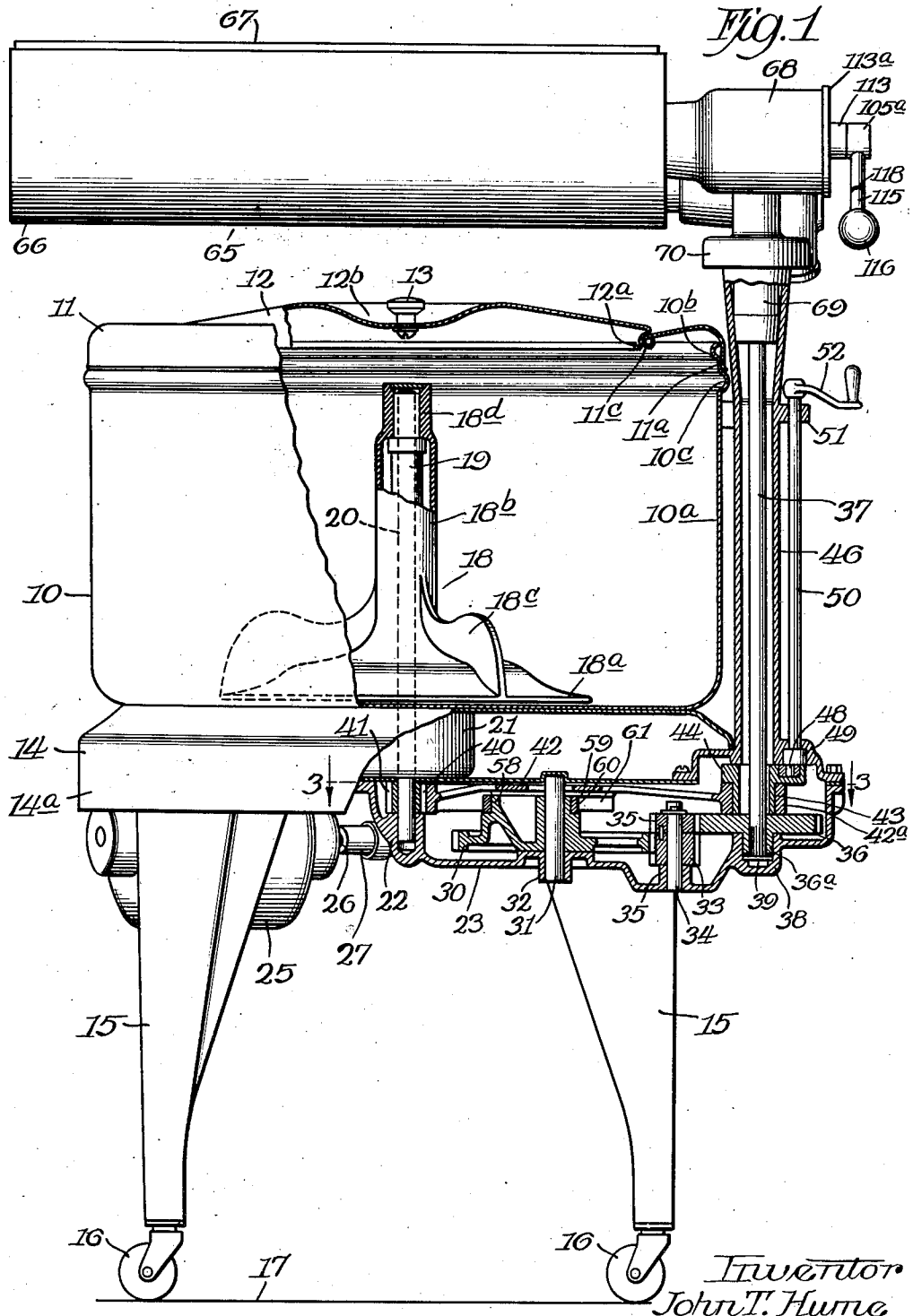
June 21, 1932. J. T. HUME 1,863,852

WASHING AND IRONING MACHINE

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Fig. 1



