May 30, 1933. A. LENNING 1,911,630

WASHING MACHINE

Filed Jan. 15, 1930 3 Sheets-Sheet 1

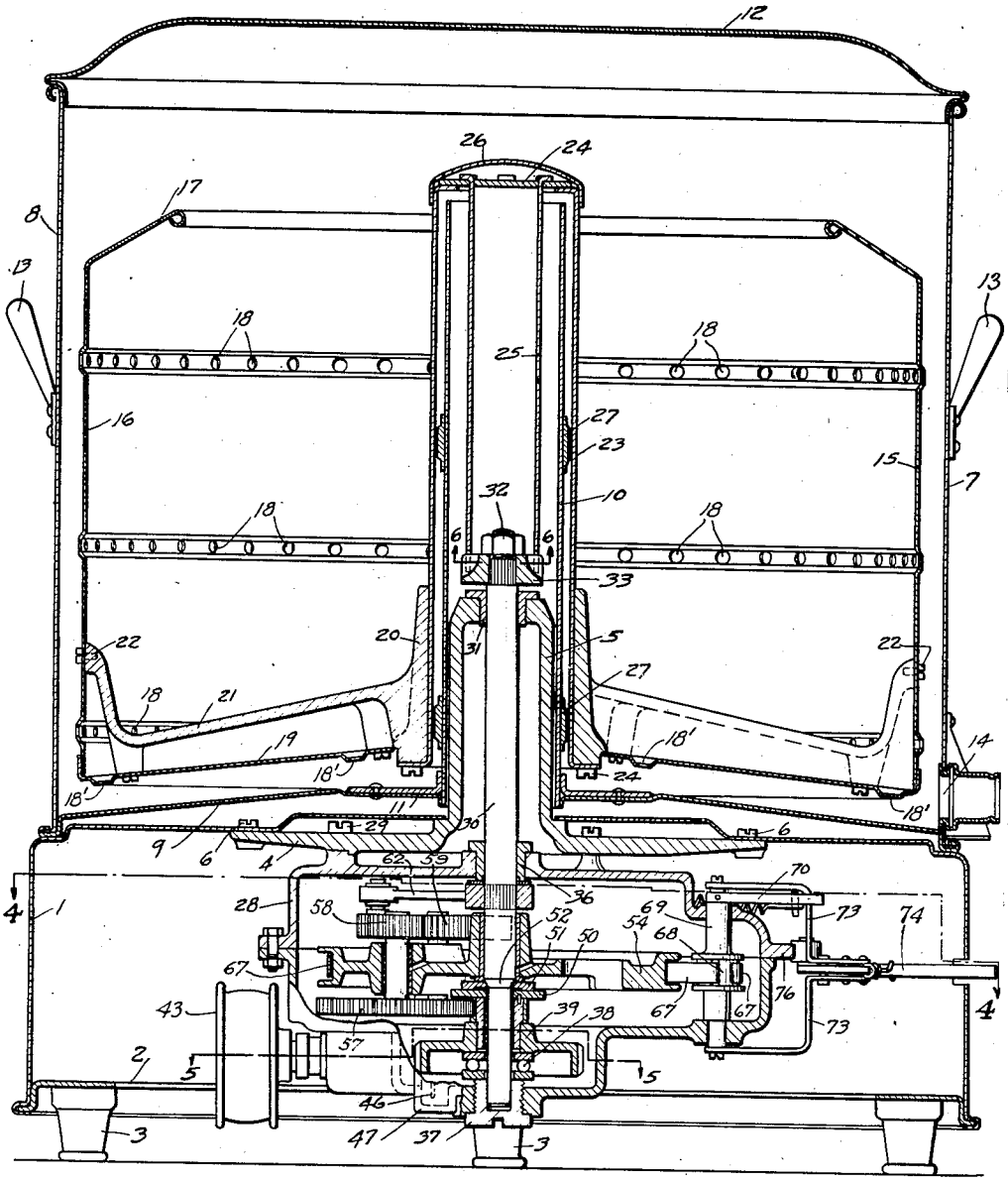


Fig. 1.

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WASHING MACHINE

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Fig. 2.

