E. A. & E. LE M. EUSTICE.

DRIVING MECHANISM.

APPLICATION FILED AUG. 27, 1910.

1,033,567.

Patented July 23, 1912.

3 SHEETS—SHEET 1.

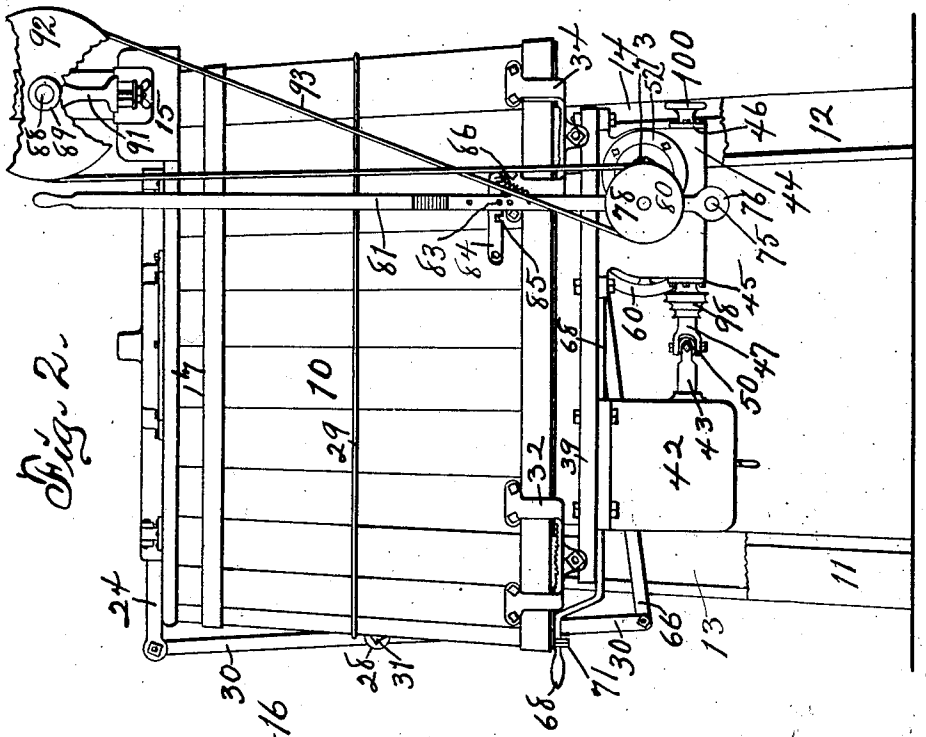

Fig. 2.

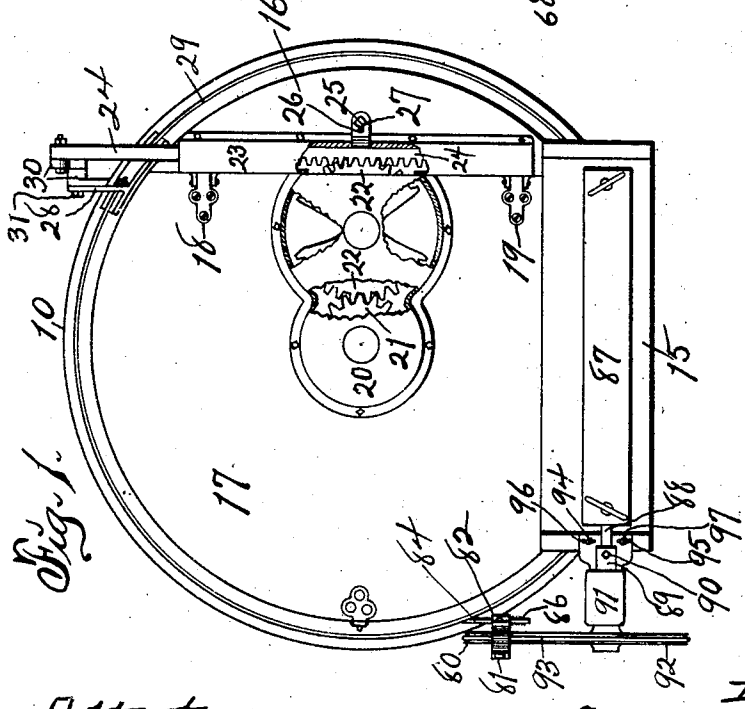

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 1.

