April 22, 1930. R. L. LEE 1,755,481

DOMESTIC APPLIANCE

Filed March 31, 1923 5 Sheets-Sheet 1

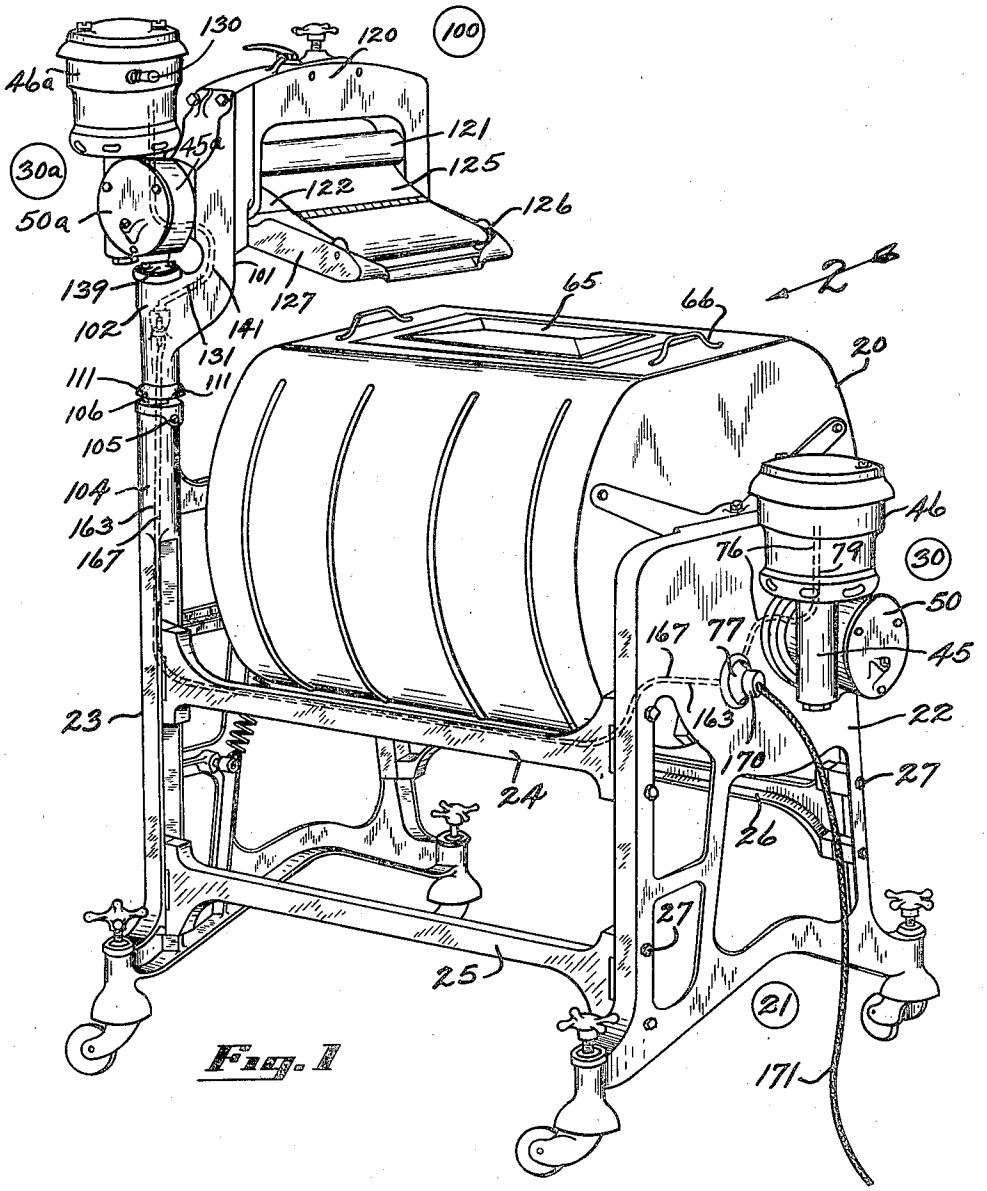


Fig. 1

Witnesses
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Warren Schmieding

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DOMESTIC APPLIANCE