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WASHING AND IRONING MACHINE

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Fig. 2

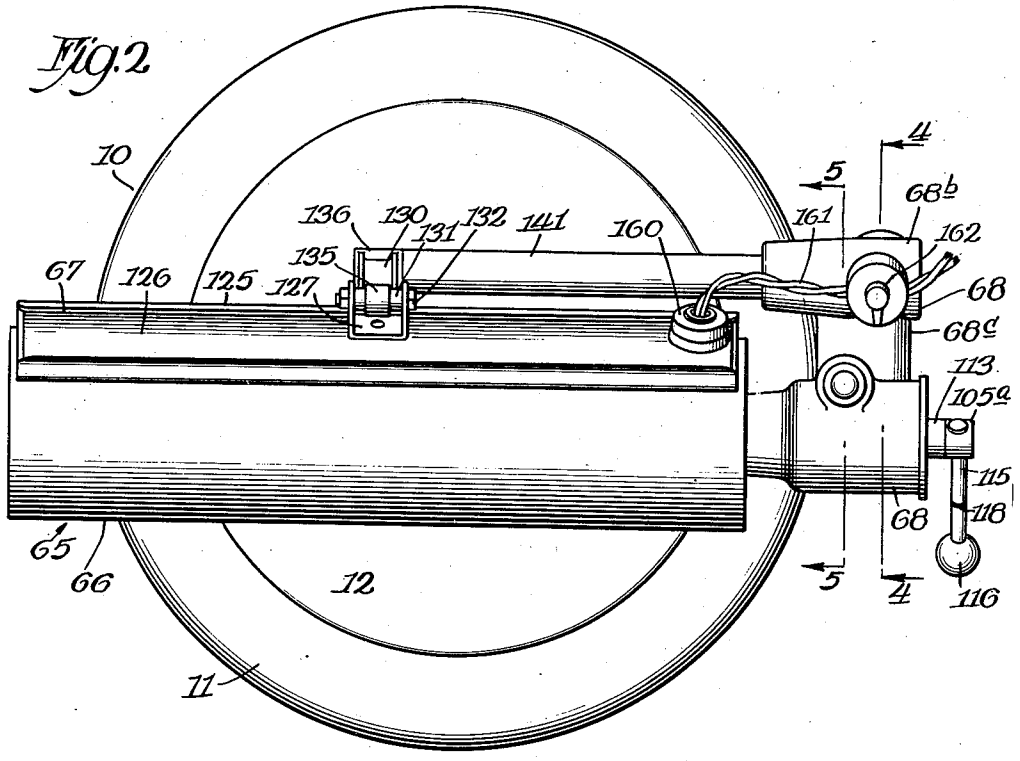
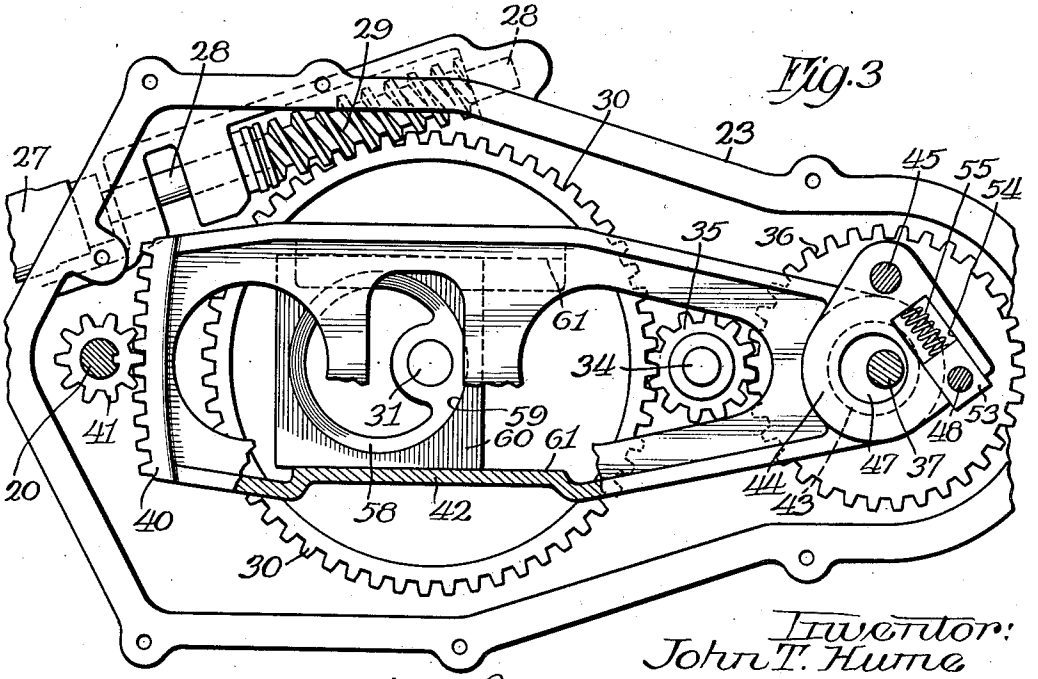


