

Aug. 7, 1934.

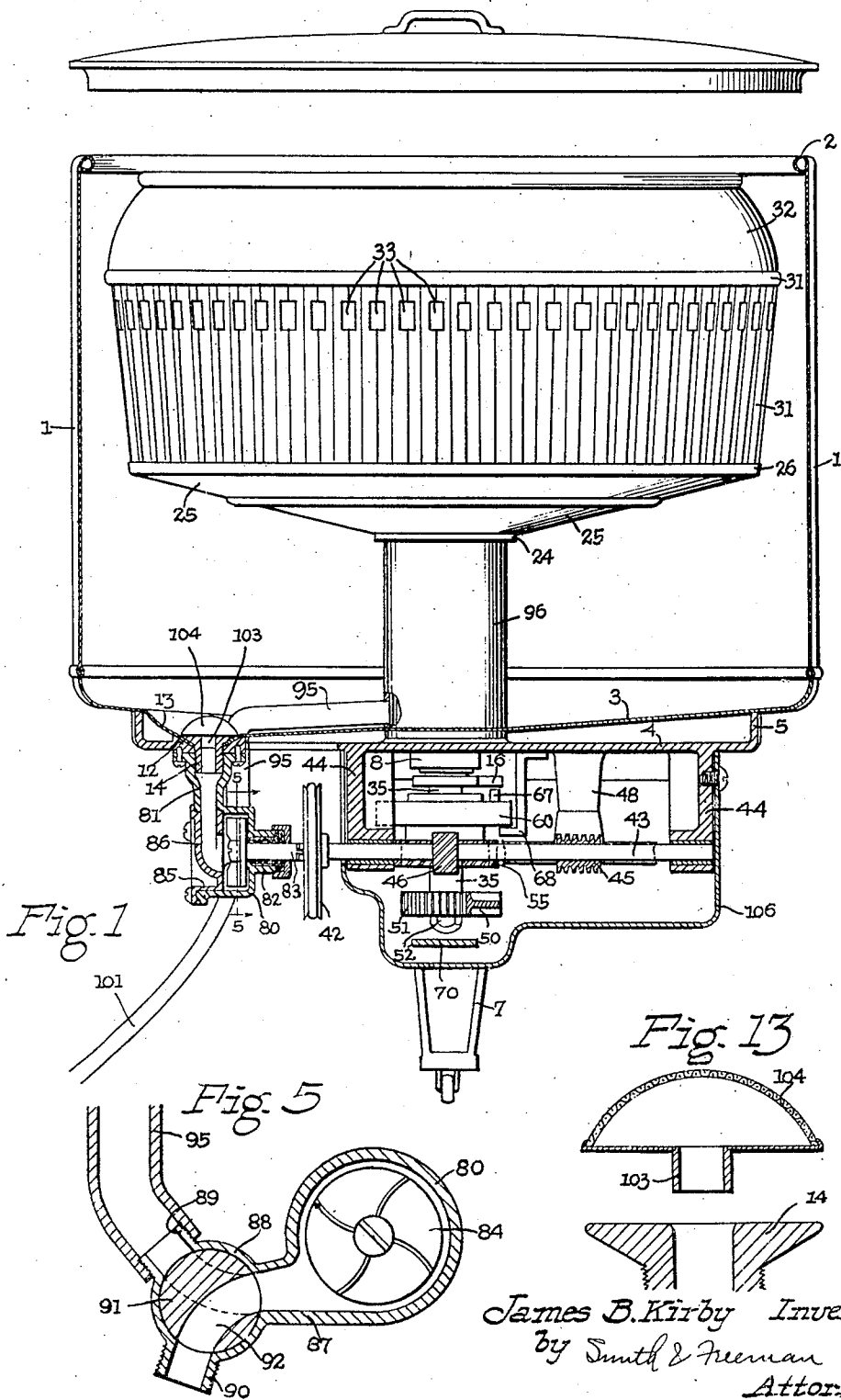
J. B. KIRBY

1,969,176

WASHING MACHINE

Filed Feb. 25, 1924

5 Sheets-Sheet 1



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WASHING MACHINE

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Fig. 2

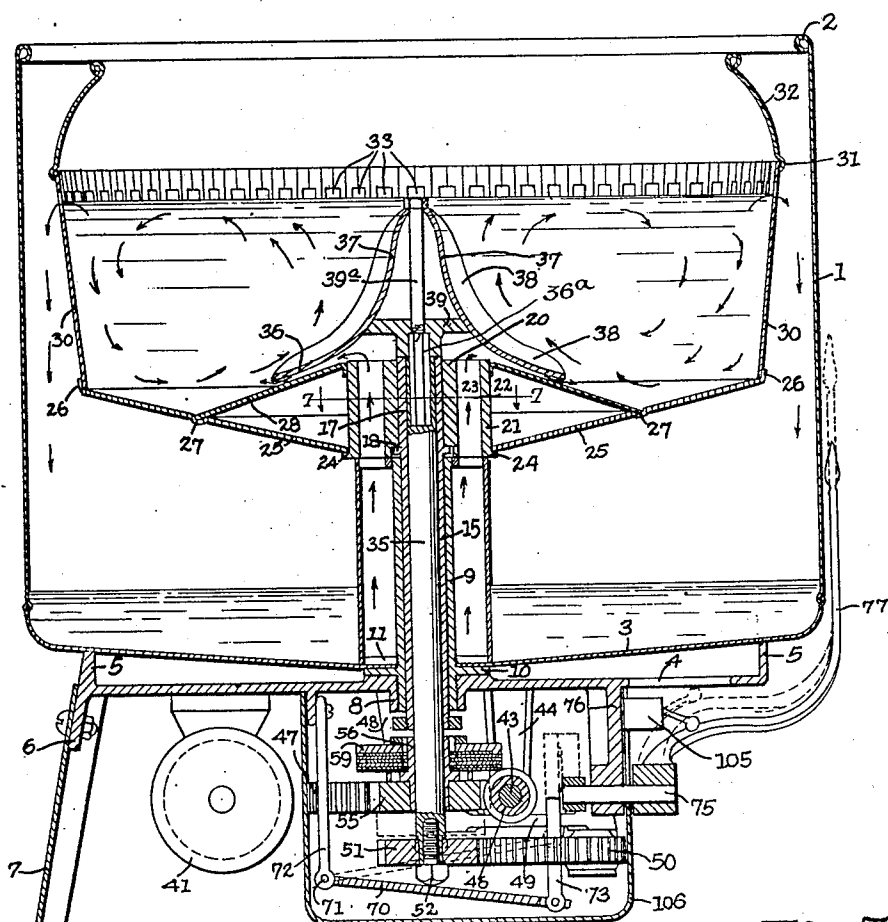


Fig. 7

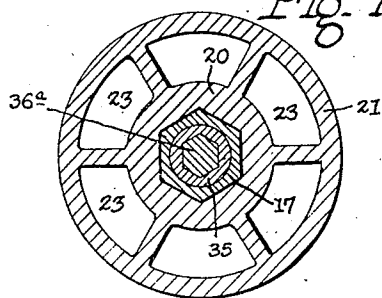
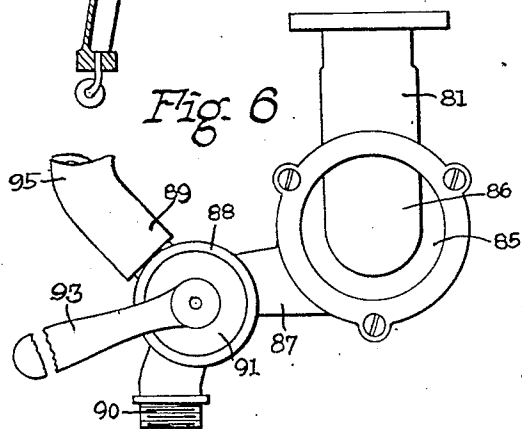