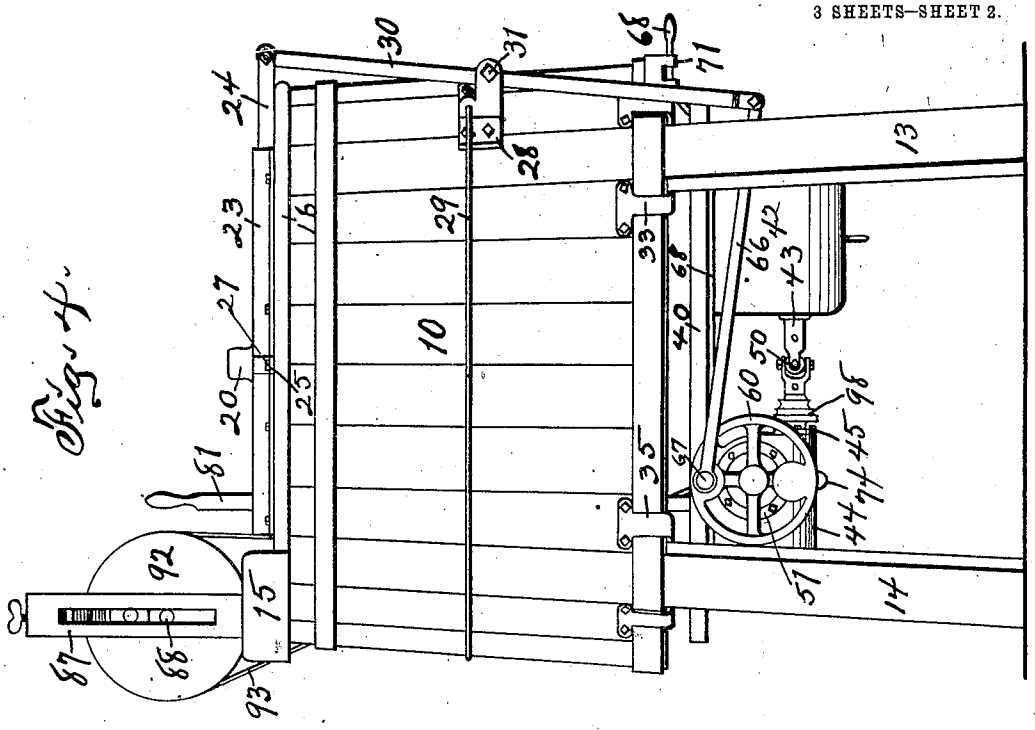
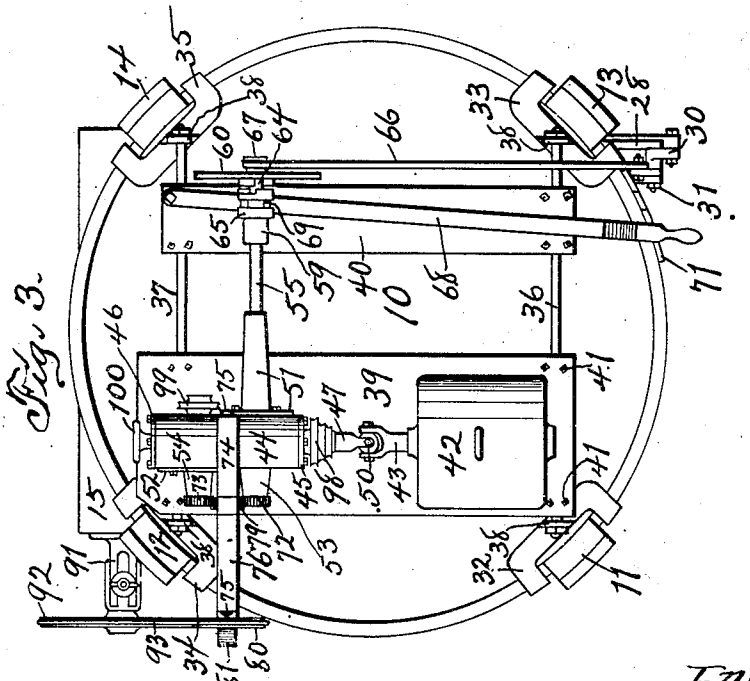


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 5.