Fig. 3



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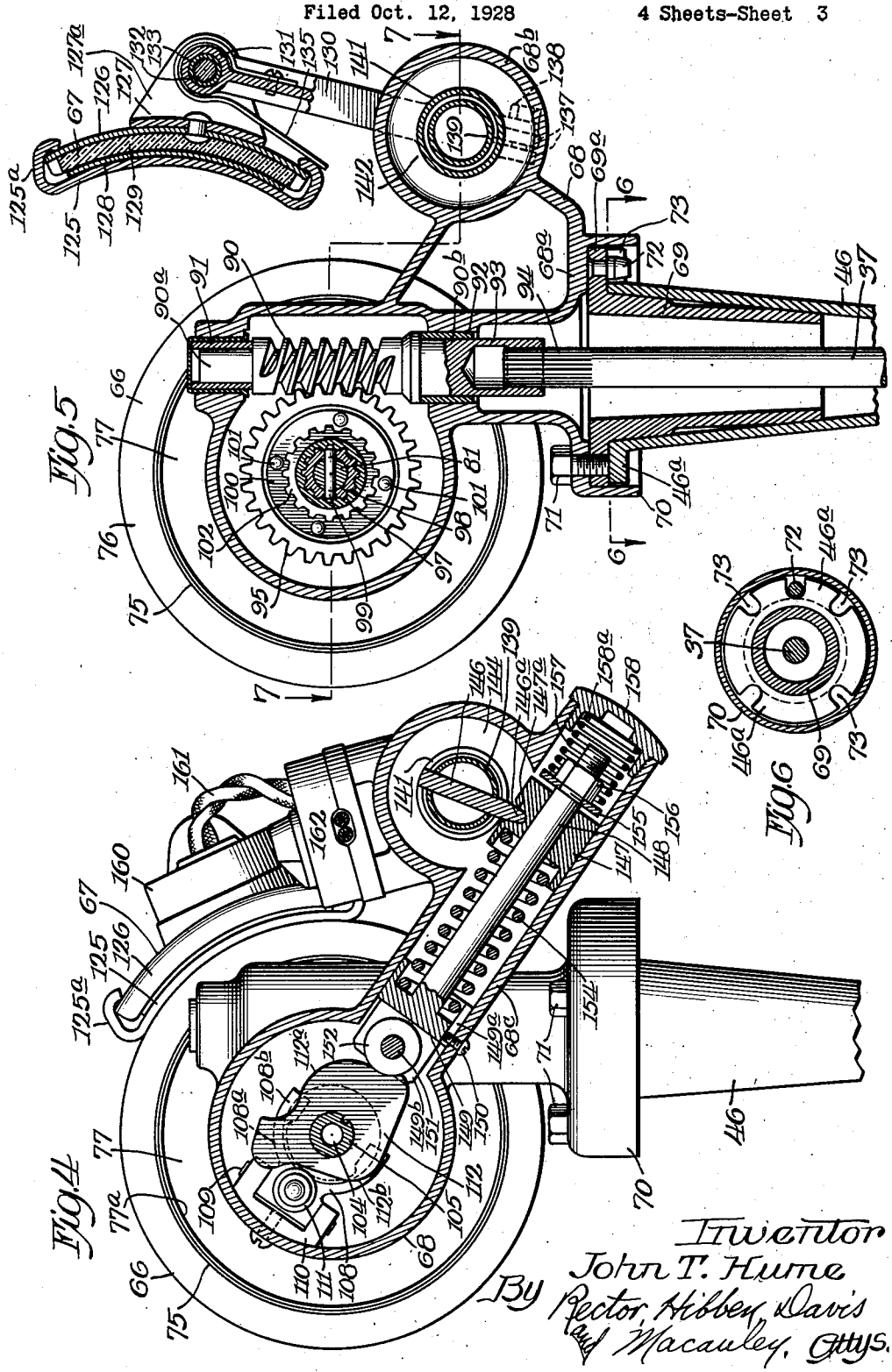


