

Jan. 12, 1937.

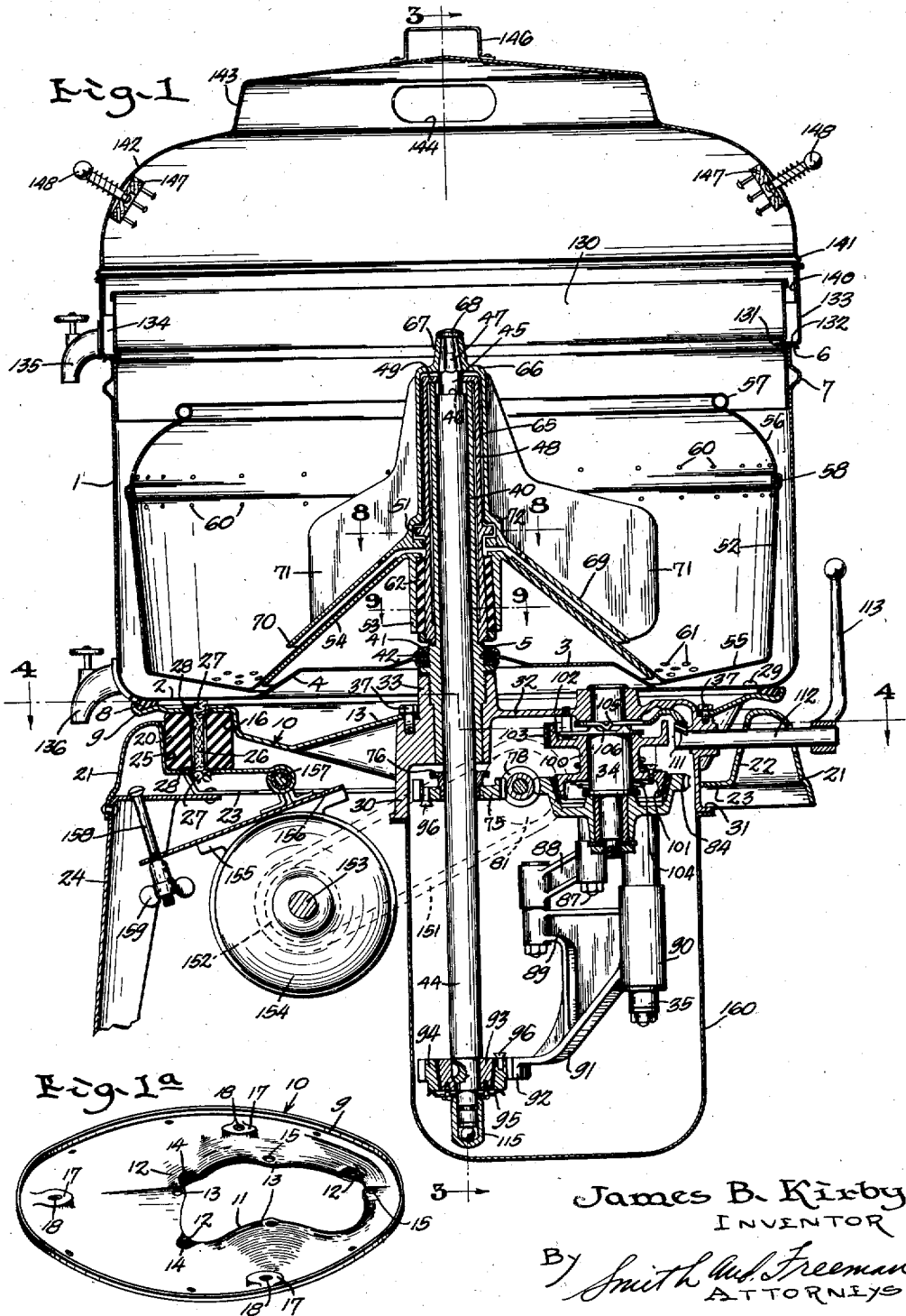
J. B. KIRBY

2,067,572

LAUNDRY MACHINE

Filed Jan. 2, 1931

6 Sheets-Sheet 1



Jan. 12, 1937.

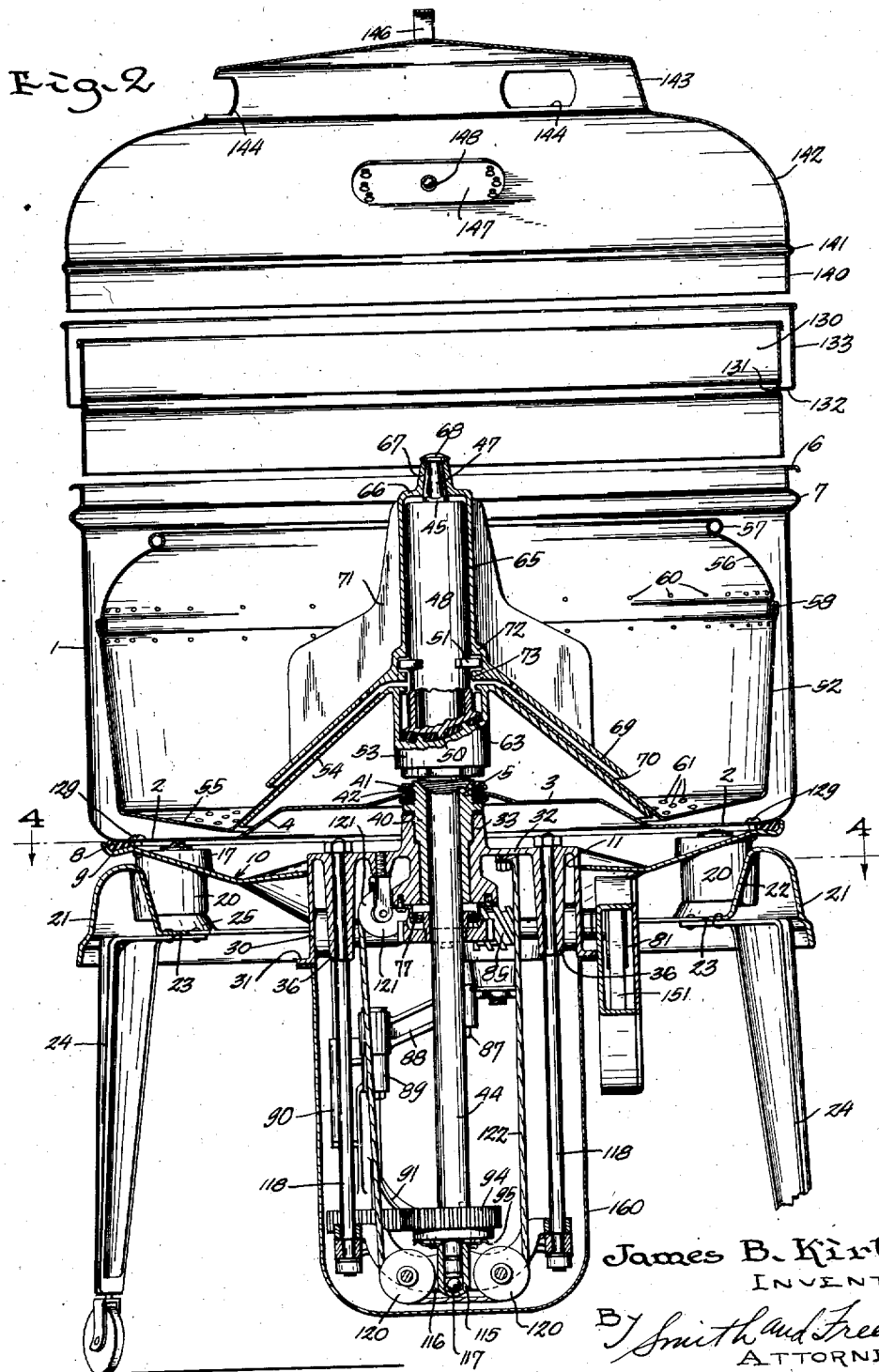
J. B. KIRBY

2,067,572

LAUNDRY MACHINE

Filed Jan. 2, 1931

6 Sheets-Sheet 2



Jan. 12, 1937.