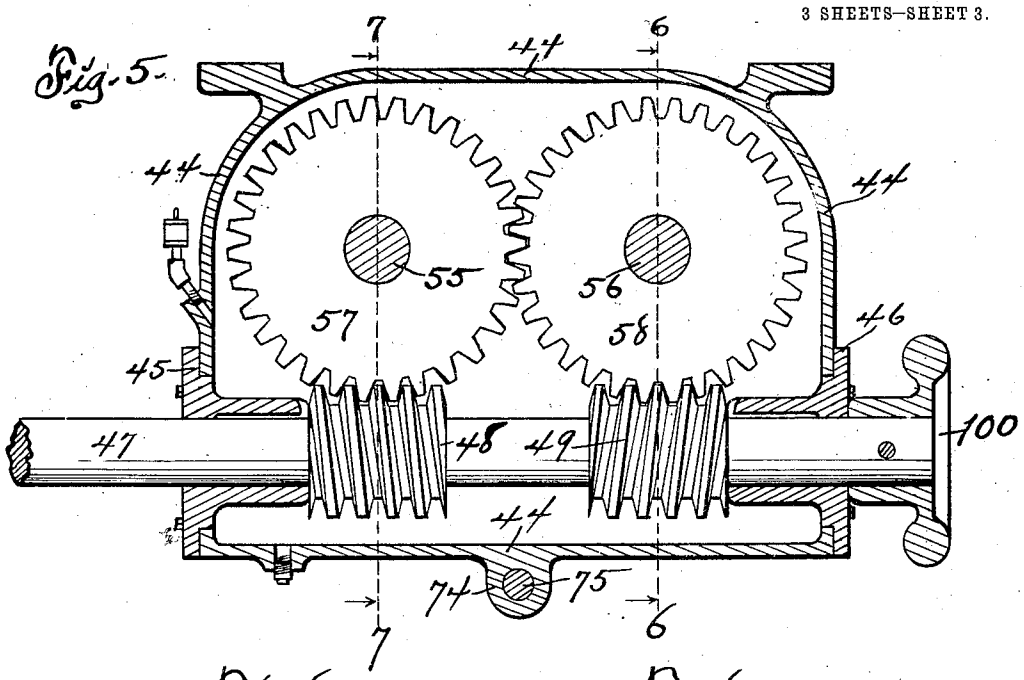


Fig. 8.

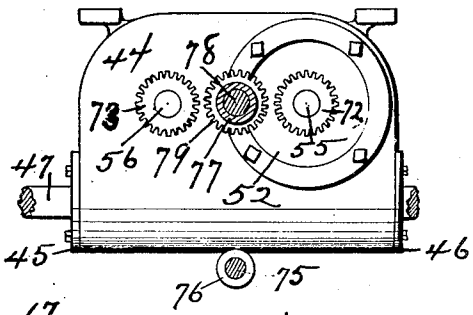
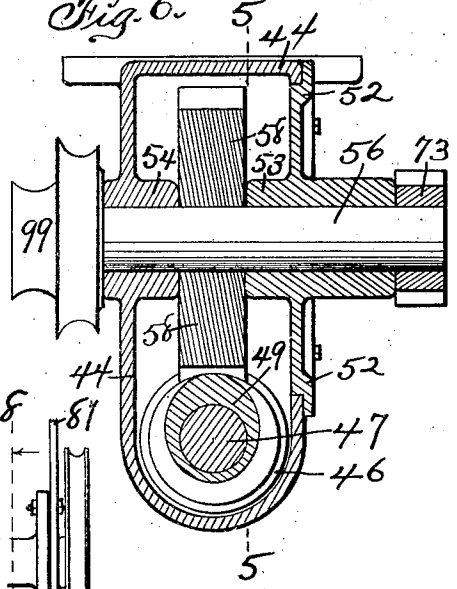


Fig. 6.