Fig. 5

Fig. 6

Fig. 4

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WASHING AND IRONING MACHINE

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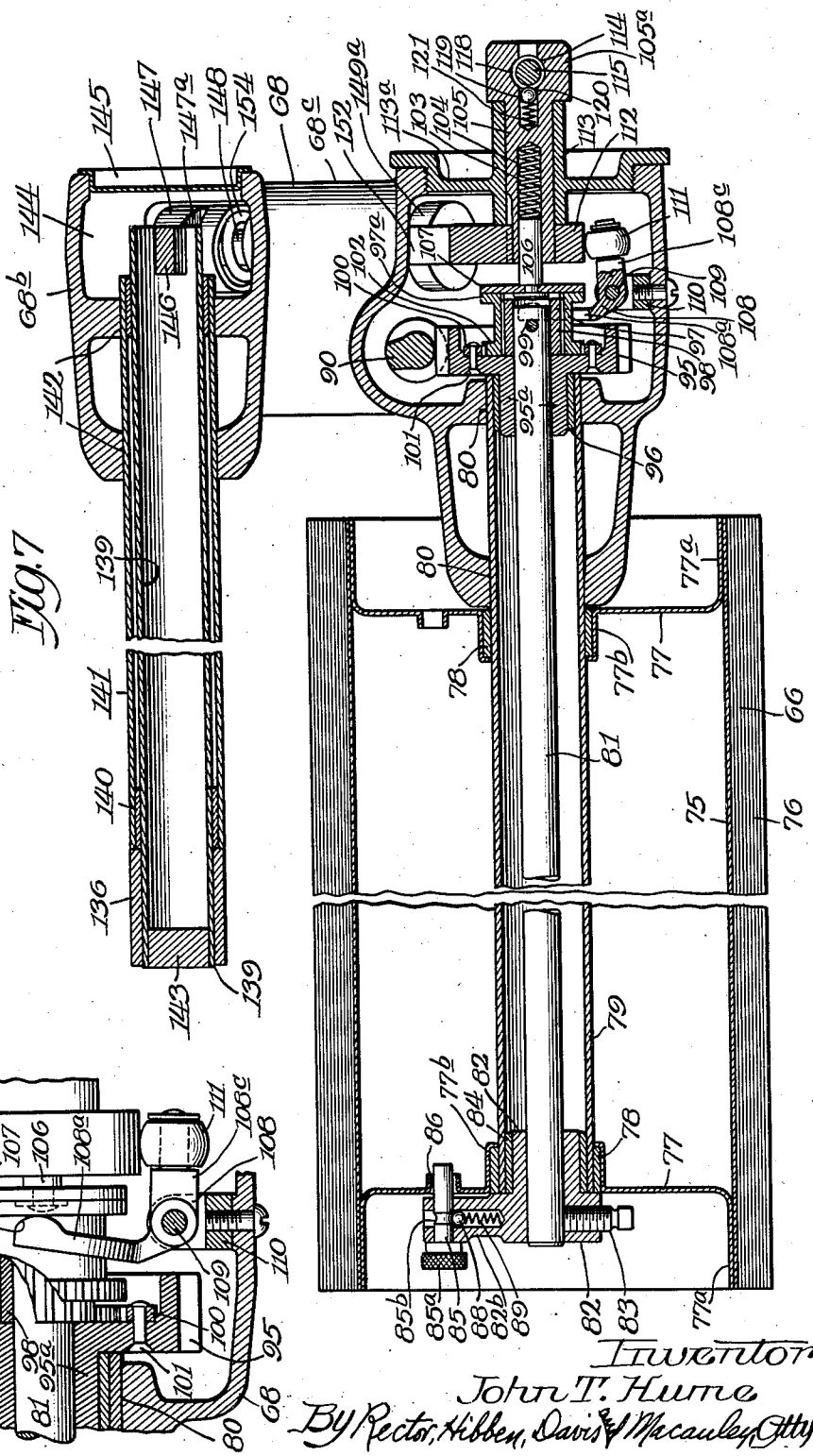


Fig. 7

Fig. 8

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UNITED STATES PATENT OFFICE

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WASHING AND IRONING MACHINE

Application filed October 12, 1928. Serial No. 312,008.

This invention relates to improvements in washing and ironing machines and its purpose is to provide a combination machine in which the driving mechanism of the washing machine is utilized for actuating the ironing elements and in which parts of the washing machine cooperate with the ironing elements during the ironing of the clothes. It has heretofore been the practice to employ the driving mechanism of washing machines for actuating clothes wringers which have been mounted on the washing machine to swing to wringing positions over the washing machine and one object of the present invention is to provide a washing machine in which a part of the driving mechanism which is employed for actuating a clothes wringer may be utilized, upon removal of the wringer, for driving the moving parts of an ironing machine adapted to be detachably mounted on the washing machine structure. The three functions of washing, wringing and ironing may thus be carried on in one composite machine having a common driving mechanism and a common supporting structure. A further object of the invention is to provide a detachable swinging ironing device adapted to be mounted on a washing machine. Still another object is to provide an improved simplified ironing machine structure comprising relatively movable ironing elements and power driven means for actuating them. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment is illustrated. In the drawings,

Fig. 1 shows a front elevation of the improved washing and ironing machine with a portion thereof broken away and illustrated in vertical section;

Fig. 2 shows a top plan view of the improved machine illustrated in Fig. 1;

Fig. 3 shows an enlarged horizontal section taken on the line 3—3 of Fig. 1;

Fig. 4 shows an enlarged vertical section taken on the line 4—4 of Fig. 2;

Fig. 5 shows an enlarged vertical section taken on the line 5—5 of Fig. 2, illustrating also a vertical section through the ironing shoe and associated parts;

Fig. 6 is a detail horizontal section taken on the line 6—6 of Fig. 5;

Fig. 7 shows a horizontal section taken on the line 7—7 of Fig. 5, and

Fig. 8 is a partial section similar to that of Fig. 7, showing the clutch for controlling the rotation of the roll.

As illustrated in the drawings, the invention is embodied in a machine comprising a cylindrical washing vessel 10 of the tub type having an annular outer wall open at its upper end to provide a circular opening which is normally closed by a removable cover 11 having an annular downwardly extending flange 11^a which seats over the upper annular extremity 10^b of the annular wall 10^a of the tub with the lower edge of the flanged cover engaging the annular bead 10^c which is formed in the tub wall. The cover 11 is provided with a central opening bounded by the annular bead 11^c and this opening is normally closed by a removable lid 12 having a centrally located handle 13 and provided with an inwardly and downwardly directed flange 12^a which extends on the inner side of the annular bead 11^c. The central portion of the lid 12 is depressed as shown at 12^b so that the handle 13 does not project materially above the upper surface of the lid. The vessel 10 is carried by a circular sheet metal frame 14 to which the bottom wall of the tub is secured and this frame is provided with an annular depending flange 14^a to which are attached the supporting legs 15. These legs are provided at their lower ends with casters 16

adapted to rest on the floor or other support 17 so that the machine may be conveniently moved about.