Filed March 31, 1923 5 Sheets-Sheet 2

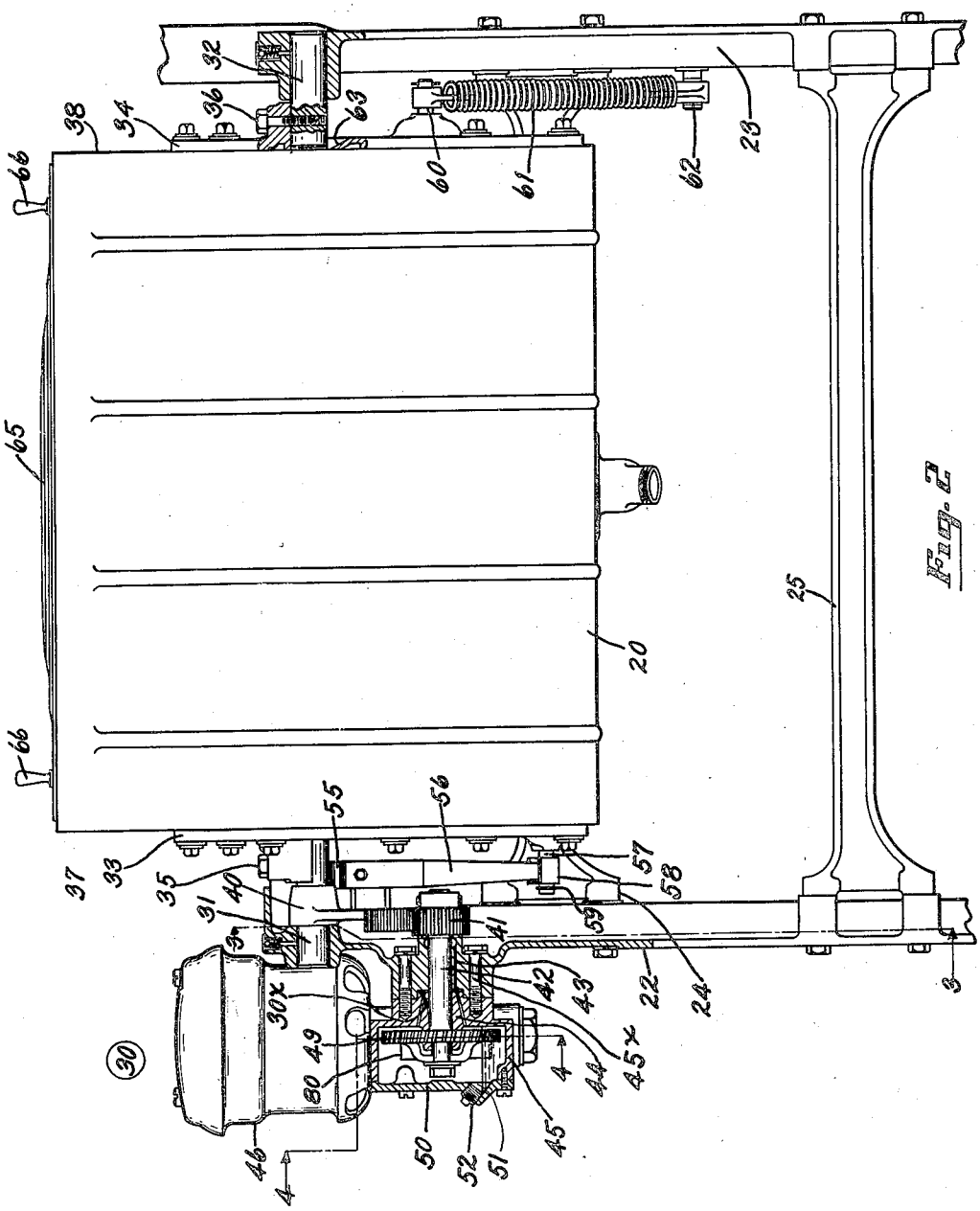


Fig. 2

Witnesses
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DOMESTIC APPLIANCE

Filed March 31, 1923 5 Sheets-Sheet 3

Fig. 5

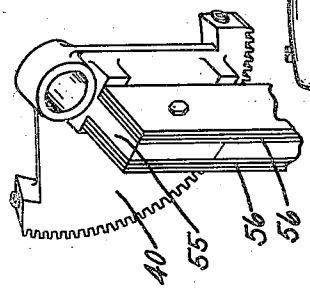
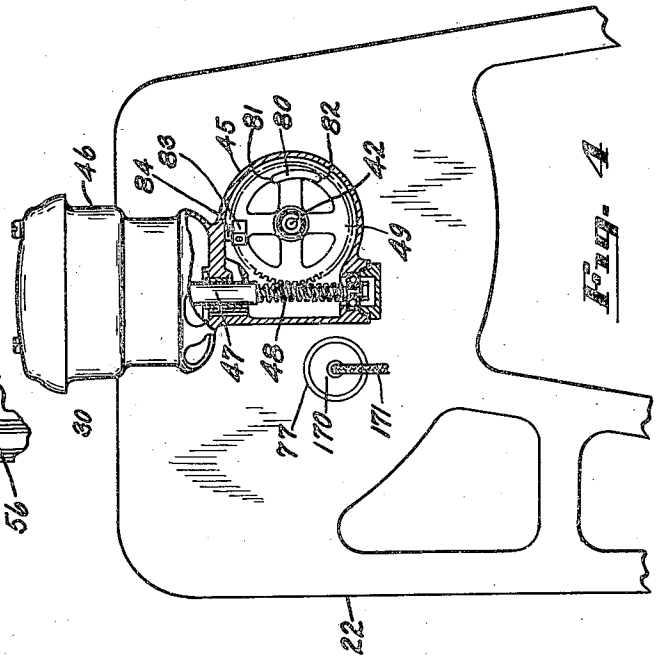