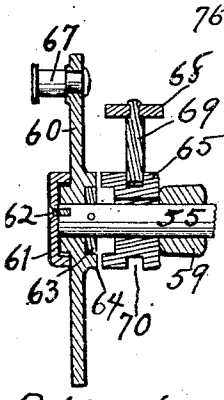
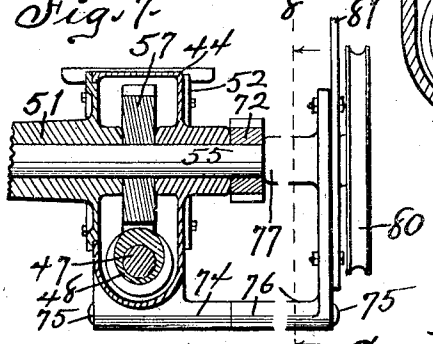


Fig. 7.



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UNITED STATES PATENT OFFICE.

EDWARD A. EUSTICE AND EDWARD LE MOTTE EUSTICE, OF NEWTON, IOWA.

DRIVING MECHANISM.

1,033,567. Specification of Letters Patent. Patented July 23, 1912.

Application filed August 27, 1910. Serial No. 579,330.

To all whom it may concern:

Be it known that we, EDWARD A. EUSTICE and EDWARD LE MOTTE EUSTICE, citizens of the United States of America, and residents of Newton, Jasper county, Iowa, have invented a new and useful Driving Mechanism, of which the following is a specification.

The object of this invention is to provide an improved construction for driving mechanisms adapted to be employed for mechanically operating a washing machine and other devices to be driven.

A further object of this invention is to provide improved means for reducing the speed of a follower in respect to a prime mover.

A further object of this invention is to provide a balanced gearing whereby end thrust is removed from a worm shaft and worm gears are balanced against each other.

A further object of this invention is to provide means for manually rotating a worm shaft auxiliary to mechanical rotation thereof.

A further object of this invention is to provide means for driving a speed reducing mechanism by an electric motor or extraneous power interchangeably.

A further object of this invention is to provide means for interchangeably using an electric motor, gas engine or other mechanical prime mover in driving a follower such as a washing machine.

A further object of this invention is to provide improved means for mounting driving mechanism relative to a follower to be driven.

A further object of this invention is to provide improved means for inter-gearing or disconnecting a driving mechanism and follower.

A further object of this invention is to provide means for driving an extraneous device such as a clothes-wringer conjunctively with or independently of a primary follower such as a washing machine.

A further object of this invention is to provide means for driving an extraneous device positively or reversely conjunctively with or independently of a primary follower.

A further object of this invention is to provide improved means for adjusting an extraneous follower relative to its support.

A further object of this invention is to provide improved means for connecting a power shaft and follower shaft.

Our invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in our claims and illustrated by the accompanying drawing, in which—

Figure 1 is a plan of the machine, portions being broken away to reveal interior construction. Fig. 2 is a side elevation of the machine, portions being broken away to reveal interior construction. Fig. 3 is a bottom plan of the machine. Fig. 4 is a side elevation of the machine opposite to that shown in Fig. 2. Fig. 5 is a longitudinal vertical section on the indicated line 5—5 of Fig. 6. Fig. 6 is a cross-section on the indicated line 6—6 of Fig. 5. Fig. 7 is a cross-section on the indicated line 7—7 of Fig. 5. Fig. 8 is an elevation, partly in section, on the indicated line 8—8 of Fig. 7.

In the construction of the machine as shown a suitable support is employed and for this purpose we have illustrated a tub 10 carried by legs 11, 12, 13, 14 and provided with a wringer stand 15, a stationary cover member 16 and a movable cover member 17 pivoted to the stationary member by hinges 18, 19. The tub and its members which we have employed and illustrated to demonstrate the support and application of our improved driving mechanism is of common and well known construction to which we make no claim. The movable portion 17 of the cover carries a dolly shaft, (not shown) within a housing 20 and a dolly pinion 21 is mounted on said shaft and is employed to oscillate the shaft and dolly within the tub. A mutilated gear 22 is mounted for oscillation on a vertical axis at one side of and meshes with the dolly pinion 21 and said mutilated gear is partially covered and inclosed by a continuation of the housing 20 beyond the dolly pinion. A slide bearing 23 is mounted on the stationary portion 16 of the cover and is formed with a slot in one side through which the mutilated gear 22 may project and intersect the longitudinal bore of said bearing. A toothed pitman or rack 24 is mounted for rectilinear reciprocation in the bearing 23 and meshes with the mutilated gear 22 diametrically opposite the pinion 21 when the movable portion 17 of the cover is closed on the tub. When the movable portion 17 of the cover is raised from the tub by move-

ment through an arc articulating on the hinges 18, 19, the mutilated gear 22 is moved away from and out of mesh with the rack 24. This arrangement is to permit opening the tub for inspection or change of the clothing therein without stopping the automatic driving mechanism and at the same time to provide that the dolly, its shaft and pinion and the mutilated gear 22 may come to rest and not be operated when the cover is moved to open position.