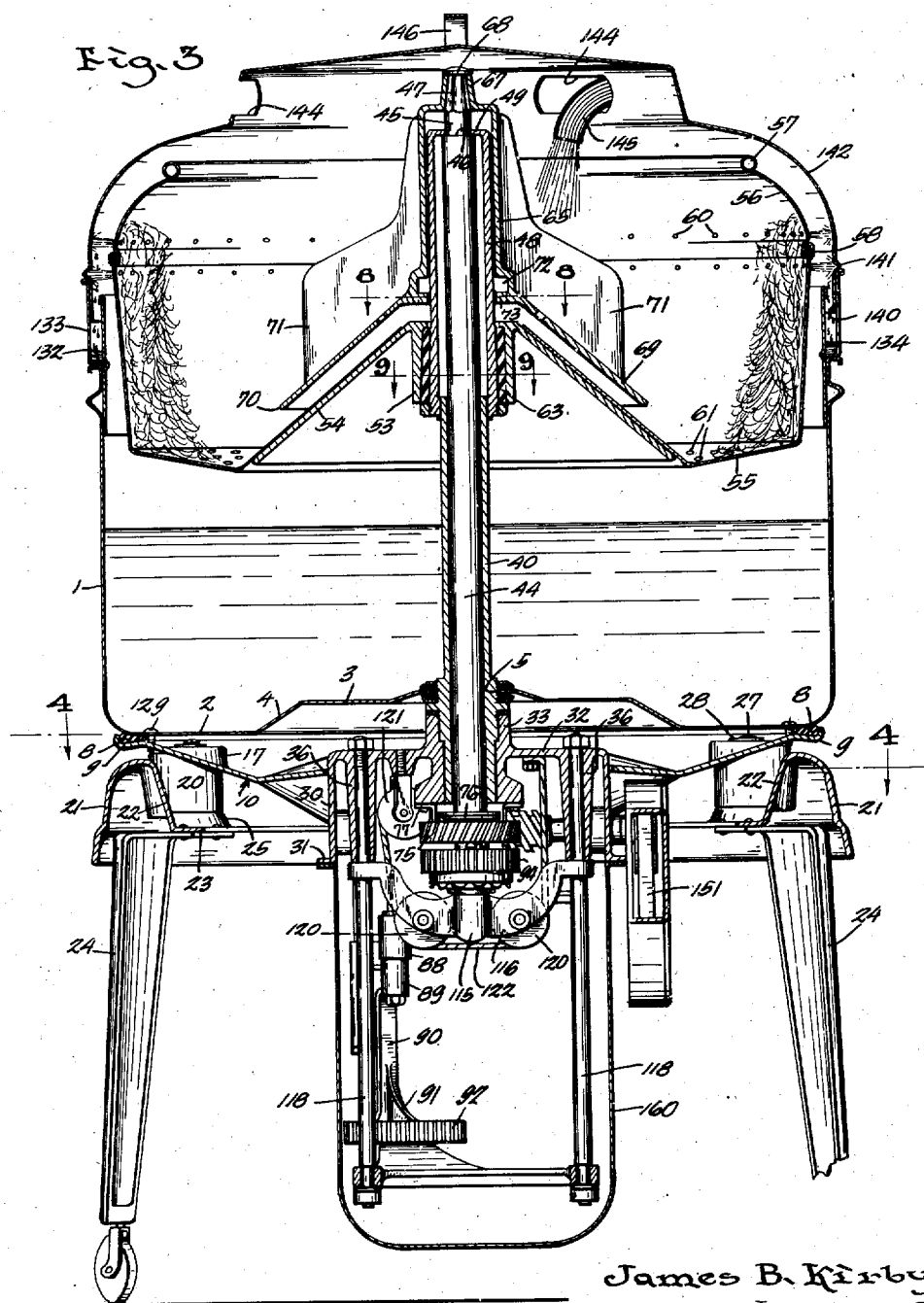
J. B. KIRBY

2,067,572

LAUNDRY MACHINE

Filed Jan. 2, 1931

6 Sheets-Sheet 3



James B. Kirby
INVENTOR

By *Smith and Freeman*
ATTORNEYS

Jan. 12, 1937.

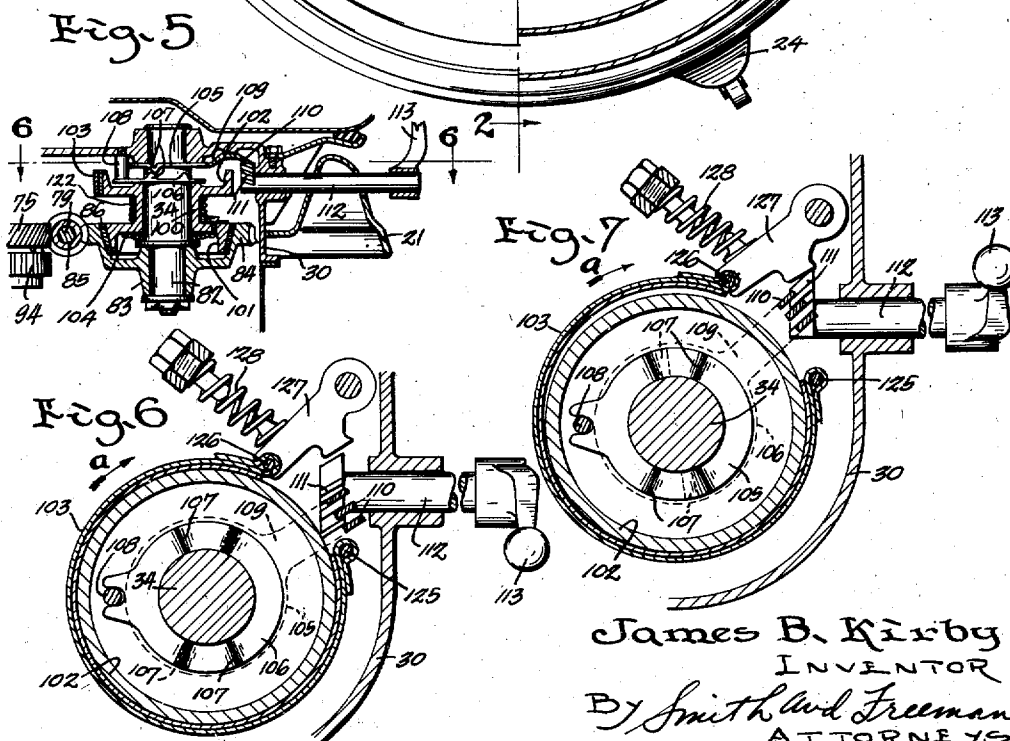
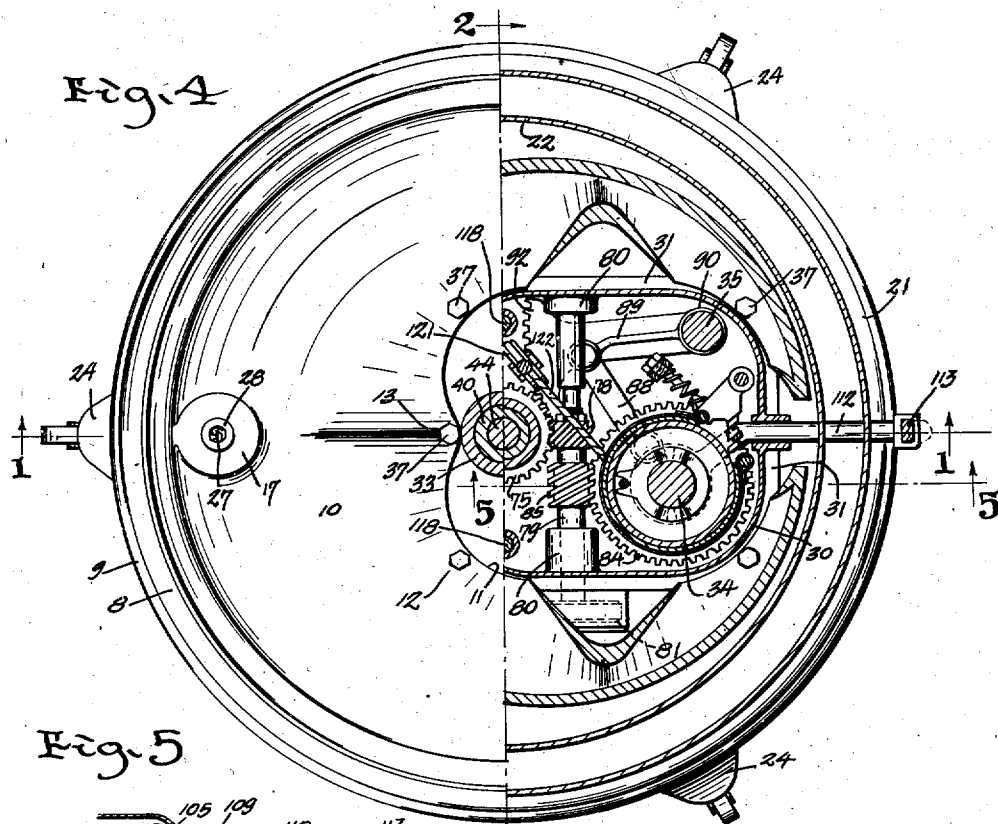
J. B. KIRBY

2,067,572

LAUNDRY MACHINE

Filed Jan. 2, 1931

6 Sheets-Sheet 4



James B. Kirby
INVENTOR
By Smith and Freeman
ATTORNEYS

Jan. 12, 1937.