Fig. 4



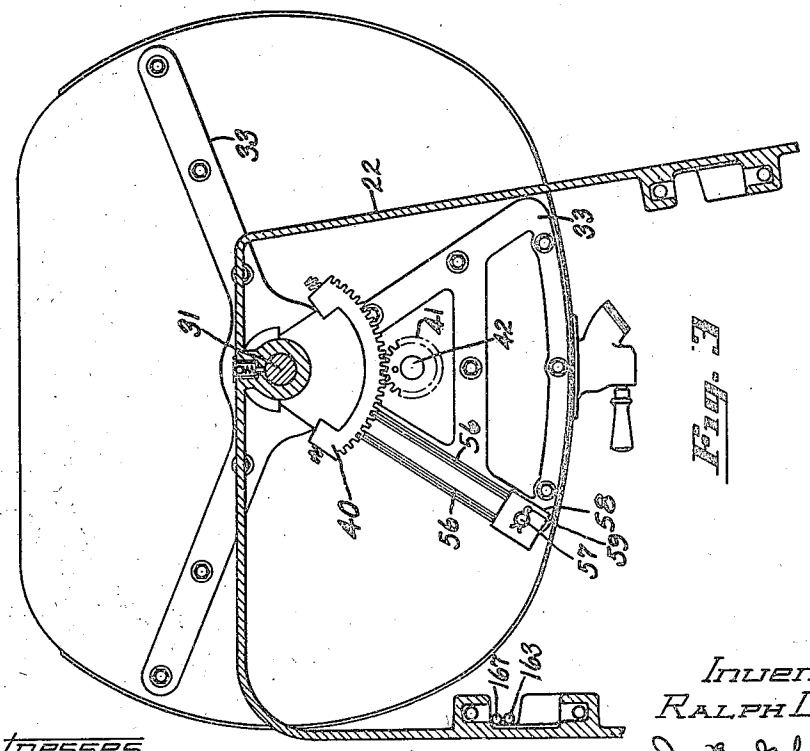


Fig. 3

Witnesses
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DOMESTIC APPLIANCE