To compensate for wear between the mutilated gear and rack 24 or between said rack and the rear wall of the bearing 23, an angle plate 25 is mounted on the stationary portion 16 of the cover and extends through a slot in the upstanding portion of the bearing 23 into contact with said rack. The angle plate 25 is formed with a slot 26 through which a screw 27 is passed to a seat in the stationary portion 16 of the cover. By means of the slot 26 and screw 27 the angle plate 25 may be adjusted to greater or less degree through the slot in the bearing and be caused to engage and hold the rack 24 toward the mutilated gear. A bracket 28 is mounted on the support (in this instance the tub 10) intermediate of the top and bottom of said support and may be secured in any desired manner. In this instance the bracket 28 is shown bolted to the stays of the tub and further held by engagement of end portions of an intermediate hoop 29 embracing the tub and nuts on the ends of said hoop between and bearing against ears of the bracket. A lever 30 is fulcrumed at or near its center on a bolt 31 mounted in outstanding portions of the bracket 28 and upper and lower arms of said lever are offset into parallel upright planes as illustrated in Figs. 1 and 3. The offset arrangement is for convenience in locating the upper and lower ends of the lever 30 in respect of follower and driving devices respectively. The upper end portion of the lever 30 is pivoted to the outer end portion of the rack 24 and said lever is oscillated as hereinafter described to give to the rack the rectilinear reciprocation above mentioned. A plurality of hangers, in this instance four in number, 32, 33, 34, 35 are mounted beneath the support, extend across the inner faces of the legs 11, 13, 12 and 14 respectively and extend upwardly outside of and are secured to the wall of the support.

It will be observed that the hangers 32, 33, 34, 35 do not in any manner engage or are they in any manner secured to the legs of the support but have their entire attachment and carrying relation on the support extraneous to the legs, thus relieving the legs of any strain or vibration on the part of the operating devices carried by said hangers as hereinafter described. Hanger rods 36, 37 are mounted in and supported at their ends by ears 38 formed on and depending from central portions of the hangers 32—33, 34—35 respectively. Hanger plates 39, 40 are suspended beneath the hanger rods 36, 37 by means of U-bolts 41, of any desired number, extending through said hanger plates and crossing and embracing said rods. The hanger plates 39, 40 are arranged parallel with each other and spaced apart and also are arranged parallel with each other and spaced from the bottom of the support. The hanger plates 39, 40 may be adjusted to any desired locations throughout the lengths of the hanger rods 36, 37 and serve to connect and brace said rods at right angles to the connection of the hangers by said rods, thus providing a rigid auxiliary support for the driving mechanism about to be described. A prime mover, 42, in this instance an electric motor, is fixed to and depends from one end portion of the hanger plate 39 and the shaft 43 of said prime mover projects longitudinally of said hanger plate and on the median line thereof. A housing 44 is fixed to and depends from the hanger plate 39 opposite to and in alinement with the prime mover 42. Journal bearings 45, 46 are mounted in apertures in end portions and near the bottom of the housing 44 and project inwardly in alinement with each other within said housing. A worm shaft 47 is mounted in and longitudinally of the lower portion of the housing 44 and is formed with oppositely pitched worms or screws 48, 49 between its ends and spaced apart, which worms or screws are of considerably greater diameter than the shaft. The apertures in the ends of housing 44 are sufficiently large to admit the worm shaft and screws by longitudinal movement through either of them and the bearings 45, 46 are placed on said shaft and fixed to end portions of the housing after the shaft is properly located within the housing. A universal coupling 50 is provided between the adjacent end portions of the power shaft 43 and the worm shaft 47 and compensates for any inaccuracy of alinement of said shafts. The housing 44 is formed with non-registering apertures in its opposite sides and said apertures are closed normally by journal bearings 51, 52. The housing 44 is formed with hubs or journal bearings 53, 54 projecting outwardly and inwardly from its walls opposite to the removable journal bearings 51, 52 respectively. Shafts 55, 56 are mounted for rotation in the journal bearings 51—53 and 52—54 respectively and extend at their ends outside of the housing 44. The shafts 55, 56 are at right angles to and above the worm shaft 47 and gears 57, 58 are mounted on and fixed to said shafts within the housing.