Within the vessel 10 there is located a clothes agitating device 18 comprising a base plate 18^a and an upwardly extending hollow stem 18^b which are connected and reinforced by vertically extending radiating vanes 18^c adapted to serve as clothes agitating members when they are rotated about the axis of the hollow stem 18^b. The base plate 18^a is spaced slightly above the bottom wall of the tub 10 and is supported in that position by a hollow sleeve 19 in which is located a vertical driving shaft 20. The sleeve 19 extends upwardly from the bottom of the vessel 10 and the shaft 20 extends above the upper end of the sleeve where it forms a driving connection with the hub 18^d which is formed at the upper end of the stem 18^b. The casing 21 is mounted within the frame 14 and contains suitable packing material for preventing leakage from the vessel around the shaft 20. This shaft is journaled at its lower end in a bearing 22 carried by a gear housing 23 which is secured on the under side of the frame 14, and it is adapted to be driven by an electric motor 25 through a train of mechanism hereinafter described, for the purpose of imparting an oscillating motion to the clothes agitator 18.

The motor 25 is secured to the under side of the frame 14, as shown in Fig. 1, and its shaft 26 is connected through a coupling 27 with an extension shaft 28 journaled in a bearing formed in the walls of the housing 23. The gear shaft 28 extends through this housing and has a spiral gear 29 secured thereon as shown in Fig. 3, which meshes with an annular gear 30. This gear 30 is located in the housing 23 and is mounted to revolve about a stub shaft 31 which is secured in a bearing 32 carried by the lower part of the housing. The gear 30 also meshes with a pinion 33 mounted to revolve about another stub shaft 34 secured in a hub 35 carried by the housing 23. A pinion 35 is keyed to the pinion 33 to revolve therewith, as shown in Fig. 1, and the pinion 35 meshes with a gear 36 which is splined on the lower end of a vertical operating shaft 37. The hub of the gear 36 carries a downward extension 36^a which is journaled in the bearing 38 carried by the outer portion of the housing 23 and the weight of the shaft 37 is carried by the roller bearing 39 which is mounted at the lower end of the hub 36^a. The shaft 37 serves to drive the clothes wringer and also the parts of the ironing mechanism hereinafter described.

An oscillating motion is imparted to the vertical shaft 20 and the clothes agitator 18 mounted thereon through a segmental gear 40 which meshes with a pinion 41 secured on the shaft 20 above the bearing 22. The segmental gear 20 is carried by an oscillatory frame or arm 42 provided at its outer end with a hub 42^a which is journaled on the depending bearing 43 carried by a plate 44. The bearing plate 44 is pivoted on a pin 45 projecting downwardly from the lower portion of the upwardly extending housing 46 in which the shaft 37 is located. The shaft 37 extends through an opening 47 formed in the plate 44 and the bearing member 43 and this opening is large enough to permit movement of the plate 44 and the connected frame 42 to the extent necessary to disengage the segmental gear 40 from engagement with the pinion 41. This movement of the plate 44 is effected by the rocking thereof about the pin 45 and this is effected by an eccentric pin 48 mounted on the cylindrical block 49 which is journaled in a bearing carried by the lower portion of the housing 46 and secured to the lower end of a shaft 50. This shaft 50 has its upper portion journaled in a bearing 51 carried by the housing 46 and is provided with a crank handle 52 by which it may be operated for the purpose of turning the pin 48 which is located eccentrically with respect to the axis of the shaft 50. The pin 48 engages an aperture formed in a block 53 which is mounted to slide in a guide 54 formed in the plate 44. The guide 54 extends in a line radially upward from the axis of the pin 45 and the block 53 is normally moved away from the pin 45 by means of the coil spring 55. The axis of the shaft 50 is so located with respect to the pin 48 and the block 53 that the spring 55 is adapted to hold the plate 44 in either extreme position to which it may be moved by the operation of the crank handle 52. When the handle 52 is in one extreme position, the teeth of the segmental gear are in mesh with the pinion 41 as shown in Fig. 3, and when the handle 52 is moved to the other extreme position, the gear teeth are out of mesh to permit the oscillation of the arm or frame 42 without effecting a corresponding oscillatory movement of the clothes agitator 18. This oscillatory movement of the frame 42 is effected by an eccentric 58 which is formed integrally with the upper part of the gear 30 and this eccentric is mounted within a circular aperture 59 formed in a block 60 which is mounted to travel between two parallel guides 61 carried by opposite sides of the frame 42. The block 60 is supported by the gear 30 and when the eccentric 58 rotates with the gear 30, the block 60 is operated by the eccentric to impart an oscillatory movement to the frame 42 about its pivotal bearing hub 43.