Fig. 6



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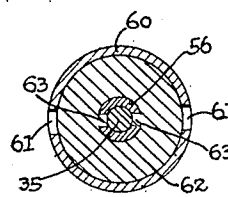
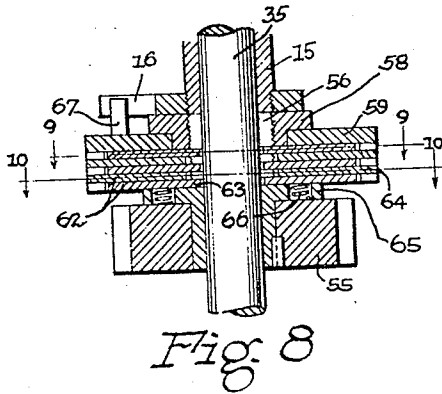
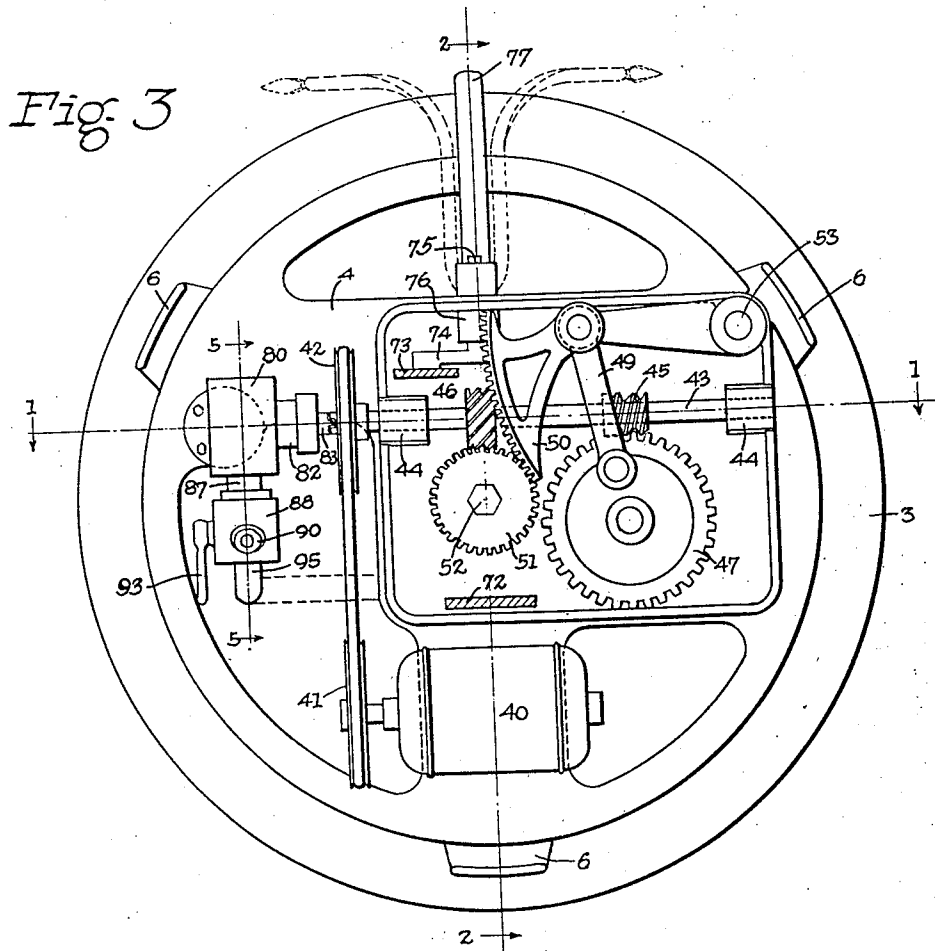


Fig. 9

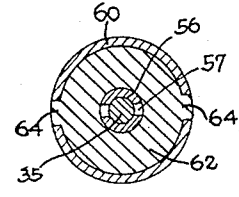


Fig. 10

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Fig. 4

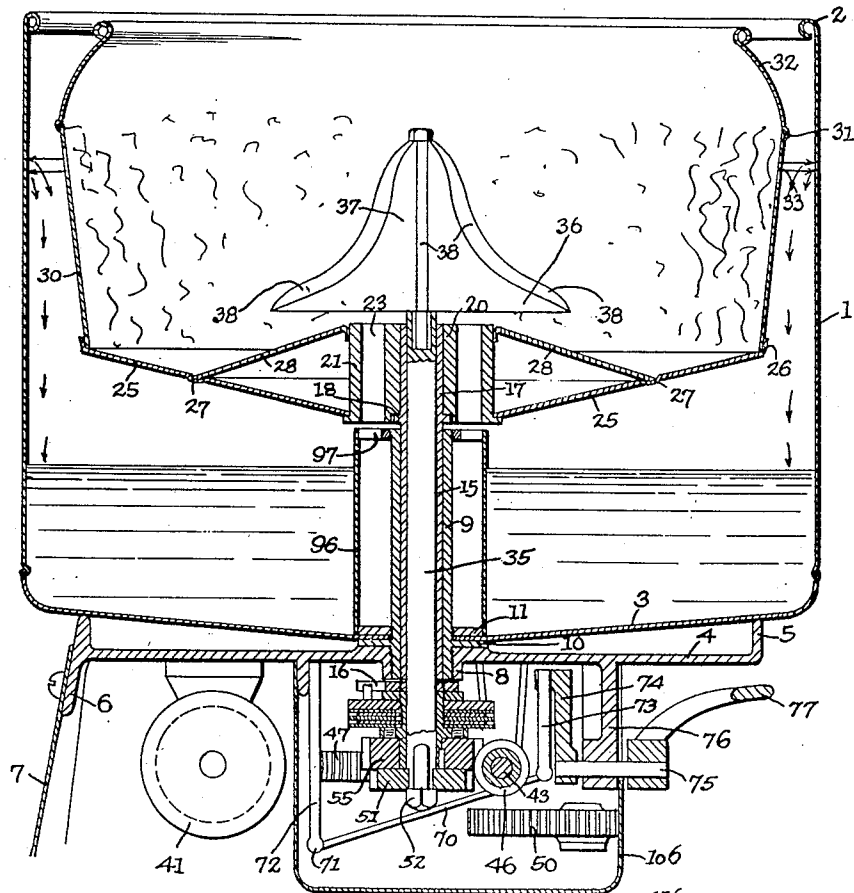


Fig. 11

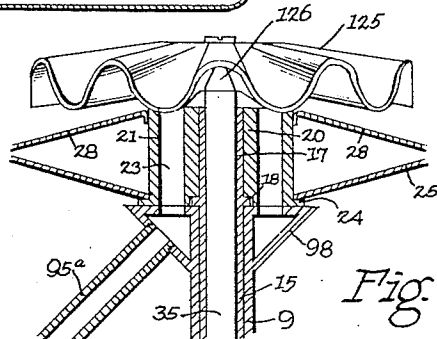
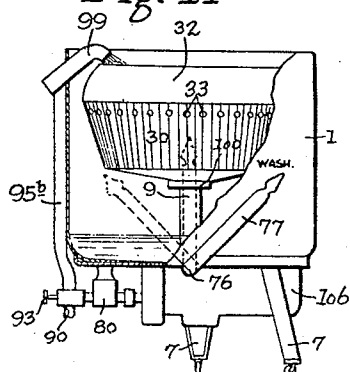