The apertures in the walls of the housing

44 are sufficiently large to pass the gears 57, 58 to and from the housing through them and the journal bearings 51, 52 are mounted on the shafts and secured to the housing after the shafts and said gears have been placed within the housing. The gears 57, 58 are of such character and are so located as to inter-mesh and also to mesh with and be engaged by the worms or screws 48, 49 respectively. The gears 57, 58 are driven in opposite directions by the oppositely pitched worms or screws 48, 49 and such opposite movement is balanced and maintained by inter-meshing of the gears auxiliary to the worms or screws. The journal bearing 51 is of abnormal length laterally of the housing 44 in order to steady and support the shaft 55, which shaft extends across and is further supported by a bearing 59 depending from the hanger plate 40. A wrist wheel 60 is loosely mounted on the outer end portion of the shaft 55 and is confined against outward movement by a cap 61 secured to the extremity of said shaft by a screw 62 loosely embracing a hub of said wrist wheel. The opposite end of the hub of the wrist wheel is formed with a recess and a collar 63 is fixed to the shaft 55 within said recess, thus limiting inward movement of the wrist wheel. The inner portion of the hub of the wrist wheel is formed as a clutch 64 and is adapted to be engaged by a clutch 65 movable on and feathered to the shaft 55 between the clutch member 64 and the outer end of the bearing 51. A pitman 66 is pivoted at one end to a wrist pin 67 on the wrist wheel 60 and is pivoted at its opposite end to the lower end portion of the lever 30. A lever 68 is fulcrumed at one end on one end portion of the hanger plate 40 and is provided with a fork 69 embracing the clutch 65 and engaging in a peripheral groove 70 in said clutch. The lever 68 extends beyond the periphery of the support 10 and is so shaped and arranged as to exert upward pressure or have an inherent upward tendency. The outer end portion of the lever 68 is adapted to engage a rack 71 fixed to and extending downwardly from the rim of the support 10 and it is the function of said rack to hold the lever in any position in which it may be placed manually, thus controlling the location of the clutch 65 in respect of engagement or disengagement relative to the clutch member 64. A pinion 72 is mounted on the opposite end portion of the shaft 55 and a pinion 73 is mounted opposite to the pinion 72 and spaced therefrom on the adjacent end portion of the shaft 56. A journal bearing 74 is formed on and extends laterally from the central portion of the bottom of the housing 44 and a shaft 75 is mounted in said bearing. A bracket 76 is journaled at its lower end on the shaft 75 and abuts the outer end portion of the bearing 74, the shaft 75 preferably being riveted at its ends to connect said bracket and bearing loosely. A journal bearing 77 is formed on the upper end portion of the bracket 76, and is arranged between and parallel with the shafts 55, 56. A shaft 78 is mounted loosely in and projects at both ends from the bearing 77 and carries a pinion 79 on its inner end adapted to engage with one or another of the gears 72, 73, or be wholly disengaged from and arranged intermediate thereof. A pulley 80, in this instance of the grooved variety, is mounted on the end portion of the shaft 78 opposite to the pinion 79. A hand lever 81 is fixed to the bracket 76 and extends upwardly alongside of the support 10. The lower end portion of the hand lever 81 is located between the pulley 80 and vertical line of the support and said lever is bent outwardly so as to clear the support and extend outside of the vertical plane of the pulley. The hand lever 81 is provided with a brace or keeper 82 on its inner face and a pin 83 is mounted in and crosses the space between said lever and keeper. A detent 84 is pivoted on the support 10 and provided with a plurality of notches 85, in this instance three in number, which notches are adapted to engage (one or another) with the pin 83 and hold the lever 81 in any position in which it may be placed manually. A spring 86 holds the detent 84 in engagement with the pin 83 except when said detent is manually lifted from the pin to permit manual oscillation of the lever 81.