It will be apparent that the shaft 37 rotates continuously during the operation of the motor 25 and the rotation of this shaft is made use of for operating the ironing machine indicated generally at 65. The ironing machine comprises a rotatable roll 66 and the relatively movable heated ironing shoe

67 both of which are carried by a frame or casing 68 adapted to be detachably mounted on the upper end of the housing 46. The walls of the housing 46 diverge upwardly at the upper end of the housing to form a tapered socket which is adapted to be fitted by a correspondingly tapered socket member 69 provided at its upper end with an outwardly directed annular flange 69^a which is located within the depending flange 70 formed on the base plate 68^a of the casing 68. The flange 69^a is secured to the base plate 68^a by means of a plurality of studs 71 and it is provided with a fixed pin 72 adapted to engage loosely any one of a plurality of notches 73 which are formed in the outwardly directed flange 46^a formed on the upper end of the housing 46. In the present embodiment, five of the notches 73 are formed in the flange 46^a, as shown in Fig. 6, and this permits the operator to locate the casing 68 in any desired position for the purpose of positioning the ironing elements 66 and 67 in a suitable position either over the washing vessel 10 or in a position disposed outwardly therefrom. The casing 68 and the other parts of the ironing machine may be lifted up to permit the turning of the ironing elements to the desired position and then the parts may be lowered to cause the pin 72 to engage the desired notch 73.

The rotatable roll 66 comprises a sheet metal cylinder 75 upon which are mounted superimposed layers 76 of suitable cloth adapted to contact with the clothes being ironed. This cloth may be a fabric woven from hemp or the like and it may be wound on the cylinder 75 in spiral fashion. The cylinder 75 is supported by a pair of end frames or disks 77 formed of sheet metal and having annular flanges 77^a which fit within and are secured to the end portions of the cylinder 75. The disks 77 are provided with central apertures bounded by laterally and inwardly extending flanges 77^b which fit over and are secured to the bearing members 78 which are adapted to rotate upon a hollow axle 79. This axle is secured in bearings 80 carried by the casing 68 and it serves as a relatively stationary support for the rotatable roll 66 which is driven by a shaft 81 located within the axle. A driving connection is established between the shaft 81 and the roll 66 at the outer end of the cylinder 75 through a driving member 82 which is secured to the shaft 81 by a set screw 83 and which is provided with a cylindrical portion 82^a journaled in a bearing 84 secured within the outer end of the axle 79. The driving member 82 has a lateral projection 82^b in which there is slidably mounted a pin 85 extending parallel to the axis of the shaft 81 and adapted to engage an aperture 86 which is formed in the operation of stamping the adjacent disk 77. The pin 85 is provided with a knurler head 85^a to be engaged by the fingers of the operator and it is held in adjusted position by means of a spherical ball 88 engaging an annular groove 85^b formed in the pin, the ball being forced outwardly by a coil spring 89. When the pin 85 is withdrawn from engagement with the aperture 86, the driving connection between the shaft 81 and the roll is broken which condition may be desirable, for example, when it is desired to re-wind the cylinder 75 with the cloth covering 76.

The shaft 81 of the ironing roll 66 is driven from the upright shaft 37 through certain mechanism comprising a spiral gear 90 which is mounted in the casing 68, as shown in Fig. 5, and which is provided at its ends with journals 90^a and 90^b journaled in the bushings 91 and 92, respectively, mounted in bearings which are formed in the upper and lower parts of the casing. The lower end of this spiral gear is provided with a socket member 93 having internal longitudinal teeth through which a driving connection is established with the teeth 94 formed on the upper end of the shaft 37 while at the same time permitting the spiral gear to be withdrawn from the upper end of the shaft when the casing 68 and the ironing elements are removed from the housing 46. The spiral gear 90 meshes with a gear 95 having a laterally extending hub 95^a which is journaled in the bushing 96 fixed within the inner end of the hollow shaft 79, as shown in Fig. 7. The shaft 81 is journaled within the hub 95^a of the gear 95 and a driving connection is adapted to be established between the shaft and the gear by means of clutch mechanism comprising a movable clutch sleeve 97 having internal longitudinal teeth which mesh with the external longitudinal teeth formed on a sleeve 98 which is secured to the shaft 81 by a transverse pin 99. The movable clutch sleeve 97 thus has a driving connection with the shaft 81 and when it is moved inwardly to the position shown in Fig. 7, it is adapted to be driven by the gear 95 through the action of an annular gear member 100 secured to the side of the gear 95 by rivets 101 and having internal annular teeth adapted to mesh with the gear teeth 102 on the clutch member 97. When the clutch member 97 is moved longitudinally of the shaft 81, toward the right as viewed in Fig. 7, the gear teeth 102 are moved out of mesh with the teeth of the gear member 100 so that the gear 95 is then permitted to rotate freely without driving the shaft 81.