Fig. 12

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Fig. 14

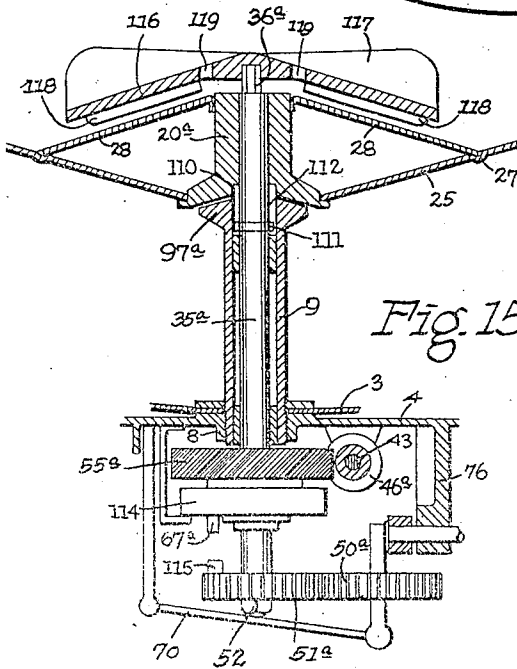
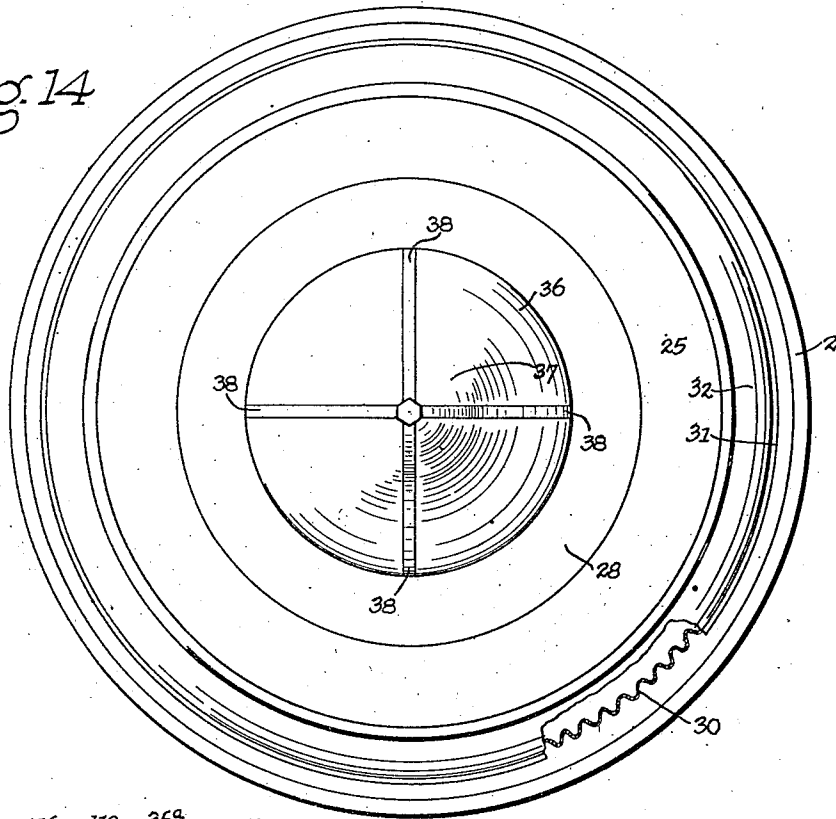
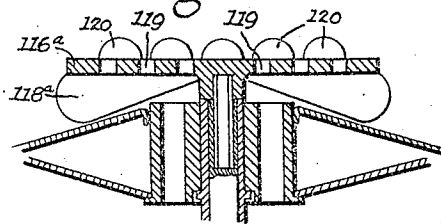


Fig. 16



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UNITED STATES PATENT OFFICE

1,969,176

WASHING 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 February 25, 1934, Serial No. 694,899

106 Claims. (Cl. 68—18)

This invention relates to washing machines and has special reference to that type of machine, used for domestic washing, wherein the water is extracted from the articles after washing by a rapid rotation of the same tub or container in which the washing was effected. The objects of the invention are the provision of a new, improved, and simplified mechanism for producing the washing action and for connecting the driving device to the tub in rotating relation for extracting purposes; the provision of new and improved means for freeing the tub from washing liquid when drying is to be effected, and introducing such liquid into the tub when washing is desired; the provision of new and improved means for storing the washing liquid during the extracting operation; the provision of new and improved expedients for performing the washing operation; the provision of washing devices which need not be removed during the extracting operation; the provision of a washing machine the parts of which are easily accessible for cleaning; the provision of a washing machine which shall not wear, tear, or catch the clothing or break buttons during either the washing or extracting operations; while further objects and advantages of the invention will become apparent as the description proceeds. This application constitutes in part a continuation of my former application Serial No. 614,080, filed January 22, 1923.

In the drawings accompanying and forming a part of this application I have shown certain physical structures in which my inventive ideas may be embodied, although it will be understood that these drawings are intended to be merely illustrative of the general principles of my invention and not to be exhaustive of the designs and constructions whereby those principles can be applied. Fig. 1 is a vertical sectional view through a complete washing machine of my invention taken through the countershaft slightly to one side of the center of the machine as indicated by the line 1—1 in Fig. 3; Fig. 2 is a vertical sectional view through the center of the machine at right angles to Fig. 1 as indicated by the line 2—2 in Fig. 3; Fig. 3 is a bottom plan view of the driving mechanism, the casings and supporting legs being omitted; Fig. 4 is a view corresponding to Fig. 2, but showing the parts in the position occupied when the water is being extracted; Fig. 5 is a sectional view corresponding to the line 5—5 in Figs. 1 and 3 looking in the direction of the arrows; Fig. 6 is a front elevation of the pump and valve shown in Fig. 5; Fig. 7 is a horizontal sectional view corresponding to the line 7—7 of

Fig. 2; Fig. 8 is an enlarged sectional view through the friction clutch and associated parts; Fig. 9 and 10 are horizontal sectional views corresponding to the lines 9—9 and 10—10 respectively of Fig. 8; Fig. 11 is a front elevation of my improved washing machine with certain parts broken away and illustrating a modified arrangement of return pipe; Fig. 12 is a detail view of a modified form of tub and support together with a modified washing agitator or dasher; Fig. 13 is a detail view of one form of outlet strainer; Fig. 14 is a top plan view of the machine showing a preferred form of dasher; Fig. 15 illustrates a modified form of driving mechanism, and Fig. 16 illustrates a modified form of dasher or agitating member.

Describing the parts by reference characters, 1 represents an upright, substantially cylindrical, sheet-metal casing having a reinforced top rim 2 and a water-retaining bottom 3. This casing is supported on a circular cast iron frame 4 here shown as having a peripheral upstanding flange 5 and plural depending projections 6 at angularly spaced points adapted to receive the hollow sheet metal legs 7 by which the machine is supported. The center of this plate is provided with an internally threaded boss 8 receiving the lower end of the vertical cylindrical sleeve 9 which projects through a hole in the bottom 3. I have shown the sleeve as formed with a flange 10 seated on the top of the frame 4, and a threaded nut 11 holding the bottom 3 against this flange and thus preventing leakage. The flange 5 is higher than the flange 10 and the bottom 3 is dished so as partly to conform thereto, but the nut 11 preferably imposes additional strain, thereby holding the parts together.