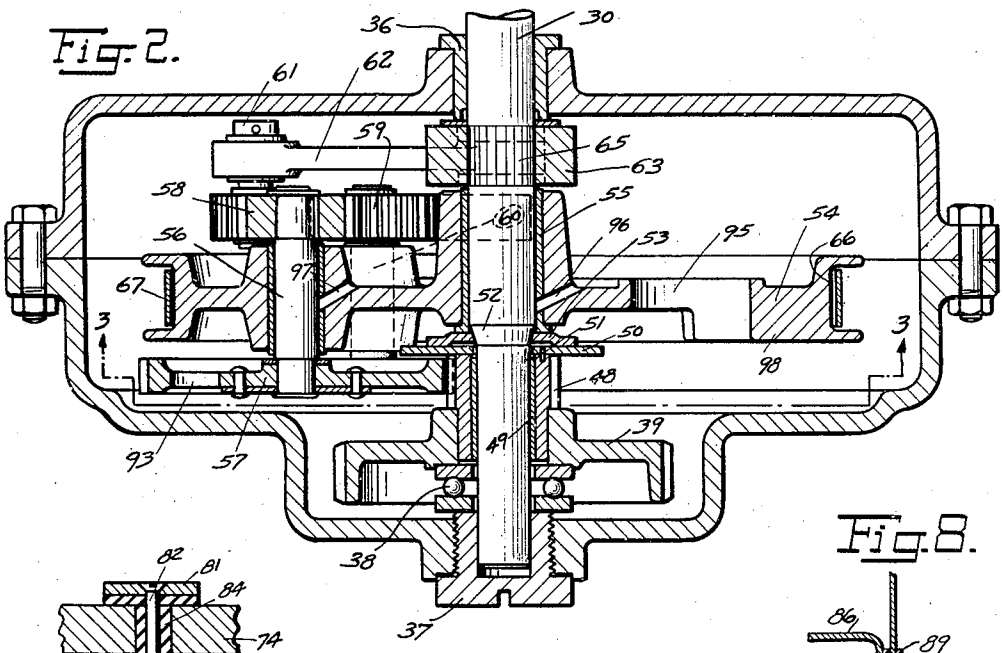
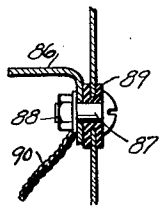


Fig. 8.



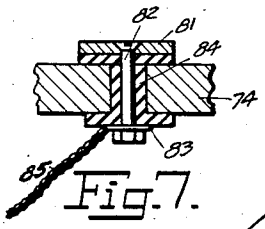


Fig. 7.

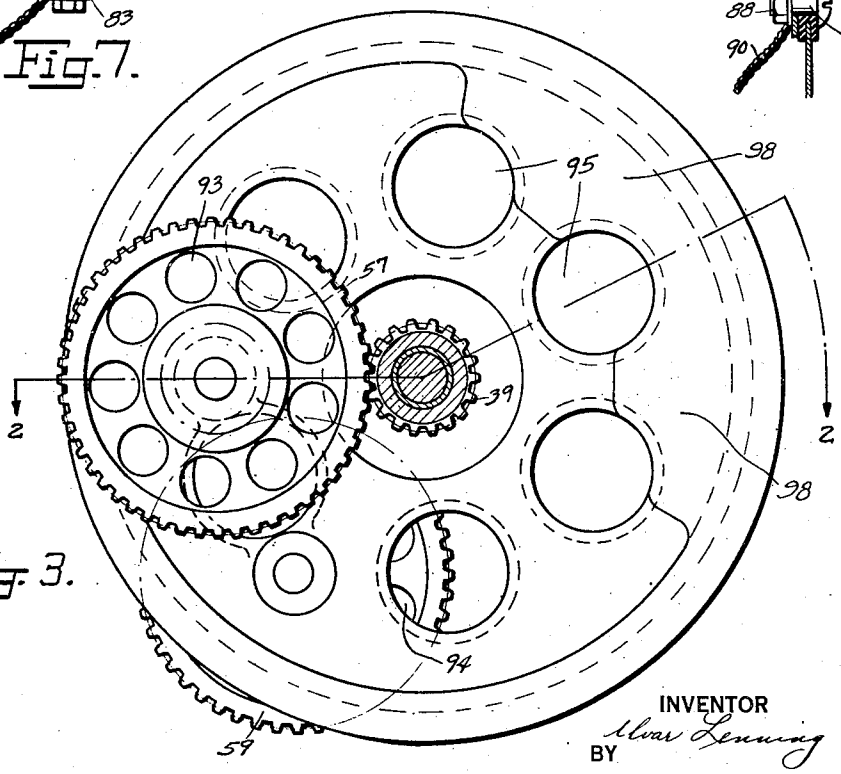


Fig. 3.

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WASHING MACHINE

Filed Jan. 15, 1930 3 Sheets-Sheet 3

Fig. 4.