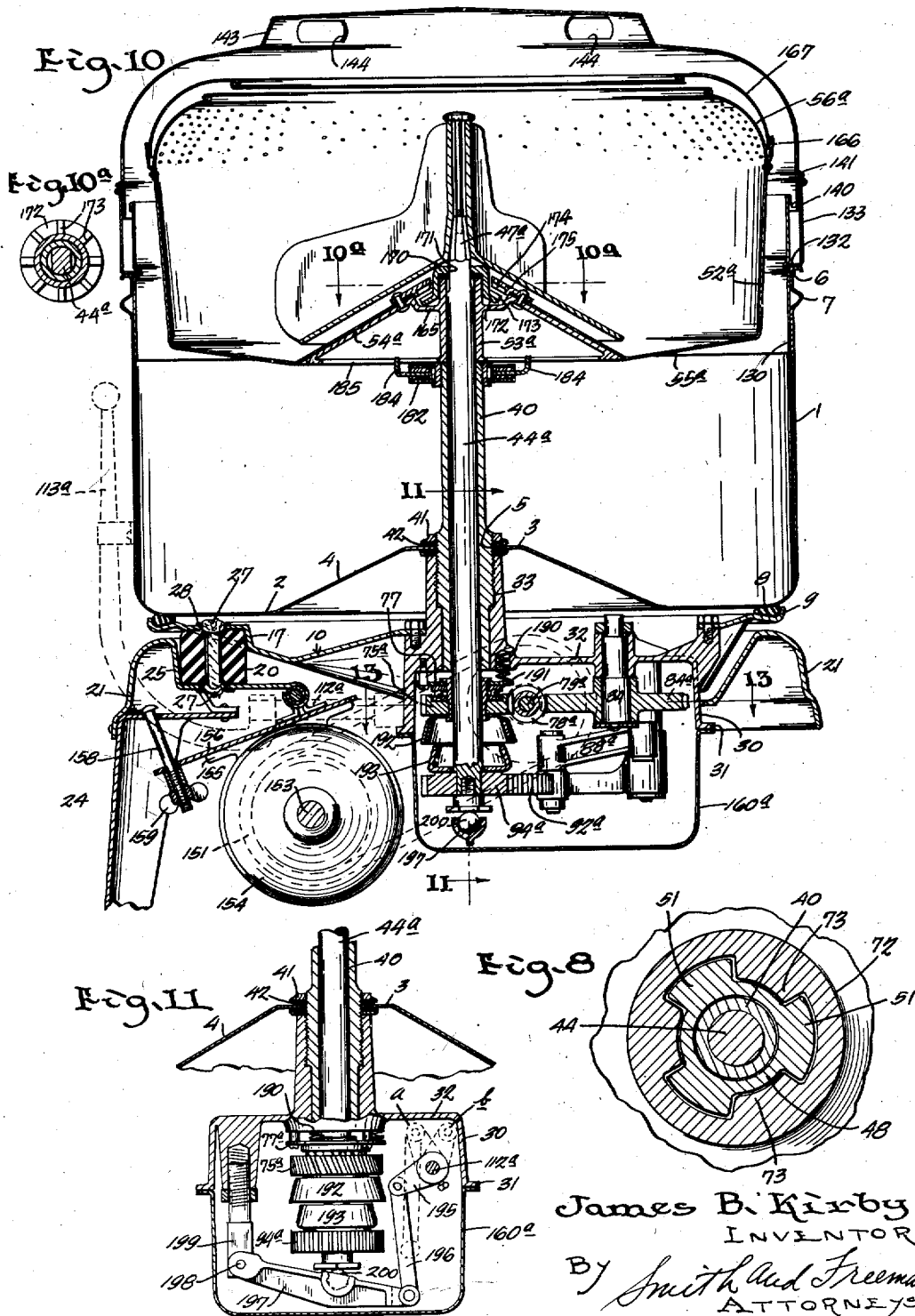
J. B. KIRBY

2,067,572

LAUNDRY MACHINE

Filed Jan. 2, 1931

6 Sheets-Sheet 5



Jan. 12, 1937.

J. B. KIRBY

2,067,572

LAUNDRY MACHINE

Filed Jan. 2, 1931

6 Sheets-Sheet 6

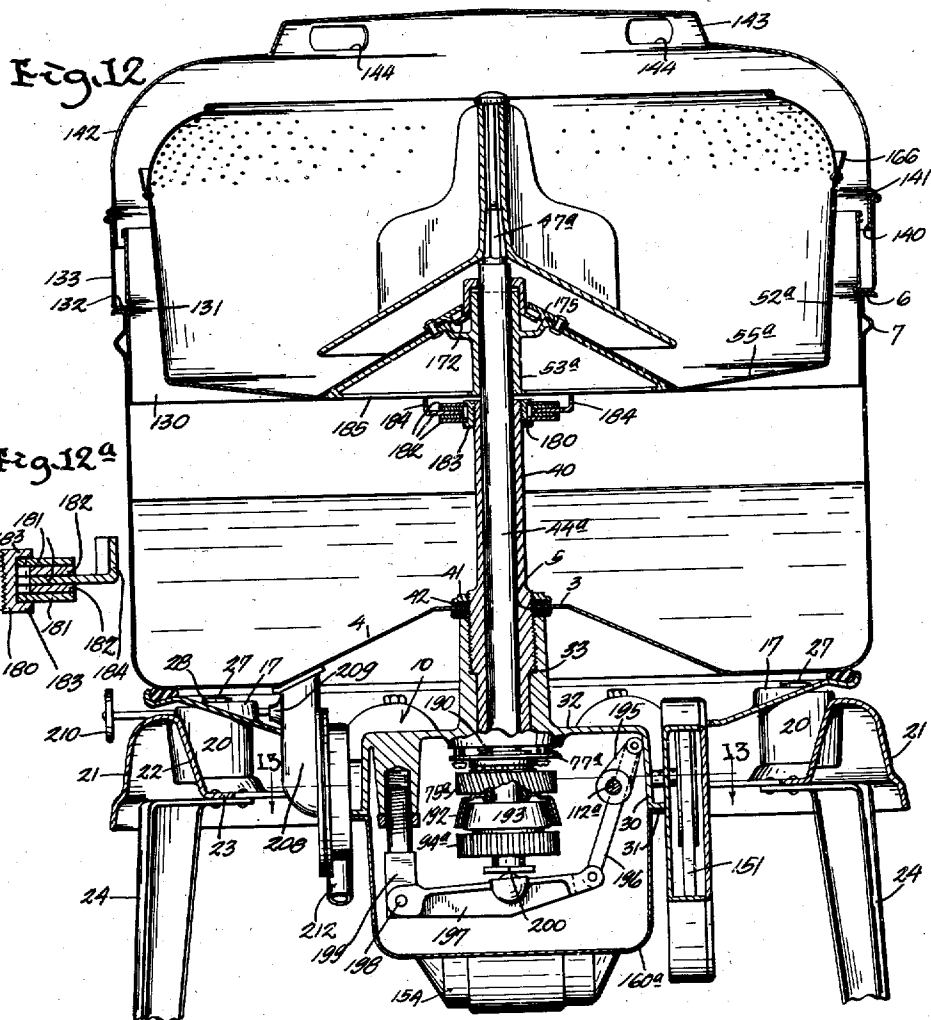


Fig. 12a

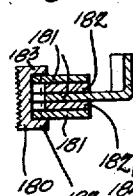


Fig. 13

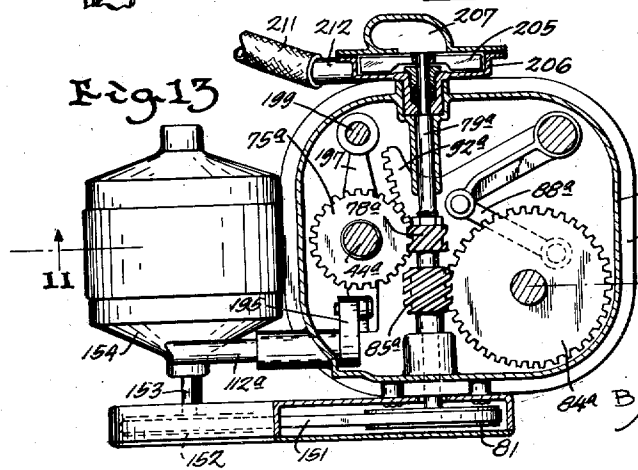
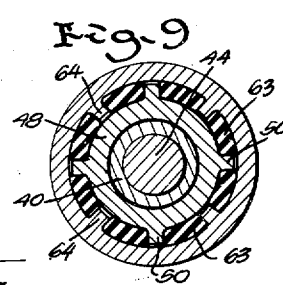


Fig. 9



James B. Kirby
INVENTOR
By *Smith and Freeman*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,067,572

LAUNDRY MACHINE

James B. Kirby, West Richfield, Ohio, assignor,
by mesne assignments, to The Apex Electrical
Manufacturing Company, Cleveland, Ohio, a
corporation of Ohio, as trustee

Application January 2, 1931, Serial No. 506,037

52 Claims. (Cl. 68—15)

This invention relates to laundry machines and has special reference to that type of machine wherein miscellaneous laundry articles are washed and the excess liquid extracted centrifugally in a single container. The main objects of the invention are: the provision of a new and improved mode of mounting the casing and attaching the operating mechanism thereto so as to permit the use of enameled metal for the casing without danger of either cracking the enamel or leakage of liquid; the provision of a new mode of mounting the casing, operating mechanism, and motor; and the provision of new, improved and simplified mechanism for raising and lowering the clothes container and its contents as required for the extracting and washing operations respectively by the power of the same prime mover which furnishes the power for the extracting and washing operations. Other objects of the invention relate to the provision of an improved and simplified operating mechanism; an improved and simplified arrangement for connecting the mechanism to and disconnecting it from the clothing container; the provision of improved means for starting and stopping the rotation of the container; the provision of new and improved construction of tub or outer casing; the provision of a new rinse-band; the provision of a new and simplified safety means for preventing extracting with the cover absent; the provision of a new brake; while further objects and advantages of my invention will become apparent as the description proceeds.