The frame 4 is formed adjacent one margin with an apertured seat 12 for a liquid discharge, and the bottom of the tub is here shown as formed with a radial trough 13 leading from the central portion to this seat. A suitable screw plug 14 is threaded into this seat and overlaps the adjacent portion of the casing bottom to make a tight joint.

Movably mounted inside of the sleeve 9 is a rotatable sleeve 15 having at its lower end a radial finger 16 and having at its upper end an external prismatic portion 17 terminating at an upwardly facing shoulder 18. Removably mounted on this prismatic portion is the tub or container in which the washing and extracting operations are conducted. In its preferred form this comprises a hub member and a sheet metal body attached thereto. The hub member comprises a central prismatic socket 20 receiving the sleeve and a cylindrical rim portion 21 connected thereto by

webs 22 which define liquid passageways 23. Formed at the lower end of portion 21 is a flange 24 on which is seated the sheet metal bottom 25 of the washing tub. The outer margin of this bottom plate is upwardly turned as shown at 26 for the reception of the sides, and midway between the center and sides there is formed a circumferential groove 27 receiving the margin of a frusto-conical plate 28 whose center is apertured for the tight reception of the portion 21 to which it is soldered or otherwise fastened. This forms a tub bottom of maximum strength and minimum weight and the upper surface of the plate 28 preferably merges with the upper end of the hub member to form a smooth sweep for liquid. The sides 30 of the tub are made of sheet metal preferably corrugated vertically for two reasons; first because after such corrugating it becomes possible to form a rectangular piece to the outwardly flaring shape desired, and second because the corrugations prevent the clothes from becoming matted against the walls sufficiently to prevent the movement of liquid past and through the same. The upper margins of the side walls are received in the depending lip 31 of a rim 32 which is here shown as extended vertically and sloped inwardly to form a convenient handle for the tub and to prevent overspilling or splashing. Adjacent to the lip 31 the walls 30 are formed with a continuous ring of liquid discharge apertures 33.

Slidably and rotatably mounted inside the sleeve 15 is a vertical shaft 35 extending from a point below the sleeve 15 to a point above the same and having at its upper end an oscillating dasher or agitating member. This member may be attached to the shaft in any suitable manner as by a depending prismatic pin 36^a engaging a hole in the shaft as shown in Figs. 2 and 4, or by having a socket engaging the squared upper end of the shaft as shown in Fig. 15. Also said member can be made of cast metal or sheet metal as desired. In its preferred form said member consists of a central, narrow, conical portion, flaring downwardly and merging with a flatter conical portion 36 which overlies a part of the tub bottom, the exterior being provided with a plurality of vanes 38 of substantially uniform thickness extending from top to bottom.

I preferably form the exterior of the dasher with a continuously curving surface approximating a pseudosphere although I do not limit myself to this shape. I have shown the interior of the dasher as having a hub 39, secured in place by a central bolt 39^a engaging the pin 36^a. When the parts are in washing position as shown in Fig. 2, the edge of the dasher is preferably located close to the tub bottom, say $\frac{1}{4}$ inch therefrom, or close enough so that the water entering the center of the tub as hereafter explained will issue with sufficient velocity to prevent clothing from working underneath the dasher.

Secured to the bottom of the frame 4 is a suitable driving motor 40 having on its shaft a pulley 41 belted to a second pulley 42 on the counter-shaft 43 journaled in the depending brackets 44. Rotating with this counter shaft are a worm 45 and a spiral gear 46. The worm meshes with a worm gear 47 journaled on a depending boss 48 carried by the frame 4 and connected by a pitman 49 with the segmental rack 50. This rack in turn meshes with a pinion 51 tightly fastened to the lower end of the shaft 35 by suitable means such as the round headed bolt 52, here arranged to serve a second function which will be explained

hereafter. This rack is mounted on a vertical pivot 53 at one side of the shaft 43 and its oscillation serves to oscillate the dasher vigorously first in one direction and then in the other.

Loosely sleeved on the shaft 35 above the pinion 51 is a spiral gear 55 which meshes at all times with the gear 46. Carried by the gear 55 is a friction clutch of which the preferred construction is shown in Fig. 8. Rigid with the gear 55 is a cylindrical sleeve 56 having external threads and longitudinal slots, the latter being indicated at 57. Adjustably threaded on this sleeve is a nut 58 against which is rotatably mounted the clutch plate 59 whose margin is formed with a cylindrical flange 60 intersected at spaced points by notches 61. Within the space defined by this flange are a plurality of floating disks 62—63, certain of the same having internal fingers 63 engaging the slots 57 of the sleeve and others having external fingers 64 engaging the slots 61. Between the gear 55 and the adjacent disk is a spacing member 65 formed with apertures in which are mounted springs 66 which tend to force the disks together with a force depending upon the stiffness of the springs and the adjustment of the nut 58. Normally the sleeve 56 rotates freely upon the shaft 35, and the plate 59 rotates freely therewith, but the upper surface of the plate 59 is provided with a pin 67 adapted when elevated to engage the finger 16 and rotate the sleeve 15. Any suitable means is provided to limit the downward movement of this clutch mechanism, such as the bracket 68 shown in Fig. 1.

The sleeve 9 constitutes a kind of pedestal, its upper end being formed with a supporting surface on which the tub may rest, at which time the finger 16 is preferably spaced somewhat below the lower end of the sleeve 9 as shown in Figs. 1 and 2. The gear 55 and its connected clutch parts are also spaced a sufficient distance below the finger 16 so that the pin 67 may rotate freely; and the rack 50 is spaced below the gear 55 a distance greater than the width of the pinion 51. The end of the screw 52 constitutes a thrust bearing and rests upon a suitable companion member here shown as a plate 70, one end of which is pivoted at 71 to the depending support 72, and the other end of which is articulated to the link 73 connected to a crank 74 on a horizontal rock shaft 75 journaled in a bracket 76 at one side of the counter-shaft 43. Secured to this rock shaft is the hand-lever 77 which projects upwardly past the side of the casing and serves to raise and lower the plate 70 and with it the operating parts.

Depending from the seat 12 is a centrifugal pump here shown as comprising a cylindrical casing 80 at the lower end of a hollow attaching neck 81. Formed at one end of this casing is the stuffing box 82 in which is mounted the shaft 83 connected to the counter-shaft 43 by a flexible joint. Inside the casing is the impeller 84 suitably attached to this shaft. The forward face of the casing is formed for the reception of the cylindrical closure 85 through which is formed an inlet conduit 86 leading from the neck 81 to the center of the impeller. Projecting from the side of the casing 80 is the discharge neck 87 which leads to the valve casing 88. For illustrative purposes I have here shown a three-way cock of the turning-plug type, the casing having a pair of discharge nipples 89 and 90, respectively, and the plug 91 having a passageway 92 so arranged that by means of the handle 93 the pump can be

connected to either discharge, or be cut off from both. The discharge nipple 90 is an outlet for the wash water, and the discharge nipple 89 is connected to the pipe 95 by means of which the water may be returned to the tub. This may be done in a great number of different ways. In Fig. 1 I have shown this pipe as passing up through the bottom of the tub and communicating with a hollow drum 96 which surrounds the sleeve 9. The upper end of this drum is connected to an apertured plate 97 fastened to the top of this sleeve and constituting the seat for the tub. When the tub rests tightly thereon as shown in Figs. 1 and 2 it is clear that water

15 pumped through the pipe 95 will enter this tub. In Fig. 12 I have shown the pipe 95^a as connected to a small circular manifold 98 carried by the upper end of the sleeve 9 and having the same function as before. In Fig. 11 I have shown this

20 pipe 95^b as running up outside of the casing 1 and provided at the upper end with a removable nozzle 99 adapted to overhang the rim 32 sufficiently to discharge into the tub. In the last named case the sleeve 9 is made plain and without any water-guiding function, although its upper end is still provided with a seating ledge 100 for supporting the tub.