Filed March 31, 1923 5 Sheets-Sheet 4

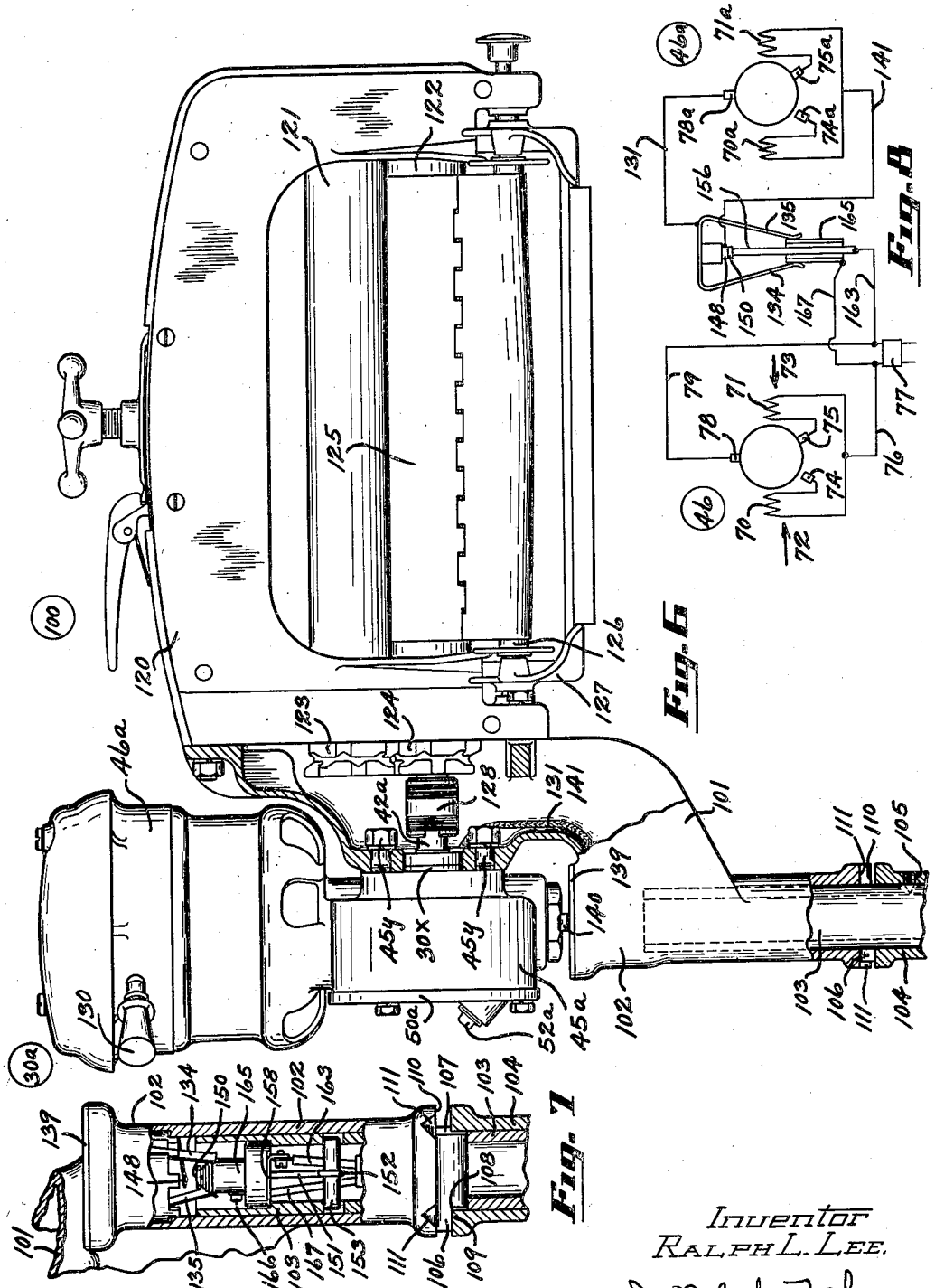


Fig. 1

Fig. 4

Witnesses
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DOMESTIC APPLIANCE