It should be understood that not all the improvements herein described are limited to a device wherein the clothes-container has a vertical movement.

In the drawings accompanying and forming a part of this application I have shown two specific embodiments of my inventive idea, although it will be understood that these drawings are intended to be illustrative rather than limiting. Figs. 1 and 2 are vertical central sectional views through that type of my improved machine wherein the clothes-container is raised and lowered between extracting and washing positions, these corresponding to the lines 1—1 and 2—2 respectively of Fig. 4 and the parts being in washing position. Fig. 1^a is a perspective view of the supporting plate; Fig. 3 is a sectional view similar to Fig. 2 except that the parts are shown in extracting and rinsing position; Fig. 4 is a horizontal sectional view corresponding to the broken line 4—4 of Figs. 1,

2, and 3; Fig. 5 is a vertical sectional view corresponding to the line 5—5 of Fig. 4; Figs. 6 and 7 are detail views corresponding to the line 6—6 of Fig. 5 and showing the parts respectively in container-raising and container-lowering position; Figs. 8 and 9 are sectional views corresponding to the lines 8—8 and 9—9 respectively of Figs. 1 and 3; Fig. 10 is a vertical sectional view through a modified type of laundry machine wherein the container occupies a fixed position relative to the casing; Fig. 10^a is a detail view on the line 10^a—10^a of Fig. 10; Fig. 11 is a vertical sectional view corresponding to the line 11—11 of Fig. 10, both these views showing the parts in the position assumed during the washing operation; Fig. 12 is a view of the same parts showing the position assumed thereby during the extracting operation; Fig. 12^a is an enlarged fragmentary section of the brake shown in Figs. 10 and 12; and Fig. 13 is a horizontal sectional view corresponding to the line 13—13 of Figs. 10 and 12.

Describing the parts by reference characters, 1 represents the upright side-wall of a metal casing, preferably of enameled sheet metal, having a water-retaining bottom formed with a flat annular portion 2 merging with said side-wall and an elevated central portion 3 joined to the portion 2 by a slanting part 4 and itself having a central aperture 5. The top rim of the side-wall is preferably bent outwardly as shown at 6 to form a peripheral reinforcing flange, and is also best provided with at least one circumferential corrugation 7 adjacent thereto to afford added stiffness, and to trap splashing liquid.

The portion 2 of the tub constitutes a seat and rests on the packing 8 carried by the circumferential flange 9 of the supporting plate indicated generally at 10. This plate is preferably made of a single casting, circular in plan, but wavy in cross-section and formed with an oblong opening 11 which extends from a point near one margin to a point slightly beyond the center. The wavy-character of the plate affords a sinuous margin to this opening as shown in Fig. 1^a, certain portions indicated at 12 being thereby located at a different level from other portions 13, and these portions being formed with apertures 14 and 15 respectively. This opening 11 serves for the reception of the gear-box hereinafter described, the shape of the plate exhibiting the double function of stiffening the same and of enabling the gear-box to be attached at different levels whereby it is the more rigidly braced as will hereafter appear.

In addition to the characteristics already mentioned this plate is preferably formed with a plurality (preferably three) of downwardly-facing circular seats 16 closely inside its periphery, each of these seats being defined by an upwardly-extending boss 17 having a central aperture 18 and located in contact with each seat is a cylindrical, axially bored block 20 of soft rubber.

Below and concentric with the plate 10 is a second rigid metal plate having a peripheral depending flange 21 merging with a circular flange 22 immediately inside the same and terminating in an inwardly-projecting horizontal web 23 to which are secured the upper ends of the legs 24. The foregoing structure constitutes the supporting frame of the machine. Formed on the plate 23 are spaced seats 25 registering with the seats 16 and supporting the opposite ends of the blocks 20. The seats 16 and 25 are apertured centrally in register with the axial bores of the blocks 20 to receive the rope-connections 26 held in place by knots 27 at their ends, suitable cup-washers 28 being preferably provided for said knots. The casing is secured to said plate 10 by a plurality of screws 29 located in holes formed at spaced intervals in the portion 9.

All the operating mechanism of the machine is preferably carried by a single cast-metal block of rectangular form which fits inside the opening 11 and constitutes the upper end of the gear-box heretofore mentioned. This block comprises a rectangular depending skirt 30 terminating at its lower end in a flange 31 and closed at the top by a horizontal web 32 formed with the upwardly extending, hollow, internally-threaded boss 33 concentric with the casing and having studs 34 and 35 and 36 depending inside the flange 30. This block is secured to the plate 10 by suitable screws 37 located in the apertures 14 and 15; and screwed into the boss 33 is a vertical, hollow bearing-sleeve 40 which projects through the aperture 5 into the interior of the casing to the desired height. A ring 42 of soft packing surrounds the aperture 5 on each face of the casing-bottom, and is backed up by suitable nuts (or washers) 41 screwed on the sleeve or otherwise held at proper height. These rings serve only to prevent leakage, without supporting function and hence without such strain as would crack the enamel when that kind of material is used, or produce leakage or deformation when copper is employed.

Slidably and rotatably mounted inside the sleeve 40 is a vertical drive-shaft 44 having at its upper end an extension 45 of reduced diameter surrounded by an abrupt shoulder 46 and itself terminating in a prismatic portion 47. Slidably and rotatably sleeved about the exterior of that portion of the sleeve 40 which is located inside the casing 1 is a second sleeve 48 formed at its upper end with an internal flange 49 which overlaps the upper end of the sleeve 40 and the shoulder 46, being pierced by an aperture through which the extension 45 is freely movable. Formed on the exterior of the sleeve 48, adjacent to its lower end, are a plurality of vertical ribs 50 and also, spaced above the upper ends of said vertical ribs, a plurality of angularly-spaced, arcuate, horizontal ribs 51.

The clothes-container comprises an upright wall 52 located inside the wall 1 and defined by a surface of revolution about a vertical hollow hub 53 which surrounds and is spaced from the lower end of the sleeve 48. Integral with the

upper end of this hub, and flaring outwardly and downwardly therefrom, is a pileus-shaped flange 54 to which is fastened the inner margin of the sheet-metal bottom 55 of this container, the outer margin of which merges with the wall 52.

The wall 52 preferably flares upwardly to a point well above the bottom where it is seamed to an inwardly-tapering ledge 56 which terminates in a rolled rim 57. This seam 58 affords reinforcement against bursting strains caused by rotation, while the inwardly-sloping ledge prevents centrifugal ejection of the clothing. Apertures 60 for the centrifugal discharge of the liquid portion of the contents are necessarily provided at the level of maximum diameter which is here adjacent to the seam 58, and other apertures 61 for the ingress of washing liquid are formed in the bottom 55. Whether additional apertures are provided in this container, is, in the form of this invention, shown in Figs. 1 to 3 optional with the manufacturer.

It is perfectly possible, and within my invention, to have the hub 53 fit snugly over the sleeve 48 and omit the vertical ribs 50 thereof, but there are certain practical advantages concerned with the centrifugal operation in spacing this hub from the sleeve and interposing in the resulting space some yielding supporting devices capable of permitting such a lateral displacement of the container as to compensate, in part at least, for an unbalanced condition of the articles therein. The simplest expedient is to interpose rectangular soft-rubber blocks 62 between these elements, the interior of the hub 53 being provided with vertical, integral ribs 64 intermediate the ribs 50 of the sleeve, thereby producing the necessary driving function.

Loosely surrounding the sleeve 48 is a third hollow, cylindrical, sleeve 65 having at its upper end an inwardly-turned flange 66 which terminates in a prismatic socket 67 which engages the complementary portion 47 of the shaft. I have shown a screw 68 located in the top of the shaft to hold this sleeve in engagement therewith although the same is not always necessary. Integral with the lower end of the sleeve 65 and flaring outwardly and downwardly therefrom is a skirt 69 which terminates in a circular margin 70 at a point intermediate the top and bottom of the central elevation with which the bottom of the container is provided according to the construction heretofore described; and merging with the sleeve and skirt are a plurality of radial blades 71 of any desirable number, here represented as three.