The operation of the mechanism is as follows: The tub is supplied with the clothing to be washed and a sufficient quantity of washing liquid is introduced either into the tub or casing to fill the lower part thereof. The current is turned on and the counter-shaft 43 is operated continuously thereby operating the gears 45 and 46 and rack 50 continuously. The operating parts being in the position shown in Figs. 1 and 2, and the valve 91 so turned as to connect the pump to the pipe 95, a forceful stream of washing liquid is delivered to the tub interior. This stream issues from beneath the dasher which constitutes a deflector forcing the liquid to flow parallel to the tub bottom and serves to prevent clothes from working beneath the dasher. When clothing is in the tub the effect of this oscillation is to cause it to move in the direction shown by the arrows in Fig. 2. At the sides of the tub the clothing is loose and settles to the bottom. As it approaches the dasher it becomes compacted together and is subjected to the rubbing action of the vanes. Rising along these vanes the clothing now moves outwardly in all directions, loosening as it approaches the tub wall. The scum, soap lees, and floating dirt move with the floating clothes until the side wall is reached whereupon the former is discharged through the apertures 33 and the latter sinks inside the tub and is again subjected to the rubbing action described. The size of the apertures is so chosen that the tub is never over filled, and the size of the casing is preferably so chosen that some depth of liquid always remains therein even when the tub is full. Inasmuch as the pump always withdraws from the lower part of this casing the floating scum is never returned to the tub. It will be understood, however, that the inner tub and dasher can be used alone, the outer casing, pump, etc. being omitted together with their functions, thus producing a washing machine of maximum simplicity and high utility, though omitting many of the further advantages of the more complete device.

As soon as the washing operation has proceeded to a sufficient extent or it is desired to arrest the same for any reason, the lever 77 is moved to a midposition whereby the plate 70 and with

it the shaft 35 are elevated, bringing the gear 51 to the position shown in dotted lines in Fig. 2, at which point it no longer engages the rack 50 which now oscillates idly. I have found it very convenient also to attach an electric switch 105 in such wise as to be opened when this lever is in a neutral position and to be closed at all other times as shown in Fig. 2, this switch being in series with the motor. Further movement of the lever in the same direction brings this pinion into contact with the gear 55 and raises the same with its attached clutch, thereby bringing the pin 67 into contact with the finger 16. Continued movement of the lever now causes the elevation of the sleeve 15, thereby raising the tub from its seat after which it is supported solely upon the thrust bearing 52 and the friction effect of the clutch causes it to rotate the tub with gradually increasing speed up to the proper rate for extracting the water. In the construction here illustrated a standard motor is employed running at 1725 R. P. M.; the worm gear 47 makes 75 R. P. M. and the spiral gear 55 and with it the tub 750 R. P. M., all of which are highly satisfactory. During the extracting operation the parts assume the position shown in Fig. 4, the crank 74 moving slightly past dead center so that the weight of the parts holds them elevated. Also this facilitates the lifting of the loaded extractor which at the start is filled with water, although most of this rapidly escapes through the slot now opened above the sleeve 15. The pump is still in operation, and this opening permits escape of the water without entering the tub; the pump outlet can also be shut off at the valve 91 in case one uses a valve of the necessary shape, but this is not necessary. The inclination of the tub walls causes the water to flow up hill through the holes 33 the centrifugal force overcoming that of gravity, and the corrugations permit a very complete removal of adherent liquid. The dasher and internal shaft spin freely with the tub, and the washing liquid is entirely collected in the casing beneath the same. When the drying operation has gone sufficiently far the tub is lowered by means of the lever 77 until it rests on the plate 97 which acts as a brake whereupon the friction very quickly brings it to rest, the gearing meanwhile rotating freely in neutral position. The utility of the switch 105 now becomes manifest in that it permits the pump to stop before the clothes are wetted again; in the absence of a switch the pump can be turned off or disconnected. The clothing can now be removed and a new supply added and the operation repeated. It is not necessary even to press the dry clothing down into the liquid since the circulating effect heretofore described draws them under without assistance.

Whenever it is desired to empty the casing a hose 101 is attached to the nipple 90 and the valve turned accordingly. This water can be discharged into a sink or other drain, at any desired height above the casing itself, thereby dispensing with the use of pails or requiring a special drain. In case the hose is used it is of course necessary to empty the hose and the last drops of water into a basin, but the discharge of the tub is extremely rapid. The height of the pedestal is such that the liquid contents of the tub can be transferred to the casing without impeding the extracting process.

Preferably during the washing operation a suitable strainer is employed to keep lint, buttons, and other foreign matter out of the pump. This strainer may conveniently take the form of a

tube 103 adapted to be inserted into the plug 14 and with an enlarged head 104 of screen cloth or other foraminous material. The tub is removed from the casing by lifting it, either with or without first removing the dasher since the latter will be removed by the tub in any case. This gives immediate access to all parts for cleaning or wiping.

The brackets 44, 48, 76, and the various gears are surrounded by a metal housing 106, having its lower end imperforate to constitute an oil container into which sufficient of the gears dip so that their splashing may lubricate the entire mechanism.

In the modification shown in Fig. 15 the sleeve 15 is omitted and the upper end of the shaft 35^a sleeved both rotatably and slidably in the hub 20^a of the tub, the upper end of the sleeve or pedestal 9 having an enlargement 97^a constituting a seat for the tub. The hub and shaft are formed with cooperating clutch portions such for example as the notches 110 formed in the one adapted to be engaged by a pin 111 or other clutch member carried by the other when the same is elevated and to be disengaged when the shaft is lowered as by being received in a recess 112 in the sleeve. The lower end of this shaft is provided with a pinion 51^a as before which meshes with a reciprocating rack 50^a. Sleeved on the shaft is a spiral gear 55^a meshing with a companion gear 46^a on the countershaft 43. Carried by the lower side of the gear 55^a is a suitable friction clutch 114, similar for example to that shown in Fig. 8, but in reversed position with its operating pin 67^a depending so as to be engaged by the finger 115 carried by the pinion 51^a, sufficient space being left between them to permit disengagement between the pinion and its rack. The thrust bearing 52 and elevating plate 70 may be the same as before.

When the shaft 35^a is lowered the tub rests on the pedestal, being merely steadied and centered by the shaft which oscillates freely carrying the dasher with it. Sufficient play is left between the clutch members of the shaft and hub to permit the disengagement of the rack and pinion. Further elevation of the shaft raises the tub from the pedestal and also causes engagement between the pin 67^a and the abutment 115 after which the tub and dasher rotate together as before. I have shown in Fig. 15 only a simple form of hub without liquid apertures and also a less desirable but still useful form of dasher or dolly comprising a disk 116 having vanes 117 on its upper face and other vanes 118 on its lower face. The last named vanes supplement the action of the pump in ejecting water radially into the tub. Perforations 119 may be made to permit a certain amount of water to enter from above, thereby drawing the clothes into contact with the vanes 117, though care should be taken not to make these perforations so large or numerous as to cause the clothes to adhere. In Fig. 16 I have shown another type of dolly, similar to that last described except that the vanes 117 are replaced by rounded projections 120, the disk 116^a being flatter than before and the vanes 118^a larger. The direction of currents and the mode of washing produced by the two last described dashers are entirely different from those produced by the first described dasher. Another type of dasher is shown in Fig. 12 wherein 125 represents a radially fluted sheet-metal disk having a hub 126 set on the squared end of the shaft 35.