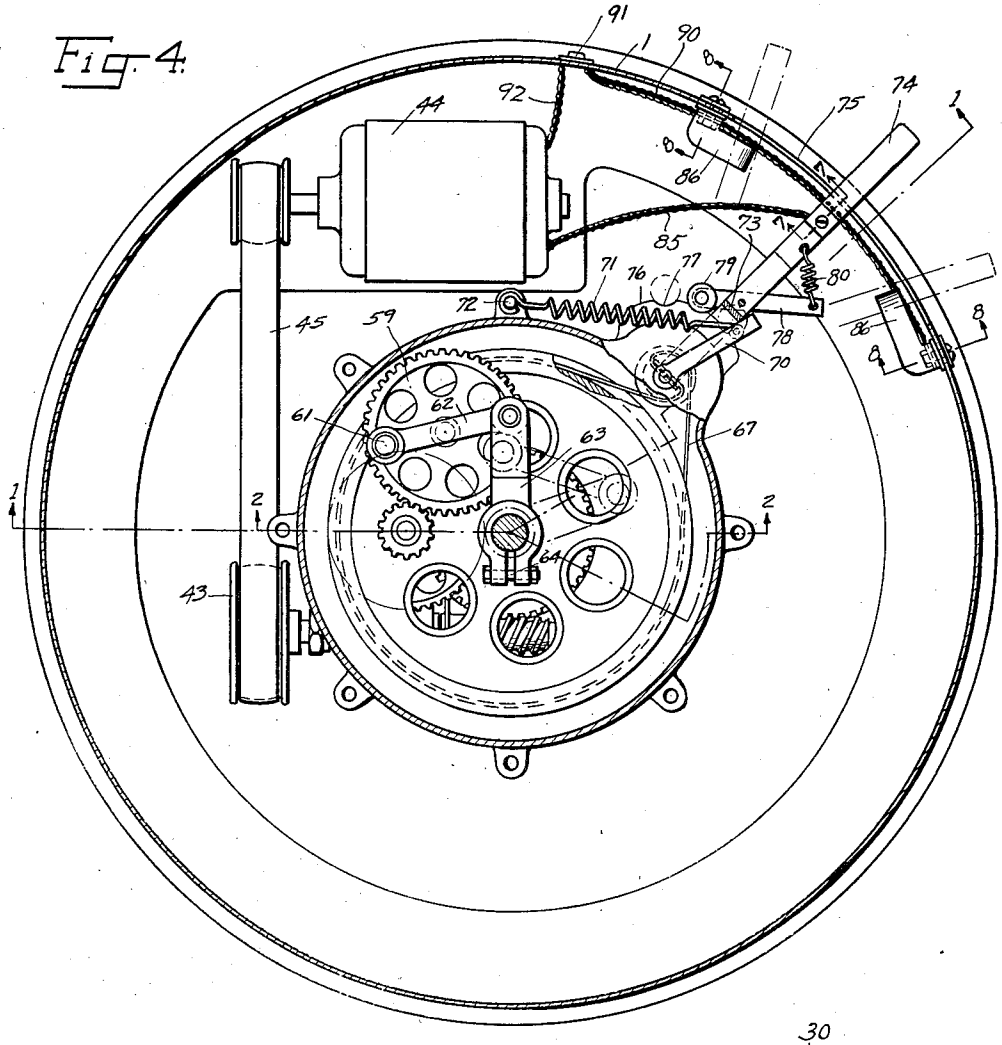
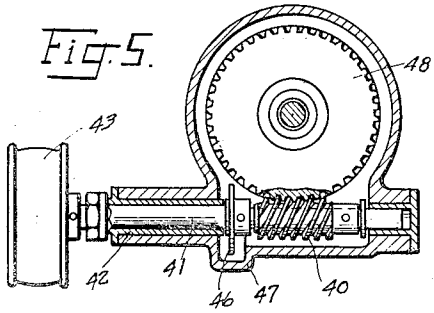


Fig. 5.



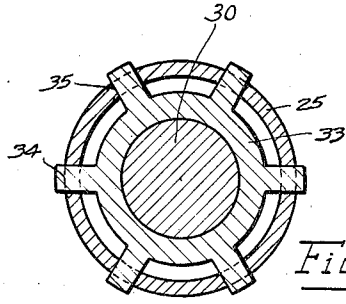


Fig. 6.

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UNITED STATES PATENT OFFICE

ALVAR LENNING, OF STOCKHOLM, SWEDEN, ASSIGNOR TO INVENTIA PATENT-VERWERTUNGS-GESELLSCHAFT, OF SCHAFFHAUSEN, SWITZERLAND, A CORPORATION OF SWITZERLAND

WASHING MACHINE

Application filed January 15, 1930. Serial No. 420,869.

The present invention relates to washing machines and has particular reference to the type of washing machine in which the receptacle in which articles are washed may also be used as a centrifugal dryer, without removing the receptacle from the machine.