Formed in the lower end of the sleeve 65, immediately above the skirt 69, is an annular recess 72 in which the horizontal ribs 51 are loosely received when both sleeves 48 and 65 occupy their lowermost positions. The interior of said recess is formed at a lower level with inwardly-projecting arcuate flanges 73 spaced apart angularly sufficiently to enable the ribs 51 to pass between the same as illustrated in Fig. 8.

In the form of the invention shown in Figs. 1 to 7 the mechanism for operating the shaft 44 is as follows: Loosely journaled around said shaft inside the gear-box is a spiral gear 75, supported at a fixed height in any suitable manner, as by having an integral neck 76 carried by the bracket 77. This gear meshes with a suitable spiral gear or worm 78 mounted on the horizontal drive-shaft 79 journaled in bearings 80 carried by the side-walls 30, and having on

its protruding end a belt-pulley 81. The stud 34 is formed, as shown in Fig. 5, with an extension 82 of reduced size at its lower end, on which extension is journaled the hub 83 of a worm-gear 84 which meshes with a second spiral-gear or worm 85 also carried by the same drive-shaft 79. The web of the gear 84 is recessed above to a kind of basin-shape and lined with friction-material 86, while an eccentric pin, 87 projecting from its lower face has articulated thereto a pitman 88 whose opposite end is articulated to an arm 89 projecting from the upper end of a sleeve 90 journaled on the stud 35 heretofore mentioned. From the lower end of the sleeve 90 projects a second arm 91 which terminates in an arcuate toothed segment 92 which swings near the shaft 44.

Tightly secured to the lower end of said shaft is a metal block 93 having a frusto-conical surface and surrounded by a toothed pinion 94 adapted to mesh with the segment 92 and recessed to complement the shape of the block 93. Suitable friction material is interposed between the adjacent surfaces of these parts and a suitable spring 95 carried by the one serves to press the other yielding into contact therewith, while the adjacent faces of the gears 75 and 94 are formed with projecting teeth 96 for a purpose to be hereafter described.

Rotatably journaled on the larger portion of the stud 34 is a cylindrical cord-reel 100 having at its lower end an enlarged, integral, tapered flange 101 fitting inside the friction material heretofore described and having at its upper end a second flange 102 surrounded by a brake-band 103. A volute spring 104 located within the hollowed-out flange 101 normally elevates the same out of driven-engagement, and loosely surrounding the stud 34 inside the hollowed-out flange 102 are two ring washers 105 and 106, both formed with cam-projections 107 on their adjacent surfaces. One of these washers, as for example 106, is held against rotation by the fixed pin 108, while the other is provided with a radial arm 109 terminating in gear-teeth 110 which mesh with other teeth 111 carried by the inner end of the horizontal rock-shaft 112 journaled in one wall of the skirt 30. The outer end of this rock-shaft is provided with a suitable operating-handle 113.

The lower end of the shaft 44 projects beyond the gear 94 and is stepped in a hollow socket 115 formed in the yoke 116, said socket being provided with a suitable thrust-bearing 117. The ends of this yoke project laterally beyond the pulley 94 where they slidably engage the vertical rods 118 carried by the studs 36 heretofore mentioned. Journaled on the yoke 116 are two grooved pulley-sheaves 120 and carried by the top-plate 32 is a third pulley sheave 121. A flexible cord 122 has one end secured to the plate 32 whence it depends vertically, passes beneath the sheaves 120, 120, and over the sheave 121 whence it leads to the reel 100. If, therefore, the lever 113 be rocked in the appropriate direction the resulting wedging action of the two cam washers forces the flange 101 into contact with the friction-lining of the gear 84, whereby the cord 122 is wound upon the reel and the yoke 116 elevated, carrying with it the shaft 44, and giving rise to the following events:

The pinion 94 is disengaged from the segment 92 and the previous oscillating movement of the shaft is stopped although the segment still continues to oscillate; and upon arriving at the

upper end of its path the pinion 94 is brought into contact with the pinion 75 and partakes of its rotational movement by reason of the inter-engagement of the teeth 96, thereby imparting rotation to the container 52, first gradually and thereafter with constantly accelerating speed due to friction-displacement of the pinion 94 about the member 93. At the same time the upward movement of the shaft 44 has served to elevate the sleeve 65 relative to the sleeve 48; if by chance, the ribs 51 coincided at the moment with the spaces between the flanges 73, as shown in Fig. 8, this relative movement continues until the shoulder 46 comes into contact with the flange 49 of the sleeve 48, and lifts the container also, the ribs 51 being at this instant in the same plane with the flanges 73 as shown in Fig. 3; if, however, as more frequently happens, this exact registry does not exist at the moment, then the tendency is to lift the container through the inter-engagement of the ribs 51, and flanges 73, but inasmuch as the segment 92 and pinion 94 have not yet become disengaged due to their greater vertical extent, the resulting rotary movement of the shaft 44 will produce this registration just described. Thenceforward the elevation of the shaft is accompanied by that of the container and its entire burden, the container also accompanying the rotational movement of the shaft when the same commences.

The function of the brake-band 103 is to hold the shaft and container in elevated position. One end of this brake-band is secured to a fixed pin 125, and the other end to a movable pin 126 carried by the end of the swinging lever 127 located near the teeth 111, and normally urged by a spring 128 in a direction to cause engagement of the brake-band. The cord is wound on the reel in such a direction that its unwinding tendency shall be to rotate the flange 102 in the direction shown by the arrow *a* in Figs. 6 and 7, which is that direction which coincides with the gripping movement of the brake-band. As a result a sort of ratchet-action is produced which causes the container to remain suspended at any point to which it is carried by the mechanism. Whenever the operator desires to lower the container the handle 113 is tipped in the opposite direction so as to cause the teeth 111, or other suitable projection, to engage the lever 127, and disengage this brake-band, whereupon the shaft and container sink gradually of their own weight, and the dasher recommences its motion of oscillation. Too rapid downward movement of the container may be readily checked by movement of the handle 113 in a direction to effect engagement of the brake band 103 with the flange 102.

It is desirable that provisions be made to enable rinsing of the clothing in the container 52 without contaminating the washing liquid remaining in the casing 1; and it is also desirable that safety-provisions be made to prevent, or at least dissuade, the extracting operation unless and until the tub is completely covered to prevent any possibility of injury to the operator. These two functions may conveniently be performed by the following: fitted to the upper part of the casing 1 is a rinse band which, in its preferable construction, comprises an upright, cylindrical, metal strip 130 formed midway of its height with an inwardly displaced corrugation 131 defining an outwardly facing groove in which is tightly soldered the inturned flange 132 of a second larger cylindrical band 133, which

projects above the top of the strip 130. The lower end of the strip 130 fits inside the casing 1, the flange 132 resting on the flange 6. The band 133 defines an annular gutter 134 which is provided with a drainage cock 135, independent of the drainage cock 136 with which the casing 1 is provided. The tops of the strip 130 and of the band 133 are preferably folded, wired, rolled, or otherwise stiffened, and the height of the band 133 is such as to terminate above the level of the strip 130 but below the level of the apertures 60 when the container is elevated into extracting position, thus rendering it necessary for the operator to maintain the cover in place while extracting is going on. This cover, preferably, is made of sheet metal having a cylindrical portion 140 to fit inside the band 133; a rib 141 to rest on top of said band; a dome-shaped part 142 to surround the top part of the container; and a central elevation 143 like a sort of cupola, formed in its side with a plurality of apertures 144 for the double purpose of admitting light, enabling inspection, and permitting the introduction of a hose 145 for rinse-water as shown in Fig. 3. One or more hand-grips 146 may be provided at any convenient point. To assist in arresting the rotation of the container I show brake shoes 147, consisting of leather flaps mounted inside the cover and adapted to be pressed against the container by pushing against suitable knobs 148 which project through the cover.

In the preferred form of the invention the apertures 61 are restricted within the limits of the circle defined by the inner margin of the rim 57; also it is desirable, though not necessary, that the apertures 60 be made rather small; although whatever the size of these apertures, they will generally become considerably impeded by the clothing during the extracting operation, with the result that when rinse-water is introduced during the rapid rotation of the container, such liquid will tend to become piled up around the outer wall of the container as shown in Fig. 3, and thus subject the clothing to a thorough rinsing action. By confining the apertures 61 to the inner portion of the tub-bottom, space is afforded for a substantial amount of rinsing liquid, although even if such an excess of rinse water be supplied as to cause some to escape by these apertures, the upwardly slanting shape of the container causes much of it to climb to the seam 58 along the outside of the wall 52 before being thrown off.