Filed March 31, 1923 5 Sheets-Sheet 5

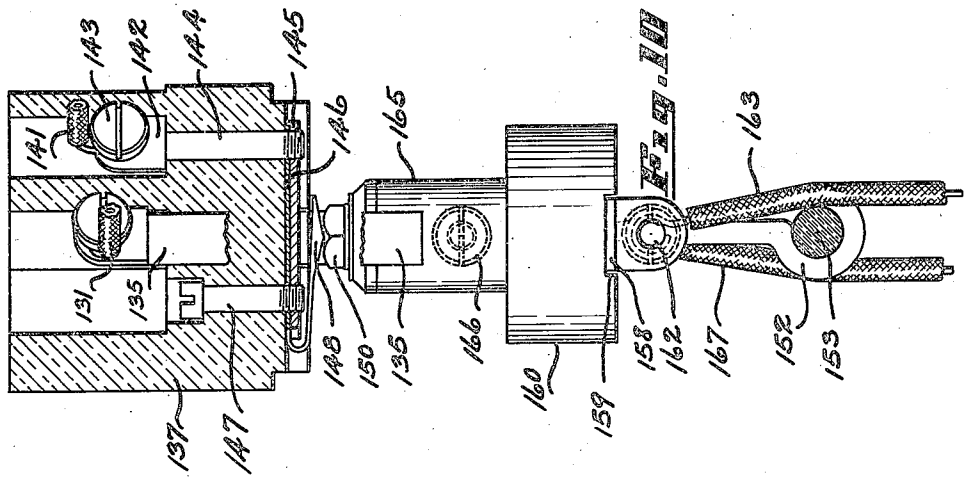


Fig. 10

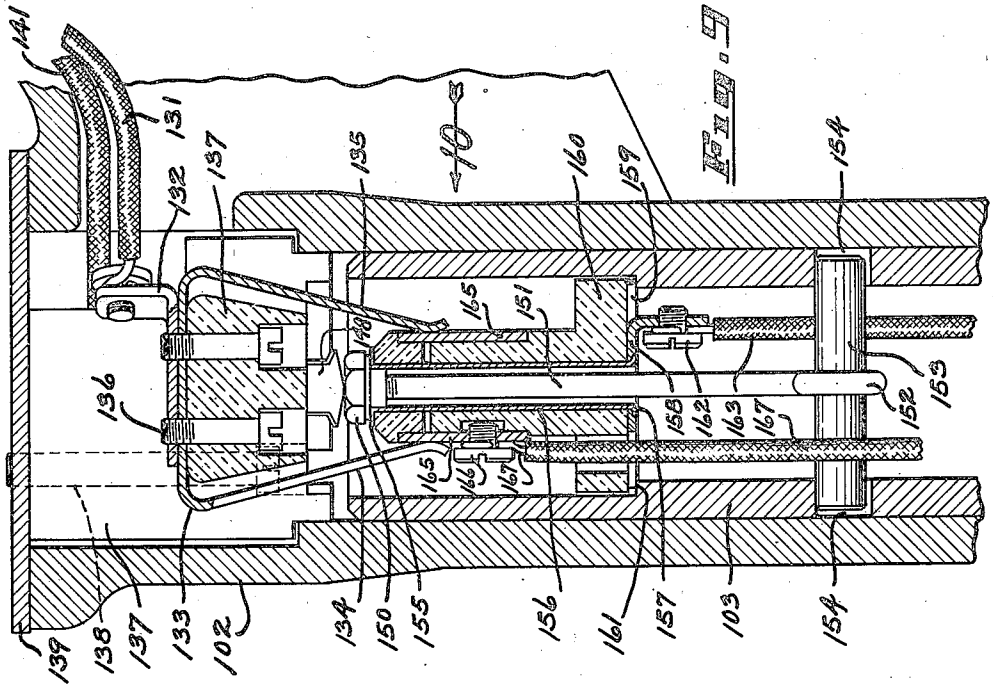


Fig. 9

Witnesses
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Patented Apr. 22, 1930 1,755,481

UNITED STATES PATENT OFFICE

RALPH L. LEE, OF DAYTON, OHIO, ASSIGNOR TO DELCO-LIGHT COMPANY, OF DAYTON, OHIO, A CORPORATION OF DELAWARE

DOMESTIC APPLIANCE

Application filed March 31, 1923. Serial No. 629,200.

This invention relates to laundry machines and particularly to machines including a washing machine and a wringer combined in one structure.

Some of the objects of the present invention are to provide a laundry machine including a washing machine and a wringer operated by separate electric motors, to locate the motors and wiring thereto so as to be protected from short circuit, for example, by splashing or dripping water, and to provide one terminal connecting both motors with service wires.

A further object is to so construct and support the electric motors and speed reducing gearing connecting them respectively with the wringer and washing machine that many parts of the individual motors and gearing are common to both in order to reduce the number of different parts required.

A further object is to transmit power to a wringer which can be moved into various operating positions relative to a support without requiring the wringer to be locked in its various operating positions.

A further object is to provide a wringer unit which is removable from a support, the transmission of power to the wringer unit being automatically interrupted when the wringer unit is removed without requiring parts to be disassembled from the support or wringer unit.

A further object is to provide a wringer unit which is rotatable with respect to a support to bring the wringer into several convenient operating positions, the transmission of power being automatically interrupted when the wringer unit is rotated out of its operating position.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a perspective view of a laundry machine embodying the present invention;

Fig. 2 is a side elevation of the washing apparatus included in the laundry machine looking in the direction of arrow 2 of Fig. 1 certain parts being shown in section;

Figs. 3 and 4 are sectional views taken on the lines 3—3 and 4—4 of Fig. 2;

Fig. 5 is a perspective view of a portion of the apparatus for operating the washing apparatus;

Fig. 6 is a side elevation partly in section of the wringer unit;

Fig. 7 is a fragmentary view of the wringer unit certain parts being broken away to show the electrical circuit connections;

Fig. 8 is a wiring diagram of the electrical motors and circuits of the laundry machine;

Fig. 9 is a sectional view on a large scale of the electrical connecting device for the wringer unit;

Fig. 10 is a side view partly in section of the electrical connecting devices shown in Fig. 9 looking in the direction of the arrow 10 in Fig. 9.

The laundry machine includes washing apparatus having a washing tub 20 pivotally mounted upon a frame 21 which includes main or end frame members 22 and 23 connected by tie-bars 24, 25, and 26, these bars being secured by means of screws 27 passing through holes in the end frames and having threaded connections with the ends of the tie-bars.

The frame 22 supports a power head 30 or mechanism for operating the washing tub 20, said mechanism including an electric motor and reduction gearing structure which is removable as a unit from the frame 22.

Frame 23 supports a wringer unit 100 in a manner to be described later.

The washing tub 20 is described in detail in the copending application of Ralph L. Lee, Serial No. 629,201, filed March 31, 1923, in which there is described a mode and apparatus for washing which involves oscillating the tub 20. The tub 20 is mounted for oscillation upon shafts 31 and 32 to which are attached spiders 33 and 34 respectively, by means of bolts 35 and 36 respectively. The spiders 33 and 34 are secured to the ends 37 and 38 of the tub 20. The mechanism for oscillating the tub 20 includes a segment 40 loosely mounted upon the shaft 31 and mesh-

ing with a gear 41 mounted on a shaft 42 which is journaled in bearing 43 formed integrally with the end frame 22 and also journaled within the bearings 44 formed integrally with a gear housing 45 secured by screws 45x to the frame 22. The gear housing 45 supports an electric motor 46 having a shaft 47 provided with a worm 48 meshing with a worm gear 49 attached to the shaft 42. The housing 45 is provided with a cover 50 provided with a filler opening 51 closed by a plug 52, the opening 51 being provided for pouring in lubricating oil. The housing 45, the motor 46, and the reduction gearing 48, 49 comprise the washing machine operating mechanism or power head device 30 which is detachable as a unit from the side frame. This power head can be removed by detaching the gear 41 and removing the screws 45x.