In the forms of washing machines of this type which have heretofore been developed separate mechanisms have been provided for imparting an oscillating motion to the receptacle for the purpose of washing, and for imparting a rotary motion to the receptacle for use thereof as a dryer. I improve upon prior constructions by providing a single alterable mechanism capable of imparting either oscillating or rotary motion to the receptacle and alterable at will to produce either of these motions.

I further improve upon the constructions heretofore developed by providing a washing machine of the character described comprising an outer receptacle adapted to hold the washing water, and in which an inner receptacle for receiving the articles to be washed is rotatably mounted, which may be removed from the base containing the actuating mechanism without disturbing the relative positions of the outer and inner receptacles.

The nature of the invention, together with the objects thereof and the advantages to be derived from its use, will appear in the course of the following description of a preferred embodiment which is illustrated in the drawings forming part of this specification.

Fig. 1 is a vertical section taken on the line 1—1 of Fig. 4 and showing a washing machine embodying the invention.

Fig. 2 is a section taken on the line 2—2 of Fig. 3 and showing, on a larger scale, a part of the mechanism illustrated in Fig. 1.

Fig. 3 is a section taken on the line 3—3 of Fig. 2.

Fig. 4 is a plan view taken on the line 4—4 of Fig. 1.

Fig. 5 is a fragmentary section taken on the line 5—5 of Fig. 1.

Fig. 6 is a section on an enlarged scale taken on the line 6—6 of Fig. 1.

Fig. 7 is a fragmentary section on an enlarged scale taken on the line 7—7 of Fig 4.

Fig. 8 is a fragmentary section on an enlarged scale taken on the line 8—8 of Fig. 4.

Referring now to the drawings, the base of the machines comprises a cylindrical casing 1, preferably formed of sheet metal and secured as by crimping to a bottom plate 2, to which are attached supporting feet 3, the latter being preferably of rubber or other resilient material adapted to absorb vibration. A rigid annular member 4 having a central cylindrical extension 5 is centrally secured to the top of casing 1 by any suitable means, such as the screws 6. The extension 5 of member 4 serves to form a standard adapted to engage and guide an outer receptacle 7. Receptacle 7 is preferably cylindrical in form and comprises a sheet metal shell 8 open at the top and secured at the bottom, preferably by crimping, to a bottom plate 9 provided with a central opening. A cylindrical tube 10 is secured to the bottom plate 9 and extends upwardly from the opening in said bottom plate to a point adjacent to the top of the shell 8. In order to obtain a rigid construction, tube 10 is secured to the bottom plate by means of a flanged bracing plate 11, riveted to the bottom plate 9. The outer receptacle is closed at the top by a removable cover 12, and is provided with suitable handles 13. A connection 14, to which a hose (not shown) is adapted to be attached, is provided adjacent to the bottom of the receptacle 7 for draining, and if desired, filling the receptacle with washing water. The inner receptacle 15 is turnably mounted within the outer receptacle 7. Receptacle 15 comprises a cylindrical shell 16, preferably of some light metal such as aluminum or an alloy thereof, said shell being flanged inwardly at the top as at 17, and being provided with a plurality of relatively small holes 18. The annular bottom plate 19, provided with drain holes 18′ is secured to shell 16 and has secured thereto an annular hub member 20. Member 20 is provided with a plurality of hollow radial arms 21 of U-shaped cross section, said arms being secured as by screws 22 to the shell 16 and serving to brace the latter. Shell 16 may also ad-

vantageously be provided with circumferential corrugations at the points where holes 18 are located, in order to provide additional rigidity to the shell.

Receptacle 15 is generally annular in form, being provided with a central vertical tube 23, the lower end of which is flanged and secured by means of screws 24 to the hub 20. At its upper end the tube 23 is inwardly flanged and has secured thereto a plate 24 from which depends a second tube 25, forming an extension extending downwardly into tube 10. A cap 26 is preferably provided covering the upper end of tube 25.

Tube 23 is adapted to bear against annular bearing blocks 27, secured to the tube 10 of the outer receptacle.

The upper half of a horizontally split housing 28 is hung from the base member 4 by means of screws or studs 29, this housing serving to hold the mechanism for turning the washing receptacle. This mechanism comprises a central vertically driven shaft 30, the upper end of which passes through a suitable bearing 31 at the top of standard 5. The upper end of shaft 30 is knurled and it has rigidly secured thereto by means of the nut 32 a driving member 33, adapted to engage the lower end of the tube 25. As may be seen more clearly from Fig. 6 the member 33 is provided with a plurality of radial tongues 34, adapted to engage the walls of slots 35 formed in the lower end of the tube 25. Intermediate its ends the shaft 30 passes through a bushing 36 in the top of the casing 28, while at its lower end shaft 30 is laterally guided by means of a blind bushing 37, screwed into the bottom of housing 28.