The clutch member 97 is normally maintained in the inner position shown in Fig. 7 by the action of a coil spring 103 which is mounted within the bore 104 of a shaft 105. The coil spring engages a plunger 106 which is secured to a circular plate 107 attached to the flange 97^a formed on the end of the movable clutch member. The clutch member is withdrawn to the position shown in Fig. 8 by

the action of a bell crank lever 108 which is pivoted at 109 on a bracket 110 mounted in the lower part of the casing 68. The bell crank lever 108 is bifurcated at one end to form upwardly extending arms 108 which extend on opposite sides of the clutch sleeve 97 and which are provided with rounded surfaces 108^b adapted to contact with the annular flange 97^a. The bell crank lever 108 also comprises an arm 108^c which has a roller 111 mounted thereon to engage the peripheral surface of a cam 112. This cam is secured on the inner end of the shaft 105 and this shaft is journaled in a bearing 113 formed in a detachable end plate 113^a which has a screw-threaded engagement with the walls of an aperture formed in the end of the casing 68. The shaft 105 is provided at its outer end with an enlarged head 105^c provided with a transverse bore 114 in which there is slidably mounted an operating handle 115. This handle is provided at one end with a circular member 116 adapted to be engaged by the hand of the operator and the other end is engaged by a nut which limits its sliding movement in the bore 114. The operating handle 115 is provided with two annular grooves 118 either of which may be engaged by a ball 119 mounted in the recess 120 formed in the head 105^a, and actuated by a spring 121 to engage the handle 115. This permits the handle to be held in the extended position shown in Fig. 1 or to be moved upwardly and held with the ball 116 adjacent the head 105^a, thus enabling the operator to locate the handle in a position wherein it will not interfere with the operation of ironing. By turning the handle 115, the cam 112 is operated to force the arm 108^c of the bell crank lever downwardly and thereby disengage the clutch member 97 from its driving engagement with the gear 95. This movement of the cam 112 is also utilized for effecting movement of the ironing shoe 67 with respect to the roll 66.

The shoe 67 comprises a metal plate 125 of substantially the same length as the roll 66 and provided with an inner convex surface adapted to conform to the curvature of the outer surface of the roll. This plate is provided at its edges with flanges 125^a which are adapted to hook over the upper and lower edges of the supporting plate 126 which is similarly curved in cross section and which is attached by rivets to a supporting bracket 127. An electrical heating plate 128, comprising one or more suitable conductors mounted between or embedded in resistance material, contacts with the inner side of the plate 125 and is spaced from the rear plate 126 by a body of insulating material 129. The conductor of the heating member 128 is connected in an electric circuit capable of being controlled by the operator. The shoe 67 is carried by an arm 130 provided at its upper end with a hub 131 which is mounted between the parallel arms 127^a of the bracket 127. The arms 127^a are connected with the hub 131 by a transverse pin 132 and a bushing 133 is mounted within the hub for direct engagement with the pin. This permits a pivotal movement of the shoe 67 with respect to the supporting arm 130 and the shoe is normally held in the position shown in Fig. 5, when out of engagement with the roll, by a leaf spring 135 having its free end engaging the lower rear edge of the shoe and having its other end attached to the arm 130 after being passed around the hub 131. This normal inclination of the shoe 67 with respect to the supporting arm 130 causes the lower edge of the shoe to engage the roll 66 before other parts of the shoe contact with the roll when the two ironing elements are brought into engagement, thus insuring a progressive engagement of the shoe with the roll from the lower edge of the shoe so that the clothes passing between the ironing elements will be effectively ironed without any wrinkles therein if they be passed between the shoe and the roll before these parts are fully in engagement with each other.

The lower end of the supporting arm 130 is provided with a bifurcated hub 136 having ears 137 projecting therefrom and engaged by the clamping stud 138. By this arrangement, the arm 130 is clamped on the outer end of a hollow shaft 139 which is journaled in bushings 140 fixed within the inner and outer ends of a hollow supporting axle 141. This axle is secured in bearings 142 which are formed in the rear extension 68^b of the housing 68, as shown in Fig. 7. The outer end of the hollow shaft 139 is closed by a plug 143 and the inner end thereof projects beyond the axle 141 within the chamber 144 of the housing 68^b which is normally closed by the detachable cover plate 145. The projecting end of the shaft 139 is provided within the chamber 144 with transverse slots in which there is fixed a pin 146 having a rounded extremity 146^a which projects beyond one side of the shaft and is adapted to engage a recess 147^a formed in a cylindrical block 147. This block is adapted to move in the cylindrical portion 68^c of the housing 68 which connects the main portion of the housing with the chamber 144. The member 147 is mounted on a plunger 148 which is connected at its upper end with a piston 149 adapted to slide in the tubular casing portion 68^c. This piston is held against rotation by the set screw 150 engaging a groove 149^a in its side and it is provided with a pair of projecting ears 149^b between which there extends a pin 151 having mounted upon it a roller 152. This roller is adapted to engage the face 112^a of the cam 112^b which is disposed on the side opposite the face 112^a by which the bell crank lever 108 is operated. A coil spring 154 is mounted