It will be understood that many changes in details of construction and design and arrangement of the different parts can be made without departing from the scope of my invention and that many parts can be omitted together with their functions, and I do not limit myself in any way except as specifically recited in my several claims.

Having thus described my invention what I claim is:

1. In a washing machine, a casing for liquid, a liquid containing tub for receiving articles to be washed said tub being removably supported inside said casing in such position that overflow from said tub shall fall directly into said casing, a conduit for washing liquid delivering into said tub, a washing device inside said tub, power means for actuating said washing device, and pumping means arranged to withdraw liquid from said casing and discharge it into said tub during and as a part of the washing operation.

2. In a clothes washing machine the combination with a casing of a liquid containing tub therein to receive the articles to be washed, the volumetric capacity of that part of the casing below the bottom of said tub being greater than the capacity of the tub, means for rotating said tub at high speed to extract the washing liquid therefrom, a mechanical washing device inside said tub, a power device for selectively rotating said tub or actuating said washing device, and means operable during the washing operation for delivering a constant stream of washing liquid from the lower part of said casing to the interior of said tub whereby floating scum is removed from said tub and collected in said casing.

3. In a washing machine, a casing for liquid, a tub for receiving articles to be washed and overflowing into said casing, a conduit for washing liquid communicating with the bottom of said tub, an operable dasher in said tub above the mouth of said conduit, means for operating said dasher, means for holding said tub stationary and pumping means arranged to withdraw liquid from said casing and move it through said conduit.

4. In a washing machine, an upright tub, a conduit for washing liquid entering the bottom thereof substantially at its center; an oscillatable dasher over the mouth of said conduit, pumping means adapted to return through said conduit the water overflowing from said tub, and means for catching such overflowing water and delivering the same to said pump.

5. In a washing machine, in combination, a tub for clothing and liquid, said tub having perforations in its wall at a level above its bottom to define a liquid level during the washing operation and allow the escape of scum and liquid while holding back the floating clothing, and an agitating device underlying the clothes and working below such liquid level.

6. In a combined clothes washing and extracting machine a casing, an elongated vertical bearing therein, a hollow sleeve journaled in said bearing, a vertical shaft journaled in said sleeve, an upright liquid-containing tub operably secured to the upper end of said sleeve and adapted to receive articles to be washed, said tub having overflow openings at the washing level, a mechanical washing device operatively secured to said shaft, an electric motor carried by said casing, means for connecting said motor selectively either to said shaft or to said tub, a pump operatively connected to said motor, the inlet of said pump communicating with the casing interior at

a point below the normal liquid level therein, and a discharge conduit leading from said pump and adapted to deliver the effluent therefrom to said tub during the washing operation.

7. In a combined washing machine and extractor, an upright tub whose side walls are substantially imperforate at their lower part, a conduit for introducing liquid into said tub for washing purposes and for floating the scum out of said tub, washing means located in said tub and operable independently of any movement of said tub, and means for rotating said tub to expel the liquid contents from its imperforate portion.

8. In a clothes washing machine, a casing, a rotatable liquid containing tub therein having an inlet in its bottom, a pump having its intake communicating with said casing and having two outlets, a conduit leading from one outlet to the inlet in the bottom of said tub, the other outlet constituting a liquid discharge, and valve means for said outlets.

9. In a combined washing machine and extractor, a casing, a vertical shaft traversing the bottom thereof, a liquid containing tub surrounding the upper end of said shaft and spaced a sufficient distance above the bottom of the casing to enable the latter to accommodate the entire liquid contents of the tub therebeneath, a mechanical washing device carried by said shaft inside said tub, a driving motor carried by said casing, operative connections between said motor and washing device, connections between said driving motor and tub alternative to said first connections whereby said tub may be rotated at high speed for extracting the liquid contents thereof, a pump carried by said casing and operatively connected to said motor and having its inlet communicating with the casing interior at a point below the normal liquid level therein and connections between the pump outlet and the tub interior adapted to deliver to said tub the effluent from said pump during the washing operation.

10. In a combined washing machine and extractor, a casing, a pedestal therein, a tub located on said pedestal at a height sufficient to accommodate all the washing liquid therebeneath, said tub and pedestal having registering apertures, an agitating device inside said tub, means for operating said device, means for rotating said tub, a pump having its inlet in communication with said casing and its outlet leading to said pedestal apertures, driving devices, means for connecting said driving devices selectively to said agitating device and said rotating means, and provisions operative upon connecting said devices to said rotating means for lifting said tub off said pedestal and thereby arresting the flow of liquid into said tub.

11. In a washing machine, a tub, a dasher located in the bottom of said tub having clothes rubbing projections on its upper face, said dasher located closely adjacent the bottom of the tub, means for introducing beneath said dasher a continuous supply of washing liquid, and means for oscillating said dasher.

12. In a washing machine a casing, a vertical sleeve therein, operating means journaled in said sleeve, a tub adapted to rest on said sleeve, a dasher in said tub operatively connected to said operating means, mechanism operative while said tub is resting on said sleeve for oscillating said dasher, and means for elevating said tub from said sleeve and connecting it to said operating

means in rotating relation and simultaneously stopping the oscillation of said dasher.

13. In a washing machine, a casing, a tub located therein at a height above the bottom of the casing and having apertures in its bottom, a washing device in said tub, means for closing said apertures against admission of washing fluid into the casing during the washing operation, and for opening said apertures to the casing and means for rotating the tub.

14. In a washing machine, a casing, a pedestal therein having a seat, a tub having a seat adopted to engage the pedestal seat, said tub-seat having apertures therethrough, means for delivering liquid to said tub, washing devices in the tub, and means for displacing said tub from said first seat to open the apertures to the casing and drain the tub into said casing.

15. In a washing machine, a liquid containing tub, having a considerable number of overflow openings arranged therearound at a uniform level which is raised considerably above the tub bottom, an agitating device located in said tub, a conduit discharging into said tub, means for operating said agitating device, and means including an annular receiver for the overflowing liquid and pumping devices connected thereto for catching the overflow from said tub and returning the liquid portion thereof through said conduit to said tub during the washing operation.

16. In a washing machine, a casing, a tub therein, an agitating device in said tub, a motor, driving connections, a brake for said tub and a lever adapted when in one position to connect said motor to said agitating device, and when in another position to connect said motor to said tub, and when in an intermediate position to apply said brake to said tub.

17. In a combined washing machine and centrifuge, the combination with a shaft of two gears rigid thereon, and having spiral teeth of dissimilar pitch, secondary gears meshing continuously with said first gears, and selective connections from said second gears to the centrifuge device and washing device respectively.

18. In a device of the character described, in combination, a casing, a rotatable tub journaled upon a vertical axis inside said casing, said tub having a liquid inlet in its bottom and having its lower part substantially imperforate otherwise and having its walls flared upwardly from the bottom, a pump having its inlet communicating with the bottom of said casing and having an outlet registering with said inlet and means for moving said tub so as to separate its inlet from said pump outlet and for rotating said tub at high speed.