A ball-thrust bearing 38 supports a worm gear 39 located around shaft 30 and driven by means of a worm 40. Worm 40 is mounted on a transversely positioned shaft 41, one end of which extends from housing 28 through a suitable oil-tight bearing 42. A pulley 43 is secured to the extended end of shaft 41 and this pulley is driven by means of an electric motor 44 and belt 45.

Adjacent to the worm 40, shaft 41 is provided with a circular collar 46, which runs in a well 47 formed in the bottom of the housing 28.

Gear 39 is rigidly secured to a spur gear 48, the latter gear being bushed as at 49, and rotating freely on shaft 30. The upper face of gear 48 supports a disc 50, forming one element of a friction coupling. Disc 50 is secured against rotation with respect to gear 48, preferably by means of a number of pins 51.

The lower end of shaft 30 is of small diameter as compared with the upper end, the portions of different diameters being connected by means of the bevelled section 52, which section engages another disc 53 which rests upon disc 50.

Above the disc 53 there is mounted a carrier plate 54, said plate being bushed as at 55, and freely rotatable on shaft 30. Plate 54, which I will hereinafter term a selector or an anchorage for reasons which will later become apparent, has journaled therethrough a vertical counter shaft 56. A spur gear 57, secured to the lower end of shaft 56, engages gear 48 around shaft 30, and a small pinion 58 secured to the upper end of this shaft meshes with gear 59, the latter being carried by shaft 60, which is also journaled in selector 54. Gear 59 carries an eccentrically mounted driving pin 61, which is connected by means of the pivotally mounted link 62 to the end of lever 63. Lever 63 is clamped by means of a bolt 64 around a knurled section 65 on shaft 30.

Selector 54 is formed with a circumferential groove 66, in which is located a flexible clutch or brake band 67. The ends of band 67 are secured to a hub 68, formed on the vertical shaft 69 journaled in the housing 28 and extending from the housing at both ends. The upper extended end of shaft 69 has pinned thereto a lever 70, and the outer end of this lever is connected by means of a spring 71 to abutment 72, formed on the housing 28. As will be seen from Fig. 4, the tendency of the spring 70 is to rotate shaft 69 in counter clock-wise direction, and the ends of bands 67 are secured to hub 68 in a manner such that counter clock-wise movement of lever 70 tends to tighten the band to cause it to grip the selector 54.

A pair of yoke arms 73 are pivotally connected to the ends of shaft 69, these arms being secured to the inner end of an operating handle or lever 74, which extends outwardly through a suitable slot 75 in shell 1 of the base. An arcuate flange 76 is formed on the side of the housing 28, said flange being provided with three recesses 77. A latch lever, 78, is pivoted on the lever 74, said latch lever carrying at one end a roller 79, adapted to engage the recesses 77 in the flange 76. Roller 79 is held in engagement with the arcuate face of the flange 76 or in the recesses 77 under the influence of a coil spring 80, attached to the opposite end of lever 78.

As shown more clearly in Fig. 7, a metal contact plate 81 is secured to the upper face of lever 74 by means of bolt 82 and nut 83, the metal parts being insulated from the lever 74 by means of any suitable insulation indicated at 84. Contact plate 81 is connected by means of a flexible insulated wire or cable 85 to one terminal of the motor 44.

As shown in Figs. 4 and 8 a pair of spring contact fingers 86 are secured by means of bolts 87 and nuts 88 to the shell 1 of the base, said fingers being insulated from the shell by means of suitable insulating nipples 89.

Fingers 86 are connected by means of an

insulated wire or cable 90 to one terminal of a connecting socket 91, the other terminal of which is connected by means of cable 92 to the second terminal of motor 44.

Turning again to the driving mechanism it will be noted that gears 57 and 59 are provided respectively with a plurality of holes 93 and 94, and that the selector 54 is also provided with a plurality of relatively larger holes 95. The selector plate is also provided with a number of oil holes permitting the oil to flow to the several journals, oil holes 96 and 97 appearing in Fig. 2. The selector 54 is also provided with a counter weight 98 for balancing the gear train carried by the selector. This counter weight may advantageously be in the form of a portion of thickened cross section.

The operation of the mechanism is as follows:

Let it be assumed that the operating lever or handle 74 is moved from the center position shown in Fig. 4 is counter clock-wire direction until roller 79 engages the end recess 77. In this position one of the spring fingers 86 is in contact with the plate 81, closing the circuit and energizing motor 44. At the same time, movement of the control lever to this position permits spring 71 to swing lever 70 in counter clock-wise direction until the band 67 grips the selector 54 to hold it stationary.