on the plunger 148 between the piston 149 and the block 147 and the movement of the block away from the piston which is caused by this spring is limited by a washer 155 mounted on the plunger to contact with the adjustable nut 156 which is secured to the threaded end of the plunger. Another coil spring 157 surrounds the nut 156 and engages the washer 155 at its upper end while its lower end seats in a recess 158[a] formed in the cap member 158 which threadedly engages the lower end of the casing portion 68[c]. When the handle 115 is operated to rotate the cam 112 to the position shown in Fig. 4, the piston 149 and plunger 148 are forced downwardly and this motion is imparted to the block 147 through the spring 154 thereby effecting the rotation of the pin 146 and its connected shaft 139 on which the shoe 67 is mounted. The shoe 67 is thus moved into engagement with the ironing roll 66 as shown in Fig. 4, and is maintained in yielding engagement therewith through the action of the coil spring 154. When clothes pass between the roll and the shoe during the operation of ironing, the spring 154 yields sufficiently to permit the necessary separation of the roll and the shoe. The washer 155 seats against a shoulder at the upper end of the threaded portion of the plunger 148 and the engagement of the coil spring 157 with this washer maintains the roller 152 in close contact with the cam surface 112[b]. When the cam 112 is rotated to its other extreme position, the roller 152 engages the indentation at the other end of the cam surface 112[a] while at the same time there is an upward movement of the piston 149 and plunger 147, under the influence of the spring 157 to cause the shoe 67 to move away from the roll 66 to the position shown in Fig. 5.

It will be apparent from the foregoing description that this invention provides means whereby the driving mechanism of a simplified form of power-driven washing machine may be utilized not only for actuating a clothes wringer adapted to be swung to and from the position over the washing machine, but also for actuating an ironing machine which may have a similar swinging movement and which is adapted to replace the clothes wringer for actuation by the same mechanism which is provided for driving the rolls of the wringer. The clothes wringer, which is not illustrated in the drawings, is provided with a tapered member similar to the member 69 for engagement with the upper portion of the housing 46 and the driving mechanism of the wringer is adapted to establish a connection with the shaft 37 through the teeth 94. When the wringer has been removed, the ironing machine may be replaced on the housing 46 in the manner illustrated in Fig. 5 and by mounting the housing 68 in the desired angular position on the housing 46, the ironing elements 66 and 67 may be caused to assume any desired position with respect to the washing vessel 10. In the operation of ironing, the roll 66 and shoe 67 are preferably disposed over the vessel 10 as shown in Fig. 2, so that the cover 11 and its removable lid portion 12 may be utilized as a clothes support for the clothes being ironed. When the machine is being operated as an ironing machine, the motion of the clothes agitator 18 may be arrested by operating the handle 52 to move the teeth of the segmental gear 40 out of engagement with the teeth of the pin 41 which actuates the agitator shaft 20. The upright shaft 37 operates continuously during the operation of the motor 25 and when the cam 112 has been actuated by the handle 115 to move the clutch member 97 into driving engagement with the gear 95, a driving connection is established between the shaft 37 and the shaft 81 so that the roll 66 is then driven to permit the ironing of clothes, assuming that the clutch pin 85 is in engagement with the aperature 86 in the outer disk 77 of the roll. The motion of the cam 112 which is necessary to establish a driving connection between the shaft 37 and the shaft 81 also serves to turn the hollow shaft 139 to move the shoe 67 into engagement with the roll so that the rotation of the roll is started simultaneously with the movement of the shoe to ironing position and this is effected by the actuation of a single operating member 115. Similarly, when the rotation of the roll is arrested by disengaging the clutch member 97, the shoe is simultaneously moved away from the roll so that there is no danger of burning the cloth covering 76 by the heated shoe. The electric circuit of the heating element of the shoe is preferably connected through a plug 160 with flexible insulated conductors 161 leading from a source of electrical current having connected therein an electric switch 112 which is preferably mounted on the housing extension 68[b] in a position to be engaged conveniently by the fingers of the operator so that the current can be readily shut off or turned on when desired.

The mechanism for actuating the clothes agitator, described above, is claimed in my co-pending application Serial No. 338,456, filed February 8, 1929, and the hereindescribed ironing mechanism is claimed in my co-pending application Serial No. 332,062, filed January 12, 1929.

Although one form of the invention has been shown and described by way of illustration, it will be understood that it may be constructed in various other embodiments within the scope of the appended claim.

I claim:

In combination, a support, a driving shaft mounted adjacent said support, a frame de-

tachably and rotatably mounted on said support, an ironing roll and a relatively movable shoe carried by said frame, a shaft for rotating said roll, a gear actuated by said driving shaft, a manually operated clutch for connecting said gear with said second-named shaft, and means actuated by the operation of said clutch for effecting movement of said shoe with respect to said roll.

In testimony whereof, I have subscribed my name.

JOHN T. HUME.