19. In a combined washing machine and extractor, in combination, a casing, an upright bearing member extending above the bottom thereof, a sleeve journaled in said bearing member, a tub secured to said sleeve, a shaft inside said sleeve, a mechanical washing device operatively secured to said shaft, a driving shaft, two spiral gears on said driving shaft, other gears meshing therewith, and connections from said last gears to said first shaft and sleeve respectively.

20. In a combined washing and extracting machine, a liquid containing tub having its lower part substantially imperforate, a washing device in the bottom part of said tub, said device having parts which underlie the clothes, means for operating said washing device, and means operable without removing said washing device for revolving said tub at high speed to discharge the liquid therefrom.

21. In a laundry machine, a casing, a tub journaled therein on a vertical axis, a dasher mounted on a vertical axis in said tub, said dasher having at its bottom end a circular disk which overlies the tub bottom and is provided with upwardly projecting blades on its upper face, means for selectively oscillating said dasher or rotating said tub, and means for preventing the entrance of clothes beneath said disk. 80
22. In a laundry machine, a casing, a tub mounted on a vertical axis therein, an oscillatable dasher mounted on a vertical axis inside said tub, a driving element, and selectively actuable operative connections between said element and said tub or dasher, the connections to said tub including rotating mechanism and the connections to said dasher including oscillating mechanism. 85
23. In a clothes washing machine, a casing for holding liquid, a container for clothes inside said casing and having apertures in its wall, vertical shaft-means journaled in the bottom of said casing, an oscillatable dasher mounted in said container on a vertical axis, and mechanism including said shaft-means for imparting oscillatory motion to said dasher independently of any motion of said container and for imparting rotational motion to said container independently of any motion of said dasher, said dasher having a circular base underlying the container contents and a washing vane carried by the upper face of said disk, the top of said casing and container being substantially open and unimpeded. 90
24. In a clothes washing machine, a liquid holding casing, a circular upright tub therein, a dasher located in said tub and oscillatable about a vertical axis, said dasher comprising a circular base located adjacent to the bottom of said tub and having projections on its upper surface, means working through the bottom of said tub for oscillating said dasher relative thereto, means working through the bottom of said casing for rotating said tub, and a sleeve carried by the bottom of said casing surrounding said first means and extending at least as high as the bottom of said tub. 95
25. In a combined washing machine and extractor, in combination, a casing, an upright bearing member traversing the bottom thereof, a tub located in said casing, an oscillatable dasher located in said tub, a driving element located beneath said casing, rotatable means journaled in said bearing member, mechanism including said means for connecting said driving element to said tub in rotating relation, and mechanism also including said means for connecting said driving element to said dasher in oscillating relation selectively of said tub. 100
26. In a laundry machine, in combination, a casing, a tub therein having an upwardly flaring wall, a submerged washing vane inside said tub, a pump having its intake connected to the bottom of said casing and its outlet delivering into said tub, means for operating said pump and washing vane simultaneously, and means for stopping the flow of water into said tub and rotating said tub rapidly to discharge its liquid contents. 105
27. In a device of the character described, in combination, an upright casing, a circular tub rotatable upon a vertical axis inside said casing and spaced sufficiently above the casing bottom to accommodate the entire tub contents therebeneath, said tub having its lower part substantially imperforate and having its walls flared upwardly from the bottom and formed with discharge apertures defining a washing level, a conduit communicating with the bottom of said casing and adapted to deliver washing liquid into said tub during the washing operation, means for arresting the elevation of such liquid into said tub during the extracting operation, and means, including a motor, for elevating liquid through said conduit during the washing operation and for spinning said tub at high speed about its axis when the elevation of said liquid is arrested. 110
28. In a device of the character described, in combination, a casing, a rotatable tub journaled upon a vertical axis inside said casing, said tub having its walls flared upwardly from the bottom and vertically corrugated, and means for rotating said tub at high speed, said tub having its upper portion curved gradually inwardly and its walls perforated at the point of greatest diameter and substantially imperforate elsewhere. 115
29. A clothes washing machine having in combination a casing, a container therein, an agitator within said container, said agitator comprising a hollow circular base part which extends laterally close to the bottom of the container and underlies the clothing therein, the margin of said base part depending to a lower level than the portions nearer the center thereof and said agitator having a central elevated hollow portion, a circular member carried by and rigid with the bottom of said container and rising into the base part of said agitator above the margin thereof, a hollow vertical sleeve located in the center of said member, a shaft traversing the bottom of said container and located inside said sleeve, operative connections between said shaft and agitator, and mechanical driving means for said shaft located beneath said casing. 120
30. In a washing machine, a casing having therein a central upstanding tubular post, a tubular shaft extending up through said post, a receptacle operatively connected to said shaft in driven relation and coaxial with said shaft, said receptacle being of the imperforate type to hold a washing liquid and having openings in its upper part for centrifugal discharge of said liquid therefrom, an agitator shaft extending up through the tubular shaft, a motor mounted beneath said casing, connections from said motor for actuating the agitator shaft and for rotating the tubular shaft at centrifugally discharging speed, a pump having a shaft driven by said motor, said pump having a connection with the container and a discharge conduit for discharging into the receptacle, an agitator, and means for mounting said agitator on said agitator shaft and within said receptacle. 125
31. In a laundry machine, a casing, a receptacle mounted in said casing above the bottom thereof and adapted to hold laundry and laundry liquid, and rotatable about a vertical axis for the centrifugal extraction of such liquid, the walls of said receptacle being imperforate in their lower part and having apertures in their upper part adapted to define a liquid level during the washing operation and also to permit the discharge of liquid during the extracting operation, agitator devices, means for agitating said laundry and liquid by said agitator devices, and means including a pump for circulating said liquid from said casing into said receptacle during and as a part of the washing operation. 130
32. In a laundry machine, a receptacle having its lower part imperforate and adapted to hold laundry and laundry liquid, a liquid holding cas-

ing surrounding said receptacle, and means operative during and as a part of the washing operation for circulating said liquid from said casing into said receptacle, so that such liquid may

5 overflow from said receptacle into said casing, said means comprising a pump, a conduit, and structural devices for maintaining said conduit in a position to discharge into said receptacle.

33. In a laundry machine, a receptacle imperforate up to a level sufficient for holding laundry and washing liquid and open at said level, said receptacle also having a guard portion extending upwardly from said level to a point high enough so that articles of laundry cannot be carried out of said receptacle during washing, and means for

15 maintaining the height of the liquid up to said level and for agitating said laundry and said liquid during washing.

34. In a laundry machine, a receptacle symmetrical about a vertical axis and imperforate up to a level sufficient for holding laundry and washing liquid and open at said level, said receptacle having a wall portion extending upwardly from said level to a point sufficiently high so that articles of laundry cannot be accidentally discharged out of said receptacle, means operative during and as a part of the washing operation for maintaining the height of the liquid up to said level, and for agitating said laundry and

30 liquid, and means for rotating said receptacle rapidly about said axis for the centrifugal extraction of its liquid contents.

35. In a laundry machine, a casing, a receptacle imperforate up to a level sufficient for holding laundry and washing liquid and open at said level, and a circulation system connected to the lower part of the casing and including a stand-pipe secured to the side of the casing and a pump, the end of said stand-pipe being supported to

40 discharge into said receptacle whereby to maintain the surface of the liquid in said receptacle substantially equal with said named level, and producing an overflow from said receptacle into said casing during and as a part of the washing operation.