The segment 40 provided with a lug 55 carrying on opposite sides thereof leaf spring members 56 which bear on opposite sides of a stud 57 carried by the spider 33. A U-shaped clip 58 retained by a cotter pin 59 serves to maintain the ends of spring 56 in engagement with pin 57 but allows the stud 57 to move longitudinally of the spring.

The spider 34 carries a stud 60 connected by spring 61 with a stud 62 carried by the frame 23.

To remove the washing tub 20 from the frame and driving mechanism the screws 35 are removed. The spring 61 is disconnected from the stud 62. The cotter pin 59 and U-clip 58 are removed from stud 57. Then the tub 20 may be moved vertically with respect of the machine frame 21 leaving the frame and operating mechanism supported by the frame in assembled relation. As the tub 20 is removed camming surfaces 63 provided on the spiders 33 and 34 will cause the shafts 31 and 32 to be cammed away from the spiders so as to clear the outer surfaces thereof.

The tub 20 is provided with a removable cover 65 having handles 66.

The oscillation of the tub 20 is accomplished by reversing the electric motor in a manner shown diagrammatically in Fig. 8. The motor 46 is provided with fields 70 and 71 which are arranged to produce opposite magnetic effects as indicated by the arrows 72 and 73. These fields are connected to brushes 74 and 75 respectively having a common connection by wire 76 to a common terminal plug 77. The brushes 74 and 75 alternately provide one of the main brushes of the motor, the other main brush being shown at 78 connected by wire 79 with the terminal plug 77. Reversal of the motor is accomplished by lifting one of the brushes 74 and 75, and causing the other brush to touch the commutator of the motor. One arrangement of these brushes is shown in Fig. 8. Brush 74 is lifted away from the commutator while brush 75 engages the commutator to render the field 71 operative. Rotation of the motor in the opposite direction is accomplished by reversing the position of the brushes 74 and 75. The lifting brushes constitute a switch for reversing the motor.

This motor and reversing switch is adapted for use either with the washing apparatus or with the wringer. When used with a washing apparatus automatic means are provided for controlling the switch so that the direction of the motor may be reversed automatically. This automatic mechanism includes a block 80 attached to gear 49 and having operating surfaces 81 and 82 (see Fig. 4). Block 80 is adapted to cooperate with a lever 83 attached to a rod 84 which actuates mechanism for lifting one brush and for permitting the other brush to engage the commutator. This mechanism is described and claimed in the copending application of Ralph L. Lee, Serial No. 629,201, filed March 31, 1923. For the understanding of the present invention it is thought sufficient to state that the operating surface 82 will push the lever 83 into the position shown in Fig. 4 to effect the lifting of one of the brushes and the engagement of the other brush with the commutator. The arrangement of the motor circuit is such that gear 49 will turn counterclockwise to oscillate the tub in one direction. The operating surface 81 will engage the lever 83 to cause the position of the brushes 74 and 75 to be reversed whereupon the gear 49 will rotate in the opposite direction to oscillate the tub in the opposite direction.

To stop the washing apparatus the motor may be provided with means for lifting the brush 78 from the motor commutator. One form of such means is shown in the copending application, Serial No. 629,201.

The wringer unit 100 includes a frame or bracket 101 having a tubular hub 102 mounted on a tube 103 secured within a tubular post 104 formed integrally with frame 23. Tube 103 is secured to post 104 by screws 105. The wringer unit 100 is maintained in various convenient operating positions by devices which do not lock the wringer in any of its operating positions but cause the wringer to be maintained by yielding pressure. This maintaining means includes a pin 106 which is supported by diametrically opposed apertures 107 provided in tube 103, the pin having a notch 108 for receiving a portion of the upper edge 109 of the post 104. When the screw 105 is removed the tube 103 can be pulled upward to permit sliding out of the pin 106. Pin 106 cooperates with radially extending transverse notches 111 provided on the lower surface 110 of hub 102. The weight of the bracket 101 and parts supported thereon causes the parts 106 and 111 to be maintained yieldingly in engagement with the tube 103 with pressure, due to their own weight,

sufficient to maintain the wringer in an operating position without requiring the wringer to be locked in position.