A clothes wringer 87 is mounted on the wringer stand 15 and secured thereto in a common and well known manner. One of the wringer shafts 88 extends laterally from the frame of the wringer and a sleeve 89 is mounted thereon and secured thereto by a set screw 90. The sleeve 89 extends through a bearing 91 and carries a pulley 92 on its outer end, which pulley is connected by a belt 93 to the pulley 80. The bearing 91 is secured to one end portion of the wringer stand 15, preferably by means of screws 94, 95 extending through slots 96, 97 in the foot of said bearing and seated in the wringer stand. The sleeve 89 and pulley 92 are adjustable longitudinally of the wringer shaft 88 and relative to the bearing 91 and said bearing is adjustable relative to the wringer stand, thus providing means for adjusting the pulley 92 in any desired manner in respect of the pulley 80, having relation to the belt 93 connecting said pulleys.

The electric motor 43 may be dispensed with and the worm shaft 47 be driven by a prime mover extraneous to the support which prime mover may be attached to the end of the shaft by the coupling 50 or otherwise as desired. In respect of the otherwise connection a cone pulley 98 is shown on the

shaft 47 adapted to receive a belt from an extraneous prime mover. Sometimes it is desirable to operate another follower extraneous to the support by the driving mechanism above described and for such purpose a cone pulley 99 is shown on the shaft 56, which cone pulley is adapted to receive a belt leading to the follower. Sometimes it is desirable to advance the driving mechanism or reverse it from a given position of rest and for such purpose a hand wheel 100 is shown on one end portion of the worm shaft 47, by means of which hand wheel said shaft and the gearing controlled thereby may be advanced or reversed as desired.

The proportions, arrangement and detail construction of the various components of our mechanism may be varied and modified in many respects without departing from the spirit of our invention and therefore we do not desire to be understood as limiting ourselves to the precise construction, arrangement and proportions shown in our drawings herewith.

In practical use of the mechanism above described the shaft 47 is rotated by the prime mover and in turn rotates the shafts 55, 56 through the inter-engaging worms 48, 49 and gears 57, 58, the oppositely pitched worms engaging the inter-meshing gears and taking the end thrust off of the shaft 47 and also minimizing the wear of the gears by the worms or screws. The shaft 55 drives the clutch 65 and when said clutch is in engagement with the member 64 drives the wrist wheel 60 by means of which the pitman 66 is reciprocated to the oscillation of the lever 30. The lever 30 reciprocates the rack 24 and said rack acts through the mutilated gear 22 and oscillates the pinion 21, dolly shaft and dolly. Power is taken off of the shaft 56 through the pinion 73 to the pinion 79 to drive the shaft 78 and pulley 80 for the operation of the wringer rolls in one direction or the lever 81 may be operated to shift the shaft 78 so as to take power from the shaft 55 through the pinion 72 to drive the wringer rolls in the opposite direction. The wrist wheel 60 may be disconnected by shifting the lever 68 when it is desired to open the tub and pass the clothes therein through the wringer or said wrist wheel may be permitted to continue in operation when the tub is open, the dolly mechanism ceasing to operate because of the disconnection of the mutilated gear 22 above described from the rack 24. Or the washing operations may be continued and the wringer be reversely operated so that clothing may be passed through the wringer in a reverse direction if desired. This arrangement and operation is desirable in wringing clothes from rinsing water at the same time that another batch of clothes is being washed in the tub and under such conditions it is desirable to place a receptacle on the housing 20 to receive the clothes passed reversely through the wringer.

It is to be understood that our improved driving mechanism above described may be employed with mechanism other than that adapted for washing and wringing clothes and that the illustration and description thereof in the latter connection is solely for convenience and clearness of demonstration.

We claim as our invention—

1. In a driving mechanism, the combination of a suitable support and legs therefor, a platform suspended from said support extraneous to said legs, a motor on the platform, a shaft mounted in the top of the support, a device mounted on the top of the support, an operating device connected with the motor and with said shaft for imparting an alternating rotary motion to the latter, means connecting said operating device and the said device for operating the latter, controlling levers, and separate means operated by the controlling levers for throwing said operating device and means into or out of operative connection with the motor.