The mechanism is driven from the shaft 153 of an electric motor 154 which is carried by that part of the frame having the flanges 21, 22 and legs 24. This being insulated from the casing and its adjuncts by the rubber cushions 20, it is only necessary to employ an electrically non-conducting power transmitting device to have the motor wholly insulated from the casing and operating parts. An example of such a non-conducting power-transmitting element is the belt 151 by which the belt pulley 81 of the shaft 79 is connected to the pulley 152 carried by the shaft 153. The base 155 of this motor is preferably attached to a plate 156 which is hinged to the plate 23 on a horizontal axle 157 which is parallel to the shaft 153 and its base is thus grounded through the plate 23 and legs 24 of the machine. A bolt 158 secured inside one of the legs 24 and provided with a thumbnut 159, serves to rotate the motor about the axle 157 and thus tighten the belt. This arrangement

permits the vibration of the plate 10 and its attached mechanism to occur without impairing the driving connection between this mechanism and the comparatively immovable motor. The bottom of the gear-box is completed by a sheet metal can 160 attached to the flange 31 and made imperforate so as to hold lubricating oil.

In the modification shown in Figs. 10 to 13, the container is maintained constantly at a sufficient height above the bottom of the casing 1 to enable the entire liquid contents to be received therebeneath. In this embodiment of my invention I have shown the hub 53^a of the container as sleeved directly upon the upper end of the shaft 44^a, and as seated, at least when in washing position, directly on the upper end of the sleeve 40. Integral with this sleeve is a frusto-conical flange 54^a as before, excepting that a hollow, annular, upwardly-facing recess 165 is formed between this sleeve and the upper end of this flange. The container comprises a sheet metal bottom 55^a, tightly secured to this flange and merging with an outwardly and upwardly projecting side wall 52^a as before, excepting that these walls are substantially or entirely imperforate. At its upper margin the wall 52^a merges with the inwardly curved ledge 56^a, this part being provided with liquid discharge perforations. Secured to the interior of the wall 52^a adjacent the ledge 56^a is a peripheral, external, upstanding, metal strip 166 in which is preferably received the lower edge of an annular, inwardly-bowed, splash-guard 167.

The upper end of the shaft 44^a projects above the sleeve 40, and also above the hub 53^a. Its upper extremity 47^a is made prismatic as before to enable the attachment of a dasher or agitator of any suitable shape and construction. The portion of the shaft which traverses the upper end of the hub 53^a is flattened on its sides as shown in Fig. 10^a, while the upper end of said hub is slidably embraced by the cylindrical portion 170 of a connector element, formed at its upper end with an intumed flange 171 which overlaps the hub and is formed with an aperture conforming to the shaft, while its lower end is formed with an out-turned flange 172, formed on its upper surface with teeth 173, adapted to engage companion teeth 174 formed on the bottom face of a frusto-conical plate 175 carried by the flange 54^a and overhanging the recess 165. When the shaft 44^a occupies its lowered position the teeth 173 and 174 are spaced apart, but upon slightly raising this shaft the shoulders defining the lower ends of the flattened portions engage the flange 171 and lift the connector 170 until the teeth 173 and 174 become engaged, thus establishing driving connection between the shaft and container.

For operative purposes this amount of elevation is sufficient, but for certain additional purposes, sometimes desirable, I have in Fig. 12, shown the shaft as elevated sufficiently so that the engagement of the flange 172 and plate 175 raises the hub 53^a slightly above the end of the sleeve 40. This elevation I utilize for the purpose of employing a brake by which to arrest the rotational movement of the container. This brake, in its present form comprises an internally threaded collar 180 screwed on the upper end of the sleeve 40 and surrounded by three circular coaxial, metal plates 181, separated by friction-disks 182. The outermost plates are secured in place by flanges 183 car-

ried by the collar 180, while the midmost plate is extended beyond the others and formed with upwardly projecting fingers 184 adapted, when the container is lowered, to engage suitable spokes 185 projecting from the hub 53^a (see Fig. 10), these spokes swinging freely over the tops of these fingers when the container is raised as shown in Fig. 12.

The elevation of this container is so small (when it is elevated at all), as not to require the power-operated elevating devices heretofore described, wherefore a simplified mechanism is employed as shown in Figs. 10 to 13 inclusive. The lower end of the shaft 44^a is, as before, surrounded by a freely rotatable pinion 75^a supported at a fixed height by a bracket 77 as heretofore described, excepting that said bracket, instead of being rigidly mounted, is backed up by suitable coil springs 190, and that a ball-bearing 191 is interposed between said pinion and the bottom of said bracket. Carried by the lower end of the shaft 44^a is a second pinion 94^a, here rigidly secured to said shaft. The adjacent faces of these pinions are provided with the cooperating members 192 and 193 of a conical-clutch, so that when the pinion 94^a and shaft are elevated, the rapid rotation of the pinion 75^a may be communicated gradually to the shaft 44^a without shock. This movement is effected by means of a lever 113^a carried by the shaft 112^a journaled in the side wall 30 of the gear-housing and provided at its inner end with an arm 195 connected by a link 196 with a supporting lever 197 whose opposite end is pivoted at 198 to the vertically adjustable stud 199, and whose middle carries the thrust bearing 200 on which the shaft 44^a rests. Even though the entire container with its liquid load is elevated, this elevation is very slight and only occurs during the latter part of the movement of the hand lever, while the arm 195 is moving from position *a* to position *b* (shown in dotted lines in Fig. 11). The vertical movement of the shaft 44^a from the position shown in Fig. 10 to that shown in Fig. 11 entails a large angular movement of the lever which requires comparatively little effort, and terminates with the arm slightly beyond dead-center which prevents accidental descent of the container. Only when this shaft nears the upper limit of this movement is the weight of the container imposed thereon, and at this time the angle between the link 196 and the arm 195 is such that the load can easily be lifted. The mechanism is, as before, driven by the horizontal drive-shaft 79^a furnished with two spiral-gears or worms, one of which, 78^a, meshes with the pinion 75^a, while the other, 85^a, meshes with the gear 84^a which is connected by the pitman 88^a with the swinging sector 92^a meshing with the pinion 94^a. A comparatively shallow oil-pan 160^a serves to house this gearing owing to the comparatively small vertical movement.

With the form of machine shown in Figs. 10 to 13 a pump is preferably provided for the purpose of elevating the washing liquid into the container, either continuously during the washing operation or intermittently as may be desired. I have shown the end of shaft 79^a as provided with a pump runner 205 (Fig. 13), located inside the casing 206, which has its inlet 207 connected to the casing 1 by an upright pipe 208 provided with a valve 209 operated by a handle 210. A hose 211 attached to the outlet 212 of the pump casing serves either to return the liquid to the

container or to deliver it at any desired place of discharge.

The purpose of the shield 167 is to reduce loss of liquid from the container by slopping during the washing operation. It is removed during the extracting operation. Its use reduces the need for employing a pump during the washing operation, and is hence particularly desirable in connection with dry-cleaning fluid which is either inflammable or expensive.

The fact that I have illustrated and described my improvements with considerable detail is induced by my desire to comply with the statute in setting forth the best mode of applying the principles of my invention and should not be taken as an indication that I limit myself to any of the features of construction, arrangement, or design therein shown, since I have illustrated divergent forms as an indication of my intent not to be so limited; and I do not restrict myself to any details shown except as specifically set forth in my several claims which I desire may be construed broadly, each independently of limitations contained in other claims.

Having thus described my invention what I claim is:

1. A laundry machine characterized by having flexibly joined portions, one of said portions comprising a liquid holding casing, laundering means therein and mechanism operatively connected to said laundering means fixedly secured to said casing and located therebeneath, and another of said portions comprising a supporting frame and a driving motor carried thereby, hollow rubber springs interposed between the aforesaid portions of the machine whereby the first portion of the machine is supported by the second portion thereof, and flexible power transmission means connecting said motor to said mechanism.

2. A clothes washing and extracting mechanism comprising a casing adapted to hold detergent liquid and a container for fabrics mounted therein for rotation about a vertical axis, a casing supporting frame, means including operating mechanism suspended beneath said casing and fixed thereto for rotating said container at high speed to extract its liquid contents, and hollow rubber springs interposed between said frame and casing in supporting relation.

3. A clothes washing and extracting mechanism comprising a casing adapted to hold detergent liquid and a container for fabrics mounted therein for rotation about a vertical axis, a clothes washing element in said container, a gear box rigid with said casing, mechanism in said gear-box for imparting activity to said element or rotation to said container, selectively, a supporting frame, and springs interposed between said frame and casing in supporting relation.

4. In a laundry machine, an upright metal casing having an aperture in its bottom and an annular seat around said aperture at a distance therefrom, a rigid reinforcing plate engaging said seat and secured to said casing, a bearing sleeve rigid with said plate and traversing said aperture, an annular frame having feet, and means yieldingly connecting said plate and frame.

5. In a laundry machine, an upright metal casing having an aperture in its bottom and an annular seat around said aperture at a distance therefrom, a rigid reinforcing plate engaging

said seat and secured to said casing, a bearing sleeve rigid with said plate and traversing said aperture, a movable member working through said sleeve, soft packing engaging the casing bottom adjacent to its aperture, backing members for said packing carried by said sleeve, and a supporting frame to which said plate is secured.

