom of the tank 1 by bolts 14 to hold the assembly 8 in position. A driving motor 15 may be suspended from the bottom of the tank, and may have a pulley 16 over which may pass a belt 17 indicated diagrammatically.

The receptacle may comprise a body 20 having an upwardly and outwardly flaring side wall 21 and a bottom wall 22 forming an annular trough 23. The receptacle may also comprise a central upstanding hub 24, which is journaled on the top of the supporting pedestal 9 by means of a sleeve bearing 25 which takes the lateral load. The bottom 22 of the body may be secured to the hub in any desired manner. The bottom of the body may be suitably radially corrugated for strength, and may have a strengthening plate 26 also radially corrugated, the outer periphery of the strengthening plate being secured to the bottom of the trough 23, the inner part of the strengthening plate being secured to the lower end of the hub 24. The corrugations on the strengthening plate 26 interfit those on the bottom 22. At the upper end of the body of the receptacle may be provided an inwardly and upwardly extending guard ring 28 for retaining the laundry in the receptacle during both washing and drying preparations. The receptacle may be provided near its top with a plurality of discharge openings 29 for discharging liquid from the receptacle.

In order to suitably agitate the laundry liquid and tumble the laundry to expose all surfaces thereof, a plurality of blades or paddles 30 may be arranged in radial planes and may be disposed around the circumference of the receptacle. Each blade may be generally L-shaped, the body of the blade generally following the contour of the side and bottom walls, the ends of the blades being rounded so that they will not catch and tear the laundry. The blades may be secured to the body in any desired manner and any desired number may be provided.

At the side of the tank may be provided a standpipe 31 comprising a riser tube 32, into which may be telescopically mounted a flow pipe 33 having a goose neck discharge nozzle 34 at the upper end for optionally discharging liquid into the receptacle, into the tank or clear of the tank. It will be understood that the top of the tank will be provided with a hole to accommodate the nozzle 34. The lower end of the riser tube has a lateral branch 35 to which may be secured a flexible hose 36 connecting with the discharge side

of the pump 12 to insure that vibrations of the assembly 8 will not be transmitted to the standpipe 31. The lower end of the flow pipe may have a lateral opening 37, which may register with the opening in the branch 35 so that, in the position shown, laundry liquid may be pumped from the bottom of the tank into the receptacle. Vertical movement of the flow pipe or lateral movement thereof will cause the opening 37 in the flow pipe and the opening from the branch 35 to go out of register, thereby acting as a valve to prevent discharge of water through the flow pipe.

According to the invention, during any operation on the laundry in the receptacle, such as washing and except drying, the flow pipe may be arranged so that laundry liquid may continuously circulate from the bottom of the tank whence it is pumped by the pump 12 through the standpipe 31 to the top of the receptacle. The continuous flow of laundry liquid into the imperforate type receptacle provides additional agitation to the liquid in the receptacle. The continuous supply of liquid in addition not only supplies the liquid lost through agitation out of the receptacle, but also causes the receptacle to overflow, carrying all the light impurities loosened from the laundry and which form a scum on the surface of the liquid.

If desired, the bottom of the receptacle may be provided with small holes to cause the heavy impurities which sink to the bottom of the receptacle to leave the receptacle, the continuous supply of liquid being sufficient that the liquid lost through these small openings is negligible in comparison with said supply.

Referring now to Figs. 2 and 3, the gear box 13 may be suitably secured to the flanges 39 on the pump 12. The gear box may have a shaft 40 suitably journaled in its side walls, the shaft having a low speed worm 41 and a high speed worm 42 thereon. Outside of the gear box and on the shaft 40 may be a pulley 43 on which runs the drive belt 17 from the motor. The pulley may have a speed-responsive clutch incorporated therein. The bottom of the gear box may be provided with a bearing in which may be seated a vertical solid shaft 44. This vertical solid shaft may have keyed thereto an arm 45, the lower surface of the arm bearing against the hub of the bearing to take the weight of the shafts above. Surrounding the inner solid shaft 44 may be a tubular shaft 46 bearing on the top surface of the oscillating arm 45. The tubular shaft 46 may have secured thereto as by means of set screws a worm wheel 48 meshing with the high speed worm 42.

Mounted on the opposite side of the worm shaft in the gear box may be a worm wheel 49 suitably supported by means of a bracket 50 extending from the wall of the gear box. This worm wheel 49 meshes with the low speed worm 41 and has pivotally secured

thereto a connecting rod 51, the other end of which is pivotally connected to the outer end of the oscillating arm 45. Pivoted connections may be made by pins, the pins being held in position in any desired manner.

Thus it will be seen that rotation of the pulley 43 and of the worms on the worm shaft 40 causes the worm wheels to rotate, the high speed worm wheel causing the tubular shaft to rotate, and the low speed worm wheel causing the solid shaft to oscillate. The size of the members in the gear box may be so arranged that the solid shaft will oscillate between 60 and 80 degrees, and the speed of the driving motor together with the gear ratios in the gear box may be arranged so that the solid shaft will oscillate about 60 oscillations per minute, and the high speed tubular shaft will rotate at a high enough speed to drive the receptacle at centrifugal discharging speed.