Motor 44, through the pulley drive and worm 40 rotates gear 39 which in turn drives gear 59 through the medium of gear 57 and pinion 58. The rotation of gear 59 actuates link 62, which imparts an oscillating motion to lever 63. This oscillating motion is in turn transmitted to shaft 30.

From a consideration of Fig. 1 it will be seen that the inner receptacle 15, when in operative position, is vertically supported through the extension 25 which rests upon the member 33 at the upper end of shaft 30. From this it will be seen that the weight of receptacle 15 and its contents, which I will hereinafter designate as the mass, is transmitted through shaft 30 to the coupling disc 53, which engages the beveled section 52 of the shaft. The weight transmitted to disc 53 is transferred to disc 50 and through gears 48 and 39 to the ball-thrust bearing 38. From this it will be seen that the weight of the inner receptacle is ultimately transferred to the ball-thrust bearing 38, through a friction coupling comprising the discs 50 and 53, which are held in frictional engagement at all times due to the weight of the receptacle.

From a consideration of Fig. 4 it will be apparent that an oscillating motion can be transmitted to the lever 63 through the gear mechanism only if the selector 54 is held stationary. For example, let it be assumed that the selector 54 is released and the receptacle 15 held against rotation. Under these conditions, actuation of the gear mechanism by the driving gear 39 would cause the intermediate gears to rotate about their supporting shafts, but due to the connecting link 62, secured to lever 63 (which it is assumed is stationary), the entire gear mechanism, including the selector, would oscillate as a unit.

Assume now that without the inner receptacle being rigidly held, the operating lever 74 is shifted from the position originally assumed, in which the selector is held stationary, to its opposite position. This movement first breaks the motor circuit and then acts to release the selector by loosening band 67. Band 67 is loosened due to the fact that upon the clock-wise movement of the lever 74, one of the yoke arms 73 strikes the end of lever 70 to rotate shaft 69 against the tension of spring 71. After band 67 is loosened the motor connection is re-established by contact of plate 81 with the other of the spring fingers 86, this contact being made as the roller 79 moves into the end recess 77 on flange 76. The tension of spring 80 holds the roller in the recess against the tendency of spring 71 to pull the lever assembly in counter clock-wise direction.

When the driving gear 39 is actuated with the selector released, an irregular motion of the driven shaft 30 and the receptacle 15 may at first occur, particularly if the alteration of the mechanism by movement of the control lever 74 is effected quickly. Due to the inertia of the receptacle 15 and its contents the effect at first will be much the same as if the receptacle 15 were being held stationary and the gear train, including the selector, will tend to oscillate. However, the friction coupling, formed by discs 50 and 53, will tend to transmit a rotary motion directly from gear 48 to shaft 30, and as the inertia of the receptacle 15 is gradually overcome it will be rotated at gradually increasing speed. With the selector released, the selector and the gears carried thereby will also tend to rotate as a unit about shaft 30, due to frictional drag between these parts, and the rotating parts. As soon as this mechanism begins to rotate the center of gravity of the system formed by lever 63 and link 62 will tend to move radially outward as far as possible under the influence of centrifugal force and these parts will assume about the relative positions shown in Fig. 4. Due to the fact that the centrifugal force increases as the square of the speed, the magnitude of this force soon becomes considerable, and its effect is to prevent the several gears in the train from rotating with respect to each other. This mechanism thus, under these conditions, forms what may be termed an auxiliary driving connection between the gear 48 and the lever 63, which acts with the friction coupling to drive shaft 30 at the same speed as that of gear 48.

During this phase of operation vibration

is prevented because of the balancing of the weight of the gear train by the counter weight 98.

The driving mechanism is lubricated by a relatively light oil placed within housing 28. The oil gathers in the well 47 and is thrown upwardly by the rapidly rotating disc 46. The spray thrown up by disc 46 is enabled to reach the top of the housing by passing through the numerous holes 93, 94 and 95 in the gears and selector, and lubricates the several parts by splash and gravity flow through the several oil holes provided.

Due to the continuous circulation of lubricant, the friction coupling formed by discs 50 and 53 is well lubricated at all times, this being highly desirable in order to prevent wear of these discs, which must necessarily slip with respect to each other when the mechanism is adjusted to produce oscillating motion.

The following advantages with respect to the above described mechanism may be briefly pointed out, viz:

The construction of the inner and outer receptacles permits these receptacles to be removed as a unit from the base by simply lifting the outer receptacle from the center standard 5. When they are so removed, the shaft 30 ceases to support the inner receptacle, which, however, is held in position and may be vertically supported either by the inwardly flanged ends of tube 23 resting on the upper end of tube 10, or by the base of the receptacle resting directly on the bottom of the outer receptacle. This removal of the receptacles as a unit is of considerable advantage, since it permits the articles to be washed to be placed in the inner receptacle, and to be subsequently boiled and washed without removing them or changing the water, simply by placing the receptacle unit first on a stove or like source of heat, and then transferring it directly to the base of the washing machine.