2. In a driving mechanism, the combination of a suitable support and legs therefor, a platform suspended from said support extraneous to said legs, a motor on the platform, a shaft mounted in the top of the support, a device mounted on the top of the support, an operating device connected with the motor and with said shaft for imparting an alternating rotary motion to the latter, means connecting said operating device and the said device for operating the latter, controlling levers, and separate means operated by the controlling levers for throwing said operating device and means into or out of operative connection with the motor, one of said controlling levers adapted to reverse the operation of said device.

3. In a driving mechanism, the combination of a suitable support and legs therefor, a platform beneath and fixed to said support extraneous to the legs, a motor carried by said platform, a rotatable shaft, driving mechanism connecting said shaft and motor and including a clutch between said shaft and motor, a lever controlling said clutch, a device at the top of the support, and connecting means between said device and the driving mechanism, said connecting means including a lever-controlled shifting device independent of said clutch, the shifting device adapted for cessation, direct or reverse operation of the device at the top of the support.

4. In a driving mechanism, the combination of a suitable support, hanger devices secured to the support, a shaft at the top of the support, a motor carried by said hanger devices, an operating device connected with the motor and with said shaft

for imparting an alternating rotary motion to the shaft, and including a controlling lever for throwing the operating device into or out of operative connection with the motor, a device at the top of the support independent of said shaft, and connecting means between said operating device and the latter device, said connecting means including a lever-operated shifting device independent of said controlling lever and adapted for cessation, or direct or reverse operation of the latter device.

5. In a driving mechanism, the combination of a suitable support, a platform suspended from said support, a motor on said platform, a shaft mounted in the top of the support, a device mounted on the top of the support, an operating device including a controller connected with the motor and with said shaft for imparting an alternating rotary motion to the latter, and means including a second controller connecting said operating device and the said device on the top of the support for operating the latter, said controllers adapted to be operated independently of each other and independently controlling the shaft and device respectively.

6. In a driving mechanism, inter-meshing gears, a driven worm shaft formed with oppositely pitched worms separately engaging said gears, shiftable follower mechanism adapted for alternate engagement with said gears, and another follower mechanism adapted to be clutched to one of said gears.

7. In a driving mechanism, the combination of a suitable support, hangers depending therefrom, hanger rods connecting said hangers in pairs, hanger plates connecting said rods, driving mechanism on said plates, followers on said support, and controllable driving connections between said driving mechanism and followers.

8. In a driving mechanism, the combination of a suitable support, hangers depending therefrom, hanger rods connecting said hangers in pairs, hanger plates connecting said rods and adjustable thereon, driving mechanism on said plates, followers on said support, and controllable driving connections between said driving mechanism and followers.

9. In a driving mechanism, the combination of a suitable support, followers carried by said support, driving mechanism suspended from said support, a speed reducing device suspended from said support and connected to the driving mechanism, and controllable driving connections between the speed reducing device and followers.

10. In a driving mechanism, the combination of a suitable support, followers carried by said support, driving mechanism suspended from said support, a speed reducing device suspended from said support and connected to the driving mechanism, and controllable driving connections between the speed reducing device and followers, said driving connections extending opposite ways from the speed reducing device and vertically crossing the support on opposite sides thereof.

11. In a driving mechanism, the combination of a suitable support, followers carried by said support, a prime mover, a speed reducing device suspended from and beneath said support and connected to the prime mover, and driving connections between the speed reducing device and followers, said driving connections being susceptible of adjustment as to operativeness and as to direction of travel of the followers.

12. In a driving mechanism, the combination of a suitable support, followers carried by said support, a prime mover, a speed reducing device suspended from and beneath said support and connected to the prime mover, and driving connections between the speed reducing device and followers, said driving connections being adjustable selectively in respect to the speed reducing device and in respect to either of the followers.

13. In a driving mechanism, a suitable support, a movable member on said support, a slide bearing on said support, a housing on the movable member hinged to the slide bearing, a shaft in the movable member and housing, a pitman arranged for reciprocation in the slide bearing, and gear connections between said pitman and shaft, said gear connections adapted to separate on the line of articulation between the housing and slide bearing.

Signed by us at Newton, Iowa, this twenty-fourth day of August, 1910.

EDWARD A. EUSTICE.
EDWARD LE MOTTE EUSTICE.

Witnesses:
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HARRY ELLERD SCARBROUGH.