The wringer unit 100 may be swung horizontally about the post 104 whereupon the parts 106 and 111 will operate as camming means to cause the wringer to be lifted or moved axially with respect to its support. This axial movement of the wringer bracket is utilized to interrupt the transmission of the power to the wringer as will appear more fully hereinafter. Instead of the camming means 106, 111, any suitable device may be used which will maintain the wringer in an operating position by virtue of friction. Axial movement of the wringer bracket may be accomplished only by manually lifting the wringer if desired.

The bracket 101 supports the wringing apparatus 120 which includes rolls 121 and 122 connected by gears 123 and 124. A conveyor belt 125 passes between the rolls and is supported by spindles shown at 126, the spindles being rotatably mounted at opposite ends of a drain board 127.

The wringer operating power head includes a unitary structure 30^a which comprises the motor 46^a practically identical with the washing machine motor 46 supported by a gear housing 45^a identical with the gear housing 45 of the power head 30. The power head 30^a includes a shaft 42^a which is connected with the shaft of the motor by means of gears substantially identical with the gears 48 and 49 of the power head 30. The shaft 46^a is connected by a coupling 128 to the gear 124.

The motor 46^a includes field windings 70^a and 71^a corresponding to the field windings 70 and 71, main brush 78^a and lifting brushes 74^a and 75^a for bringing the reversing fields alternately into operation. When the power head is associated with the wringer, the brush lifting reversing switch is actuated by mechanism including handle 130. A preferred form of this mechanism is disclosed in copending application, Serial No. 629,201 and includes means for placing brushes 74^a and 75^a in the position shown in Fig. 8, for reversing their positions or for causing both brushes 74^a and 75^a to be lifted from the commutator to stop the motor.

The motor brush 78^a is connected by wire 131 with a terminal clip 132 engaging a fork 133 having branches 134 and 135. The fork 133 and the clip 132 are attached by screws 136 to a non-conducting block 137 which is attached by screws 138 to a plate 139 in turn attached by screws 140 and supported upon the upper end of the hollow hub 102 of bracket 101.

The fields 70^a and 71^a are attached by wire 141 to a clip 142 by means of a screw 143, the clip being attached by a screw 144 to a plate 145 which clamps a resilient spring contact member 146 against the lower end of the non-conducting block 137. A clamping screw 147 also engages the plate 145 to clamp the spring contact 146. Contact 146 is provided with a contact button 148 for engaging upon a contact nut 150 having threaded engagement with a rod 151 terminating with hook 152 which surrounds a fiber pin 153 received by diametrically opposite holes 154 provided in the tube 103. The nut 150 bears against the flange 155 of a conducting tube 156 which is spun over at 157 to engage a terminal clip 158 located within a notch 159 provided across the lower surface of a non-conducting block 160 which rests upon a ledge 161 provided within the tube 103. By screwing down the nut 150 upon the rod 151 it is apparent that the block 160 will be clamped in the position shown in Fig. 9. The clip 158 is attached by screw 162 with wire 163 leading to the terminal socket 77. The block 160 is provided with a conducting sleeve 165 adapted to be engaged by the branches 134 and 135 of the fork conductor 133. The sleeve 165 is attached by screw 166 with a wire 167 connected with a terminal socket 77.

Referring to Fig. 1 the wires 131 and 141 are brought up through the bracket 101 and thence into the housing 45^a and then into the motor 46^a.

The wires 163 and 167 are brought down through the post 104 and then across the tie-bar 24 (see also Fig. 3) and then across the frame 22 to the terminal socket 77. It is obvious that owing to the channeled configuration of the tie-bar 24, as shown in Fig. 3 and the analogous construction of the frame 22, the wiring is protected from injury and can not come in contact with the tub or the operator. The wires 76 and 79 which connect the terminal socket 77 with motor 46 are located along the end frame 22, and are led into the housing 45 and up into the motor 46. The socket 77 may be connected by a plug 170 and a flexible cable 171 with a suitable current source.

In the present invention, the laundry machine comprises washing apparatus and a wringer which are driven by separate electric motors supported in close proximity to the apparatus and wringer whereby the mechanical driving connections can be made as simple and as direct as possible. The transmission of power to the separate motors is effected by wires concealed by the framework of the laundry machine, these wires being connected with a common terminal socket, or other suitable electric connecting device supported by the machine frame, so that there is but one connection to be made from the electrical service wires to the laundry machine.

The electric motors and reduction gearing for the wringer and washing apparatus are identical therefore these devices can be interchangeably mounted on either the wringer frame or the washing machine frame to drive

either the wringer or the washer. The oscillation of the washing tub and the reversal of the wringer is accomplished by controlling a brush lifting switch mechanism which is the same for both motors, and is adapted for manual control when associated with the wringer, or is adapted for automatic control when used with the washing apparatus. Therefore the number of parts required for the construction of the two motors has been minimized.