6. In a laundry machine, an upright metal casing having an aperture in its bottom and an annular seat around said aperture at a distance therefrom, a gear box below said casing, an upright bearing sleeve carried by said gear-box and traversing said aperture, a rigid plate secured to said seat and to said gear box, and leak-preventing packing carried by the exterior of said sleeve and engaging the bottom of said casing adjacent to said aperture.

7. In a laundry machine, an upright metal casing having a bottom formed with a central elevated portion which is formed with an aperture and a surrounding annular seating portion located at a lower level, a rigid reinforcing plate beneath said casing and engaging said seating portion, means rigidly securing said casing to said plate near the margin of said plate, an upright sleeve rigid with said plate and traversing said aperture, mechanism carried by said plate and working through said sleeve for performing laundering operations inside said casing, and leak-preventing means carried by the exterior of said sleeve and engaging the bottom of said casing adjacent to said aperture.

8. In a laundry machine, an upright metal casing having an aperture in its bottom and an annular seat around said aperture at a distance therefrom, a rigid plate beneath said casing engaging said seat, connecting means engaging said plate and bottom at a distance from said aperture and securing said plate rigidly to said bottom, an upright hollow sleeve rigid with said plate and traversing said aperture, gearing carried by said plate, laundering mechanism located in said casing and operatively connected with said gearing through said sleeve, packing means carried by the exterior of said sleeve and engaging the bottom of said casing adjacent to said aperture adapted to prevent leakage of liquid from said casing, and a supporting frame for said plate and casing.

9. In a laundry machine, an upright metal casing having an aperture in its bottom and an annular seat around said aperture at a distance therefrom, a rigid plate beneath said casing engaging said seat, connecting means engaging said plate and bottom at a distance from said aperture and securing said plate rigidly to said bottom, an upright hollow sleeve rigid with said plate and traversing said aperture, gearing carried by said plate, laundering mechanism located in said casing and operatively connected with said gearing through said sleeve, packing means carried by the exterior of said sleeve and engaging the bottom of said casing adjacent to said aperture adapted to prevent leakage of liquid from said casing, a supporting frame separate from said plate and casing, and means securing said plate to said frame in supported relation.

10. In a laundry machine, in combination an annular frame having upwardly facing seats at angularly spaced points, legs carried by and forming a part of said frame, a liquid holding casing, a reinforcing plate secured to the bottom of said casing and having downwardly facing seats registering with said first seats, supporting

elements of yielding nature interposed between the respective seats, and operating mechanism carried by said plate.

11. A reinforcing plate for the bottom of a laundry-machine casing consisting of a one-piece metal disk having an annular marginal portion adapted to engage and to be secured to the casing bottom and also having an aperture which overlaps the center of said plate, the web between said aperture and said marginal portion being sinuous and having bolt-holes near said aperture, said bolt holes being located at different levels, means for securing the marginal portions of said plate to a supporting frame, a gear box located in said aperture and having apertured shoulders at different heights which register with said bolt holes, and means passing through the bolt holes and the apertured shoulders for securing said gear box to said plate.

12. In a laundry machine, a casing for liquid having an aperture in its bottom, a rigid reinforcing plate underlying said bottom and having its margin secured to said casing, said plate having an aperture therein which registers with said first aperture, and a metal member detachably secured to said plate and depending below the aperture therein, said member characterized by having a vertical sleeve which traverses said first-named aperture and by also having bearings for a horizontal shaft and supports for gearing elements located in determined relation to said sleeve and bearings.

13. In a washing machine, a casing having an aperture in one wall, a plate having its marginal portion rigidly fastened to said casing and having an offset apertured web portion, a gear carrying element rigidly attached to web portion of said plate in a plurality of different planes, whereby it is braced, and a bearing sleeve carried by said element and extending through said apertures.

14. In a laundry machine, a casing for liquid having an aperture in its bottom, and an annular seat surrounding the same, an annular frame having feet, a rigid reinforcing plate having its margin secured to said seat and also secured to said frame in supported relation, an upright sleeve rigid with said plate and projecting through said aperture, packing means preventing leakage between said sleeve and the wall of said aperture, an operating member working through said sleeve, and gearing carried by said plate and operatively connected to said member.

15. In a laundry machine, a metal casing adapted to hold detergent liquid, a clothes washing element therein, an annular supporting frame, an electric motor carried by said frame, a reinforcing plate carried by said casing, gearing carried by said plate and operatively connected to said washing element, rubber supporting blocks interposed between said frame and plate, and an electrically non-conducting power transmitting element connecting said motor and gearing.

16. In a laundry machine, a metal casing adapted to hold detergent liquid, a clothes washing element therein, operating mechanism for said element, a supporting frame, an electric motor carried by said frame and operatively connected to said mechanism, and means connecting said casing and mechanism in supported relation to said frame, said last named connecting means and the operative connection between said motor and mechanism being of electrically non-conducting character whereby said motor is insulated from said casing and mechanism,

the frame of said motor being grounded to said supporting frame.

17. A rinse band and trough for the purpose described defined by a cylindrical inner wall portion adapted to fit inside a cylindrical washing machine casing and having a part extending above the rim and a cylindrical outer wall spaced from said inner wall and having at its bottom an interned flange connected to the inner wall portion and constituting a bottom for the trough and adapted to seat on the casing rim, said trough bottom being located wholly above the rim of said casing.

18. Apparatus for extracting comprising a casing having spaced inner and outer wall sections at the top thereof defining a drain trough, a container mounted inside said casing for rotation about a vertical axis and having its walls formed as a surface of revolution about said axis and flaring upwardly from its bottom to a level which is above the top of said casing wall, said container having liquid discharge apertures above the top of said casing wall sections and an interned annular band above such apertures, and a safety cover substantially conforming to the outline of said container and closely overlying the same and having its margin surrounding said apertures in a position to arrest and divert extracted liquid into said drain trough.

19. In a laundry machine, in combination, a casing, an extractor-container journaled in said casing upon a vertical axis, said container having upwardly flaring walls terminating in liquid discharging provisions, means for supporting said container with said liquid discharging provisions located above the top of the casing wall, a removable cover for said casing having a domed part adapted to closely surround the upper part of said container, and an elevated part above the open top of said container, and trough means below the liquid discharging provision of said container for receiving from said cover the liquid ejected from said container against the interior of the cover.

20. A laundry machine comprising a container mounted for rotation about a vertical axis and having its walls formed as a surface of revolution about said axis and flaring upwardly from its bottom to a level which is above such bottom and having liquid discharge apertures at and above such level, and an annular shield carried by and removably attached to said container and covering said apertures.

21. Apparatus for washing and extracting comprising a container mounted for rotation about a vertical axis and having its lower part imperforate and its walls flaring outwardly and upwardly so as to discharge the detergent liquid upwardly upon rapid rotation, means for agitating the container contents to wash the fabric articles therein, and an annular shield removably attached to the upper part of said container in surrounding relation to prevent escape of liquid therefrom during the washing operation.

22. A laundry machine comprising a container mounted for rotation about a vertical axis and having its walls formed as a surface of revolution about said axis and flaring in both directions from a level intermediate its upper and lower ends, and having liquid discharge openings at its level of greatest diameter said container being otherwise imperforate, and displaceable means carried by said container for covering said apertures.

23. The combination with the casing of a

laundry machine, and a clothes container located therein for rotation about a vertical axis and having liquid discharge openings in its side wall, of a removable cover for said casing, a brake shoe carried by the interior of the cover, and means projecting outside the cover whereby said brake shoe may be pressed against said container.

24. In a laundry machine, a casing, an upright sleeve therein a vertical shaft journaled in said sleeve, a container carried and rotated by said shaft and having liquid discharge apertures in its side wall, brake means carried by said sleeve, and means for applying said brake means to said container to arrest its rotation.

25. In a centrifugal extractor in combination, an upright rotatable element, a sleeve coaxial therewith, a hub surrounding and spaced from said sleeve, said hub and sleeve having alternating upright ribs on their adjacent surfaces, bottom and side elements rigid with said sleeve and defining a surface of revolution coaxial therewith, and soft rubber elements interposed between said sleeve and hub, said elements being arranged between adjacent ribs.

26. In a laundry machine, in combination, a container for clothes, said container having an apertured side wall which defines a surface of revolution about a vertical axis, a vertical shaft coaxial therewith, means for raising and lowering said shaft and for oscillating and rotating said shaft, a clothes washing element inside said container, means normally supporting said container independently of said shaft, and means operative upon elevating said shaft for automatically connecting said element to said container in rotating relation and for automatically disengaging said container and element when said shaft is lowered.

27. In a laundry machine, in combination, a container for clothes, said container having an apertured side wall which defines a surface of revolution about a vertical axis, a vertical shaft coaxial therewith, means for raising and lowering said shaft and for oscillating and rotating said shaft, a clothes washing element inside said container operably associated with said shaft, and interfitting driving connections between said element and container adapted to become engaged at one relative elevation of said element and container and to become disengaged at a second relative elevation of said element and container.