The actuating medium provides means for imparting both oscillating and rotary motion to the inner receptacle for purposes of washing and drying, without altering in any way the connection between the driving mechanism and the receptacle, such alteration being effected by a simple movement of the single control lever 74. Since control lever 74 also renders the driving motor inoperative except when the mechanism is in proper adjustment, it eliminates the necessity for a separate power switch.

The driving mechanism in both positions of adjustment provides a resilient drive, so that in case the receptacle becomes jammed or is otherwise prevented from turning, no damage will be done. If the receptacle becomes jammed when the mechanism is adjusted for rotary motion, the friction clutch will slip, thereby preventing damage to the mechanism, while if the receptacle becomes jammed when the mechanism is adjusted for oscillating motion, the band 67 will allow the selector to oscillate instead of the receptacle.

For washing purposes the receptacle 15 should oscillate about fifty times per minute, and for drying purposes it should rotate at about four hundred revolutions per minute. A suitably compact mechanism may be obtained by using a small motor adapted to turn about six thousand revolutions per minute, the speed of shaft 41 being reduced to about thirty-six hunded revolutions per minute by the pulley drive, and the speed of gears 39 and 48 being reduced to about four hundred revolutions per minute by the worm gear connection.

It will be obvious to those skilled in the art that numerous changes and modifications may be made in the form or structure which has been used for illustrative purposes, without departing from the invention, which is to be understood as embracing all that may fall within the scope of the appended claims.

What I claim is:

1. Apparatus of the character described comprising, in combination, a driven member, a rotary driving member, mechanism actuated by said driving member for imparting oscillating motion to the driven member, mechanism tending at all times to transmit rotary motion from the driving member to said driven member, and means operable to render said first mentioned mechanism inoperative and to permit said last mentioned mechanism to transmit rotary motion from the driving member to said driven member.

2. Apparatus of the character described comprising, in combination, a turnably mounted mass, a driven member adapted to turn said mass, a rotary driving member, mechanism actuated by said driving member for imparting oscillating motion to said driven member, mechanism for imparting rotary motion from said driving member to said driven member, both of said mechanisms including frictionally engaging parts yieldable to limit the magnitude of the force which can be transmitted from the driving member to the driven member.

3. Apparatus of the character described comprising, in combination, a turnably mounted mass, a driven member adapted to turn said mass, a rotary driving member, mechanism actuated by said driving member and capable of imparting either oscillating motion or rotary motion to said mass, said mechanism including a selector determining the character of the motion imparted to the mass, means for actuating said driving member, means for controlling said selector, and means for simultaneously controlling both of said means.

4. Apparatus of the character described comprising, in combination, a turnably

mounted mass, mechanism for turning said mass and alterable to impart to said mass either rotary motion or oscillating motion, means for actuating said mechanism, means for selectively altering said mechanism to secure one or the other of said motions, and means for rendering said actuating means inoperative when said mechanism is altered.

5. Apparatus of the character described comprising, in combination, a turnably mounted mass, mechanism for turning said receptacle and alterable to impart to said mass either rotary motion or oscillating motion, a motor for actuating said mechanism, a manually operable member for altering said mechanism, said member being movable from one position causing said mass to be oscillated to a second position causing said mass to be rotated, and means controlled by said member for rendering said motor inoperative when said member is moved from either of said positions.

6. Apparatus of the character described comprising, in combination, a rotary driving member, a driven member, mechanism including a rotatable selector for imparting oscillating motion to said driven member, said mechanism being operative to impart oscillating motion to said driven member only when said selector is stationary, and said mechanism revolving as a unit about the axis of the driven member when said selector is released to transmit rotary motion from the driving member to the driven member due to centrifugal force generated by the rotation of the mechanism.

7. Apparatus of the character described comprising, in combination, a rotary driving member, a driven member, and means for transmitting rotary motion from the driving member to the driven member comprising parts for transmitting such motion due to frictional contact and parts laterally offset with respect to an axis of rotation and adapted to rotate with respect thereto to transmit such motion due to centrifugal force generated by rotation of said last mentioned parts.

8. Apparatus of the character described comprising, in combination, a turnably mounted mass, a driven member adapted to turn said mass, a rotary driving member, a friction coupling between said members, said coupling being held in engagement at all times by the weight of said mass, mechanism actuated by the driving member for imparting oscillating motion to the driven member, said mechanism, when operative, acting to overcome the tendency of said friction coupling to transmit rotary motion to the driven member, and means for selectively altering said mechanism to render it operative or inoperative at will.