The transmission of power to the wringer is accomplished in such a manner that the wringer need not be locked in any of its operating positions. The transmission of power is automatically interrupted when the wringer is moved away from any of its operating positions and is reestablished by movement of the wringer to an operating position. The means which yieldingly maintains the wringer in an operating position causes the wringer bracket to be cammed axially and upwardly, to cause the circuit making devices housed by the wringer bracket to be separated by relative endwise movement of these devices. When the wringer unit is lifted manually or by the camming action of parts 106 and 111, parts 148 and 150 will be disengaged by virtue of the relative endwise movement thereof. Fig. 7 shows part 148 disengaged from part 150.

The wringer unit may be removed without disassembling any parts of the laundry machine, and the removal of the wringer unit will automatically interrupt the transmission of power to the wringer. Parts 134, 135 and 148 constitute an electrical socket device supported by the wringer unit. The conducting sleeve 165 and the center contact 150 constitutes a plug device supported by the wringer supporting members 103, 104. Whenever the wringer is removed the socket device is separated from the plug device, and when the wringer is placed upon the laundry machine frame again the socket device is again engaged by the plug.

The laundry machine is constructed so that the wringer unit may be swung over the washing tub to wring clothes therefrom or to other convenient operating positions. The wringer is swingable also for the purpose of permitting the wringer to be clear of the space included between the main frames 22 and 23 of the laundry machine, so that the washing machine tub may be removed by upward movement between the frames 22 and 23 while the machine frame and operating power head remains assembled.

It should be understood that both motors of the laundry unit could both be supported by one of the main or end frame members also that separate power heads including reversing motors for separately driving the wringer and washing apparatus can be employed whether the washing apparatus be the rocking tub type, or other types such as, the reversible cylinder type, the dolly type or the vacuum cup type.

While the form of mechanism herein shown and described constitutes a preferred embodiment of one form of invention, it is to be understood that other forms might be adopted and various changes and alterations made in the shape, size, and proportion of the elements therein without departing from the spirit and scope of the invention.

What is claimed is as follows:

1. A laundry machine, comprising in combination a support; a wringer unit mounted to swing relative to the support into a plurality of operating positions; means for yieldingly maintaining said wringer in operative position, means for transmitting power to the wringer unit; and means operated by merely swinging the unit for automatically interrupting the transmission of power to the unit.

2. A laundry machine, comprising in combination a support; a wringer unit mounted for movement with respect to the support into an operating position; means for transmitting electrical power to the wringer unit; and means for automatically interrupting the transmission of electrical power by merely moving said unit out of said operating position.

3. A laundry machine, comprising in combination a support; a wringer unit mounted on said support and rotatable into an operating position, and axially movable relative to the support; means for transmitting power to the wringer unit; means for causing the wringer to move axially of the support by merely rotating same from said operating position; and means actuated by said axial movement of the wringer unit for interrupting the transmission of power to the wringer unit.

4. A laundry machine, comprising in combination a support; a wringer unit horizontally swingable with respect to the support and vertically movable along the support; and means for yieldingly maintaining the wringer in an operating position, said means comprising cam means for lifting the wringer when the wringer is moved out of an operating position.

5. A laundry machine, comprising in combination a support; a wringer unit mounted for rotation upon said support and movable axially with respect to the support; and means for causing the unit to be moved axially automatically by merely rotating said unit about its support.

6. A laundry machine, comprising in combination a support; a wringer horizontally swingable and vertically movable with respect to the support; and means for causing the unit to be lifted automatically by merely swinging said unit about its support.

7. A laundry machine, comprising in combination a support; a wringer unit swingable about said support to an operating position and axially removable from the support; means for transmitting power to the wringer; and means for automatically interrupting the transmission of power when the wringer is removed from its support or by merely swinging said unit away from an operating position.

8. A laundry machine, comprising in combination a support; a wringer unit swingable about said support and axially removable from the support; means for transmitting power to the wringer; cam means operable for moving the wringer axially by merely swinging said unit from an operating position; and means for automatically interrupting the transmission of power when the wringer is swung from an operating position or when the wringer is removed from its support.

9. A laundry machine, comprising in combination a support; a wringer unit horizontally swingable about said support and adapted to be lifted from the support; means for transmitting power to the wringer; cam means operable for lifting the wringer by merely swinging said unit from an operating position; and means for automatically interrupting the transmission of power when the wringer is lifted by the cam means or removed from its support.

10. A laundry machine, comprising in combination a support; a wringer unit swingable about said support and endwise removable along the support; means for transmitting power to the wringer; and means for automatically interrupting the transmission of power when the wringer is removed from its support or is swung away from an operating position, said means including an electrical connecting device including relatively rotatable and axially movable contacts, said means also including mechanism for effecting relatively axial movement of the contacts when the wringer is swung away from an operating position.

In testimony whereof I hereto affix my signature.

RALPH L. LEE.