28. In a laundry machine, in combination, a container for clothes, said container having an apertured side wall which defines a surface of revolution about a vertical axis, a vertical shaft coaxial therewith, means for raising and lowering said shaft and for oscillating and rotating said shaft, a clothes washing element inside said container operably associated with said shaft, and interfitting driving connections between said element and container adapted to become engaged when said element is elevated relative to said container and to become disengaged when said element is again depressed relative thereto.

29. In a laundry machine, a casing for detergent liquid, a container for clothes located therein for vertical movement and for rotation about a vertical axis, said container having liquid discharge apertures in its wall, a washing element inside said container, an electric motor, gearing including a vertical shaft operatively connecting said motor to said element and container, and control means for said gearing including a single manually operable member ac-

cessible exteriorly of said casing said gearing comprising means adapted at one setting of said manually operable member to connect said motor to said container in elevating relation and at another setting of said member to allow said container to descend into the liquid, said shaft being automatically connected to said container in rotating relation when said container is elevated and automatically disconnected therefrom when said container is depressed.

30. In a laundry machine, a casing for detergent liquid, a container for clothes located therein for vertical movement and for rotation about a vertical axis, said container having liquid discharge apertures in its wall, a washing element inside said container, an electric motor, gearing for operatively connecting said motor to said element and to said container, an elevating device for said container, means including a single manually operable member accessible exteriorly of and casing for connecting said motor to said elevating device in operating relation, and means operative automatically at one level of said container for connecting said gearing thereto in rotating relation and at another level for disconnecting said gearing therefrom.

31. In a laundry machine, a casing for detergent liquid, a container for clothes located therein for vertical movement and for rotation about a vertical axis, said container having liquid discharge apertures in its wall, a washing element inside said container, an electric motor, two trains of gearing interposed between said motor and said container and element, one of such trains including rotating devices and the other trains including oscillating devices, means automatically operative at one level of said container to connect thereto and to said motor the train which includes the rotating devices, means automatically operative at another level to connect to said element and to said motor the train which includes the oscillating devices, a winch for raising and lowering said container, and means to connect said winch in operated relation to said motor.

32. In a washing machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, an oscillating element for washing clothes in said container, power means for operating said centrifugal container and said oscillating element, and cooperating mechanism driven by said power means for elevating said container, said cooperating mechanism including a single manually operable control member outside said casing for controlling the upward and downward movement of said container.

33. In a laundry machine, in combination, a casing, an extractor-container journaled in said casing upon a vertical axis, said container having upwardly flaring walls terminating in an inwardly turned rim, said walls having a row of liquid discharge apertures located substantially at the level of greatest diameter, means for supporting said container with said apertures located above the top of the casing wall, an annular trough carried by said casing and surrounding said container, said trough having inner and outer walls located beneath said apertures, and a top member constituting with said trough an extension of said casing and having a part adapted to fit inside the outer wall of said trough, and an elevated, inwardly inclined part

overlying the inwardly turned rim of said container.

34. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism cooperating with said power means for elevating said container, control means for connecting said power means to said mechanism in operative relation, and means for lowering said container while at the same time controlling the speed of its downward movement.

35. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism cooperating with said power means for elevating said container, control means for selectively controlling the rotation of said container, the operation of said agitating means and the elevation of said container, and means for lowering said container while at the same time controlling the speed of its downward movement.

36. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism cooperating with said power means for elevating said container, and means for maintaining said container in its elevated position and for lowering the same while at the same time controlling the speed of its downward movement.

37. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism cooperating with said power means for elevating said container, and friction means for maintaining said container in its elevated position and for controlling the downward movement thereof.

38. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism including a frictional driving connection cooperating with said power means for elevating said container, and control means including a single manually operable member for connecting said power means to said mechanism in operative relation and for lowering said container in a controllable manner.

39. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said con-

tainer, power means for selectively rotating said container and oscillating said agitating means, mechanism including a frictional driving connection cooperating with said power means for elevating said container, and friction means for maintaining said container in its elevated position, and for controlling the downward movement thereof.

40. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism including a frictional driving connection cooperating with said power means for elevating said container, means for maintaining said container in its elevated position, and a single control member for controlling the washing and drying operations and the raising and lowering of said container.

41. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, and mechanism including a clutch cooperatively connected with said power means and container for elevating the latter and a brake for maintaining it in elevated position.

42. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism cooperating with said power means for elevating said container, and means for lowering said container and controlling at the same time the speed of its downward movement, said last named means being operative to hold said container at different elevations intermediate its upper and lower positions.

43. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, cable means operatively connected to said container for elevating the same, and clutch means for connecting said cable means to said power means in operative relation.

44. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, and cable means connecting said power means to said container for elevating the same.

45. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said

agitating means, and mechanism driven by said power means for elevating said container, said mechanism automatically disconnecting said power means from its driving connection with said agitating means when said container is elevated.

46. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, and mechanism driven by said power means for disconnecting said agitating means from said power means, for elevating said container and connecting it in for rotation by said power means.

47. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means including disconnectible driving connections for selectively rotating said container and oscillating said agitating means, and mechanism driven by said power means for elevating said container, said mechanism serving to disconnect the driving connection between said agitating means and said power means at the start of the upward movement of the container and to effect a driving connection between said power means and said container for its rotation at the finish of the upward movement of the container.

48. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism cooperating with said power means for elevating said container, a friction clutch for connecting said container to said power means for rotation when in its raised position, and means for lowering said container and automatically operating said clutch for disconnecting the rotational driving connection between said power means and said container.

49. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism cooperating with said power means for elevating said container, and means for lowering said container and automatically connecting said agitating means in operative relation with said power means.

50. In a washing and drying machine, a casing, a centrifugal container therein with its axis substantially vertical and movable between upper and lower positions in said casing, oscillatable agitating means for washing clothes in said container, power means for selectively rotating said container and oscillating said agitating means, mechanism driven by said power means for elevating said container, and means for lowering said container automatically operable for first disconnecting the rotational driving connection between said power means and

said container and then connecting said agitating means in operative relation to said power means.

5 51. In a laundry machine, in combination, a container for clothes, said container having an apertured side wall which defines a surface of revolution about a vertical axis, a vertical shaft coaxial therewith, and means for raising and
10 lowering said shaft and container and for selectively oscillating and rotating said shaft, said means including an axially movable clothes washing element inside said container adapted for connection with said shaft and driving connections between said element and container
15 adapted to become engaged at one elevation of said element and container and to become disengaged at a second elevation of said element and container.

52. In a laundry machine, in combination, a container for clothes, said container having an apertured side wall which defines a surface of revolution about a vertical axis, a vertical shaft coaxial therewith, and means for raising and
5 lowering said shaft and container and for selectively oscillating and rotating said shaft, said means including an axially movable clothes washing element inside said container adapted for connection with said shaft, detachable driving connections between said element and container and frictional driving connections for said shaft adapted to become engaged at one elevation of said element and container and to become disengaged at a second elevation of said element
10 and container.
15 and container.

JAMES B. KIRBY.

CERTIFICATE OF CORRECTION.

Patent No. 2,067,572.

January 12, 1937.

JAMES B. KIRBY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 7, second column, line 10, claim 24, after the word "therein" insert a comma; page 8, first column, line 1, claim 29, after "casing" insert a comma; line 21, claim 30, for "and" read said; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of March, A. D. 1937.

Seal)

Henry Van Arsdale
Acting Commissioner of Patents.

said container and then connecting said agitating means in operative relation to said power means.

5 51. In a laundry machine, in combination, a container for clothes, said container having an apertured side wall which defines a surface of revolution about a vertical axis, a vertical shaft coaxial therewith, and means for raising and
10 lowering said shaft and container and for selectively oscillating and rotating said shaft, said means including an axially movable clothes washing element inside said container adapted for connection with said shaft and driving connections between said element and container
15 adapted to become engaged at one elevation of said element and container and to become disengaged at a second elevation of said element and container.

52. In a laundry machine, in combination, a container for clothes, said container having an apertured side wall which defines a surface of revolution about a vertical axis, a vertical shaft coaxial therewith, and means for raising and
5 lowering said shaft and container and for selectively oscillating and rotating said shaft, said means including an axially movable clothes washing element inside said container adapted for connection with said shaft, detachable driving connections between said element and container and frictional driving connections for said shaft adapted to become engaged at one elevation of said element and container and to become disengaged at a second elevation of said element
10 and container.
15

JAMES B. KIRBY.

CERTIFICATE OF CORRECTION.

Patent No. 2,067,572.

January 12, 1937.

JAMES B. KIRBY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 7, second column, line 10, claim 24, after the word "therein" insert a comma; page 8, first column, line 1, claim 29, after "casing" insert a comma; line 21, claim 30, for "and" read said; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of March, A. D. 1937.

Seal)

Henry Van Arsdale
Acting Commissioner of Patents.