The concentric solid and tubular shafts extend up through the pump 12, through the hollow pedestal 9, up to the clutch shown in detail in Figs. 4, 5, and 6. The pump impeller 18 may be driven from the tubular shaft in any desired manner. The top of the pedestal 9 may be provided with an interiorly fitting cylindrical bearing 52 for journaling the tubular shaft 46. The tubular shaft may be provided at its upper end with a series of longitudinal extending splines 53. The solid shaft 44 may be provided with an enlarged upper end having longitudinal extending splines 54 similar to those on the tubular shaft.

The receptacle hub 24 may have a bearing sleeve 25 secured within to journal the receptacle on the hollow pedestal 9. The receptacle hub may have a hub sleeve 56 secured therein by any suitable means, as by means of screws. This hub sleeve 56 may have a slot 57 therein in which may be placed a leaf spring 58 which may be secured to the sleeve by means of a screw. At the upper end of the slot 57 is a hole 59 in which may be placed a ball 60 which is urged inwardly by means of the leaf spring 58. A ball bearing 61 may be placed between the hub sleeve 56 and the top of the pedestal 9 to take the weight of the receptacle 11. Positioned between the solid and tubular shafts on the one hand and the hub sleeve 56 on the other, may be a clutch sleeve 62 having a series of interior splines 63 interfitting selectively the splines 54 on the solid shaft and the splines 53 on the tubular shaft. On the outer surface of the clutch sleeve 62 may be a longitudinal spline 64 which may fit in grooves 65 on the hub sleeve 56 to prevent relative rotation between the clutch sleeve and hub sleeve. The spline 64 contacting with ball 60 may have three depressions 66, 67 and 68 into which ball 60 may be seated. These depressions allow the ball to hold the clutch

sleeve in any one of three positions, upper, neutral and lower.

The upper end of the clutch sleeve 62 may be threaded and a cap 69 may be fitted thereto, said cap having a serrated hand-grasping portion 70 and a depending skirt 71 having a slot 72 such as shown in Fig. 6 therein. A screw 73 may be passed through the slot 72 and through the hub 24 and hub sleeve 56 to prevent unscrewing of the cap 69 from the clutch sleeve 62, and also to limit the movement of the cap in a vertical direction.

Thus it will be seen that when the clutch is in the position shown in Fig. 4 the tubular shaft is operatively connected to the hub sleeve and hence to the receptacle, so that the tubular shaft rotating continuously at centrifugal discharging speed will drive the receptacle at such speed. When the clutch is at the position shown in Fig. 5 the solid shaft is operatively connected to the hub sleeve and hub so that the oscillatory motion of the solid shaft will be communicated to the receptacle for washing. When the clutch is in neutral position the rotation of the solid and tubular shafts have no effect upon the receptacle.

The slot 72 in the cap insures that when it is desired to throw the clutch from either the washing or drying position into neutral, the clutch sleeve 62 cannot be moved accidentally through the neutral position. The vertical movement of the clutch sleeve will be arrested at the neutral position by the horizontal position of the slot and before the clutch sleeve can be moved further the cap must be rotated to allow the screw 73 to register with the vertical part of the slot.

Thus it will be seen a laundry machine is provided which will wash the laundry thoroughly and with the minimum amount of wear on the laundry, and will dry the laundry on the centrifugal extraction principle. Gearing is provided which will give the desired motions to the receptacle for washing and drying, in a simple and efficient manner. A clutch is provided which is in a convenient position, which will selectively connect the receptacle to its proper driving medium in order to get the desired motion for either washing or drying.

In the foregoing description and in the claims the term imperforate type as applied to the receptacle is intended to include any type of receptacle which is sufficiently imperforate to hold laundry liquid for washing or other purposes regardless of the fact that holes may be provided for certain purposes.

While I have shown and described and have pointed out in the annexed claims certain novel features of the invention, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its operation may be made by those skilled in the art with-

out departing from the spirit of the invention.

Having thus described my invention, I claim:

- 5 1. A laundry machine comprising a tank, a hollow pedestal rising from the bottom of said tank, a receptacle having part sufficiently imperforate to hold liquid and having a central hub journaled on said pedestal, a plurality of agitator blades disposed in radial planes and secured to said receptacle, a tubular shaft extending up through said pedestal, an inner shaft within said tubular shaft, said hub having an interior hub sleeve, said inner shaft having an enlarged head above said tubular shaft, said head and tubular shaft having longitudinal splines, a clutch sleeve between said shafts and hub sleeve and having splines to selectively engage said first splines, said clutch sleeve having a spline engagement with said hub sleeve, and means for imparting to one of said shafts a continuous rotary motion and to the other of said shafts an oscillatory rotary motion.
- 25 2. A laundry machine comprising a tank, a receptacle mounted in said tank, a plurality of agitator elements disposed in and secured to said receptacle, a pair of shafts extending from said tank to said receptacle, clutch means for selectively connecting said shafts to said receptacle, and means for imparting to one of said shafts a continuous rotary motion and to the other of said shafts an oscillatory rotary motion.
- 35 3. A laundry machine comprising a tank, a pedestal rising from the bottom of said tank, a receptacle having part sufficiently imperforate to hold liquid and having a central hub journaled on said pedestal, a plurality of agitator blades disposed in and secured to said receptacle, a pair of shafts extending from the bottom of said tank up to said hub, clutch means for selectively connecting said shafts to said hub, and means for imparting to one of said shafts a continuous rotary motion and to the other of said shafts an oscillatory rotary motion.
- 45 4. In combination, a tank, a pedestal assembly supported by said tank, and comprising a pedestal having a gear box at its lower end, a receptacle having part sufficiently imperforate to hold liquid and having agitator blades secured thereto, said receptacle being rotatably mounted at the upper end of said pedestal, a drive shaft in said gear box, concentric shafts in said pedestal, gearing in said gear box connecting said drive shaft and concentric shafts, and clutch devices at the top of the receptacle for selectively connecting said receptacle to said concentric shafts, one of said concentric shafts being adapted to rotate continuously and the other of said concentric shafts being adapted to move back and forth.
5. A machine of the class described comprising a hollow pedestal, a receptacle having a central hub journaled on said pedestal, a tubular shaft extending through said pedestal and said hub, an inner shaft within said tubular shaft, said shafts and hub having non-circular portions, a clutch sleeve between said hub and said shafts, said clutch sleeve having an axial movement on the non-circular portion on said hub and engageable selectively with the non-circular portions on said shafts, and means for imparting different rotary motions to said shafts.
6. A laundry machine comprising a laundry receptacle, a tank surrounding said receptacle, agitator elements in said receptacle, means securing said elements to said receptacle so that they project inwardly from the outer walls thereof, a continuously rotating drive shaft for drying, an oscillatory rotary drive shaft for washing, and means for selectively connecting said receptacle to said shafts, the laundry being thrown against said elements during washing to obtain effective rubbing and tumbling action, both liquid and laundry being thrown against said blades during drying, said elements allowing the liquid freely to pass out of said receptacle.
7. A laundry machine comprising a laundry receptacle having part sufficiently imperforate to hold liquid, a tank surrounding said receptacle, agitator blades in said receptacle, means securing said blades to said receptacle so that they project inwardly from the outer walls of said receptacle, a continuously rotating drive shaft, an oscillatory rotary drive shaft, and means for selectively connecting said receptacle to said shafts, the laundry being thrown against said blades during washing to obtain effective rubbing and tumbling action, both liquid and laundry being thrown against said blades during drying, said blades allowing the liquid freely to pass out of said receptacle.
8. A laundry machine comprising a tank, a pedestal in said tank, a receptacle journaled on said pedestal to rotate about a substantially fixed vertical axis during both washing and drying, drive shafts extending to said receptacle, clutch means on said receptacle for selectively connecting said shafts to said receptacle, and means for imparting motions to said shafts so that when the receptacle is connected to one of said shafts, the articles of laundry will be washed and when the receptacle is connected to the other of said shafts, the articles of laundry will be dried.
9. A laundry machine comprising a tank, a hollow pedestal rising from the bottom of said tank, a receptacle journaled on said pedestal, a tubular shaft extending up through said pedestal, an inner shaft within said tubular shaft, clutch means for selectively connecting said shafts to said receptacle, a gear box secured to the lower end of said pedestal, and gearing in said gear box for

imparting a continuous rotary motion to one of said shafts and an oscillatory rotary motion to the other shaft.

10. A laundry machine comprising a tank,
6 a hollow pedestal rising from the bottom of said tank, a receptacle having a central hub journaled on said pedestal, a tubular shaft extending up through said pedestal, an inner shaft within said tubular shaft, clutch means
10 for selectively connecting said shafts to said hub, a gear box secured to the lower end of said pedestal, and gearing in said gear box for imparting a continuous rotary motion to one of said shafts and an oscillatory rotary
15 motion to the other shaft.

11. In combination, a tank, a hollow pedestal in said tank, a receptacle journaled on said pedestal, a tubular drive shaft within said pedestal, an inner drive shaft within said
20 tubular shaft, clutch means on said receptacle for selectively connecting said shafts to said receptacle, and means for imparting a continuous rotary motion to one of said shafts for drying and a back-and-forth motion to
25 the other of said shafts for washing.

12. A laundry machine comprising a laundry receptacle, a tank surrounding said receptacle, agitator elements fixedly mounted in said receptacle projecting upwardly from
30 the bottom wall thereof, means for imparting an oscillatory rotary motion to said receptacle for washing to cause the agitator elements to tumble the laundry, and means for imparting a continuous rotary motion to said
35 receptacle for drying.

In testimony whereof I have hereunto set my hand.

GEORGE W. DUNHAM.

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