9. Apparatus of the character set forth comprising a driving member, a driven member, a yieldable direct drive connection between said driving member and said driven member, members forming an alternative drive connection between said driving member and said driven member including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, and means to secure and loosen said anchorage.

10. Apparatus of the character set forth comprising a driving member, a driven member, a yieldable direct friction drive connection between said driving member and said driven member, members forming an alternative drive connection between said driving member and said driven member including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, and means to secure and loosen said anchorage.

11. Apparatus of the character set forth comprising a driving member, a driven member, a yieldable direct drive connection between said driving member and said driven member comprising relatively movable frictionally contacting parts, members forming an alternative drive connection between said driving member and said driven member including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, means to secure and loosen said anchorage, and means to hold said frictionally contacting parts in engagement while the anchorage is secured to give oscillatory drive.

12. Apparatus of the character set forth comprising a driving member, a driven member, a yieldable direct drive connection between said driving member and said driven member, members forming an alternative drive connection between said driving member and said driven member including a gear train, a rotatable member eccentrically mounted on one of the gears of the gear train and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, and means to secure and loosen said anchorage.

13. Apparatus of the character set forth comprising a driving member, a driven member, means for mounting said driving member and said driven member in axial alignment, a yieldable direct drive connection between said driving member and said driven member, members forming an alternative drive connection between said driving member and said driven member including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative

drive members, and means to secure and loosen said anchorage.

14. Apparatus of the character set forth comprising a driving member, a driven member, a yieldable direct drive connection between said driving member and said driven member, members forming an alternative drive connection between said driving member and said driven member including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members loosely mounted on the driven member, and means to secure and loosen said anchorage.

15. Apparatus of the character set forth comprising a driving member, a driven member, a yieldable direct drive connection between said driving member and said driven member, members forming an alternative drive connection between said driving member and said driven member including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, means to secure and loosen said anchorage, a motor connected to the driving member and common means for controlling the motor and the means for securing and loosening the anchorage.

16. Apparatus of the character set forth comprising a rotatable driving member, a driving friction plate secured to said driving member, a vertical driven shaft, means for mounting said member and said shaft in vertical axial alignment, a driven friction plate mounted on said driven shaft and resting on the first mentioned friction plate, a mass bearing down on said driven friction plate, members forming an alternative drive connection between said driving member and said driven shaft including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, and means to secure and loosen said anchorage.

17. Apparatus of the character set forth comprising a rotatable driving member, a driving friction plate secured to said driving member, a vertical driven shaft, means for mounting said member and said shaft in vertical axial alignment, a driven friction plate mounted on said driven shaft and resting on the first mentioned friction plate, a mass bearing down on said driven friction plate, members forming an alternative drive connection between said driving member and said driven shaft including a gear train, a rotatable member eccentrically mounted on one of the gears of the gear train and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, and means to secure and loosen said anchorage.

18. Apparatus of the character set forth comprising a rotatable driving member, a driving friction plate secured to said driving member, a vertical driven shaft, means for mounting said member and said shaft in vertical axial alignment, a driven friction plate mounted on said driven shaft and resting on the first mentioned friction plate, a mass bearing down on said driven friction plate, members forming an alternative drive connection between said driving member and said driven shaft including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members loosely mounted on said driven shaft, and means to secure and loosen said anchorage.

19. Apparatus of the character set forth comprising a rotatable driving member, a driving friction plate secured to said driving member, a vertical driven shaft, means for mounting said member and said shaft in vertical axial alignment, a driven friction plate mounted on said driven shaft and resting on the first mentioned friction plate, a mass bearing down on said driven friction plate, members forming an alternative drive connection between said driving member and said driven shaft including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, means to secure and loosen said anchorage, a motor connected to said drive shaft, and common means for controlling the motor and operating the means for securing and loosening the anchorage.

20. Apparatus of the character set forth comprising a rotatable driving member, a driving friction plate secured to said driving member, a vertical driven shaft, means for mounting said member and said shaft in vertical axial alignment, a driven friction plate mounted on said driven shaft and resting on the first mentioned friction plate, a mass bearing down on said driven friction plate, members forming an alternative drive connection between said driving member and said driven shaft including an eccentrically mounted rotatable member and an oscillatory member moved by the eccentrically mounted member, an anchorage for the alternative drive members, means to secure and loosen said anchorage, a lever for operating the last mentioned means, an electric motor connected to said drive shaft, and a switch for said motor controlled by said lever.

In testimony whereof I have affixed my signature.

ALVAR LENNING.