36. A washing machine comprising a receptacle adapted to hold laundry and washing liquid and having its side walls formed in their upper part with apertures adapted to define a liquid level during washing operation, washing devices for agitating the contents of said receptacle a conduit for washing liquid located and supported to discharge into said receptacle, a container for catching liquid overflowing from said receptacle, pump means for returning such liquid from said container through said conduit to said receptacle during and as a part of the washing operation but without returning the scum, and a source of power for operating said pump means and for selectively operating said washing devices and for rotating said receptacle to extract its liquid contents centrifugally.

37. A combined washing and extracting machine comprising a rotatable extractor having an imperforate lower portion and discharge openings defining a liquid level in said receptacle during the washing operation, the side walls of said receptacle being continued above said openings to guard against discharge of the laundry from said receptacle, and an agitator located in said receptacle and having an alternating back and forth movement relative thereto during the washing operation.

38. A combined washing and extracting machine, comprising a receptacle which is rotat-

able about a vertical axis, said receptacle having its lower portion imperforate and having discharge openings defining the level of liquid maintained in said receptacle during the washing operation, the side walls of said receptacle being continued above said openings, an agitator located in said receptacle and operable independently thereof, and means for selectively spinning said receptacle to extract its liquid contents, and for operating said agitator.

39. In a laundry machine, a casing, a pedestal therein, an imperforate type receptacle positioned on said pedestal and having its bottom spaced at all times a sufficient distance above the bottom of said casing to accommodate therebeneath the entire liquid contents of said receptacle, an agitator in said receptacle, means operative independently of any movement of said receptacle for moving said agitator relative thereto, and means operative only after the arrest of such movement of the agitator for rotating said receptacle at high speed to extract liquid from the laundry therein.

40. The method of washing clothes which comprises confining said clothes in a restricted pool of laundry liquid, mechanically agitating said clothes and pool, continuously supplying a solid stream of laundry liquid directed downwardly into the top of said pool, drawing off from the top of said pool the excess of laundry liquid in said pool and the loosened scum, trapping said scum in a second and quiet pool of laundry liquid, and continuously returning liquid from the bottom of said second pool to supply said first pool as aforesaid.

41. In a combined clothes washing and extracting machine, a rotatable extractor and an independently operable washing element therein, said extractor having an imperforate lower portion, and also having overflow openings defining a liquid level.

42. In a combined clothes washing and extracting machine, a rotatable extractor, a washing element therein, and operable independently thereof, and mechanism for selectively spinning said extractor and operating said washing element, said extractor having overflow openings at the level of liquid maintained during the washing operation, the lower portion of said extractor being imperforate.

43. In a combined washing machine and extractor, in combination, a casing, an upright bearing member extending above the bottom thereof, a sleeve journaled in said bearing member, a liquid holding tub, means for securing said tub to said sleeve, a shaft inside said sleeve, a mechanical washing device operatively secured to said shaft, a driving element, and means for connecting said element to operate said shaft back and forth and to rotate said sleeve.

44. In a combined washing machine and extractor, in combination, a casing, an upright bearing member extending above the bottom thereof, a sleeve journaled in said bearing member, a liquid holding tub secured to said sleeve, a shaft inside said sleeve, a mechanical washing device operatively secured to said shaft, a driving element, and selectively actuable operative connections between said element and said shaft or sleeve, the connections to said shaft including oscillating mechanism which produce back and forth movement thereof.

45. In a combined clothes washing and extracting machine, in combination, a liquid-containing casing, a tub for containing laundry arti-

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- cles and liquid located inside said casing on a vertical axis and having liquid discharge openings in its side wall at a height spaced both from the top and from the bottom of said side wall,
- 5 means for supporting said tub at a sufficient height above the bottom of the casing to allow the entire liquid contents of the tube to be accommodated therebeneath, a washing element in said tub, and power mechanism located beneath
- 10 said casing and working through the bottom thereof for selectively imparting to said washing element a back and forth movement independently of any movement of said tub for washing the laundry articles therein, and for spinning
- 15 said tub rapidly about its axis to eject its liquid contents.
46. In a clothes washing machine, the combination with a casing of a receptacle therein to receive the articles to be washed, means for supporting the receptacle above the liquid in the casing, the volumetric capacity of that part of the casing below the bottom of said receptacle being greater than the capacity of the receptacle,
- 20 means for rotating said receptacle at high speed to extract the washing liquid therefrom, mechanical washing devices inside said receptacle, a power device for selectively rotating said receptacle or actuating said washing devices, and means operable during the washing operation for delivering a constant stream of washing liquid
- 30 from the lower part of said casing to the interior of said receptacle whereby floating scum is removed from said receptacle and collected in said casing.
47. In a washing machine, an upright receptacle, a conduit for washing liquid entering the bottom thereof substantially at its center; a movable washing element over the outlet mouth of said conduit, pumping means adapted to return
- 35 through said conduit the water overflowing from said receptacle, and means for catching such overflowing water and delivering the same to said pump.
48. In a combined washing machine and extractor, a casing, a pedestal therein, a receptacle located on said pedestal, means for supporting the receptacle at a height sufficient to accommodate all the washing liquid therebeneath, said receptacle and pedestal having registering apertures, agitating devices inside said receptacle,
- 50 means for operating said devices, means for rotating said receptacle, a pump having its inlet in communication with said casing and its outlet leading to said pedestal apertures, driving devices, means for connecting said driving devices
- 55 selectively to said agitating devices and said rotating means, and provisions operative upon connecting said devices to said rotating means for lifting said tub off said pedestal and thereby arresting the flow of liquid into said receptacle.
- 60 49. In a washing machine, a casing, a pedestal therein having a seat, a receptacle having a seat adapted to engage the pedestal seat, said receptacle-seat having apertures therethrough, means for delivering liquid to said receptacle, washing devices in the receptacle, and means for displacing said receptacle from said first seat to open the apertures and drain the receptacle into said casing.
- 70 50. In a laundry machine, in combination a support, a vertical bearing member carried thereby, a shaft slidably and rotatably journaled therein, a wheel carried by said shaft, a gear and a rack carried by said support at different heights,
- 75 a driving member, operative connections from said driving member to said gear and rack, respectively, and means for raising and lowering said shaft to cause said wheel to engage with said gear and rack selectively.
51. In a laundry machine, a tank, an imperforate type receptacle mounted in said tank and adapted to hold laundry and laundry liquid, agitator devices, means for agitating said laundry and liquid by said agitator devices, and means for circulating said liquid from said tank into the
- 80 top of said receptacle including a conduit and structural devices for maintaining the discharge end of said conduit in operative relation to the top of said receptacle and directed toward the bottom thereof.
52. In a laundry machine, a receptacle imperforate up to a level sufficient for holding laundry and washing liquid and open at said level, a guard ring secured to said receptacle at said level and converging inwardly and upwardly to a point
- 85 high enough above so that articles of laundry cannot be carried out of said receptacle during washing, means for maintaining the height of the liquid up to said level and for agitating said laundry and liquid during washing, and means for rotating said receptacle for centrifugal extraction.
53. In a combined clothes washing machine and extractor, a sheet metal container having a peripheral seam intermediate the height of its
- 90 side wall, said side wall being tapered toward the axis with increase of distance from said seam in both directions and being perforate at its region of greatest diameter.
54. In a laundry machine, a casing, a vertical bearing in its bottom, a shaft rotatably and slidably mounted in said bearing, a container in said casing, a washing element in said container and operatively connected to said shaft, means for
- 95 raising and lowering said shaft, means for securing said container to said shaft to rise and rotate therewith and for automatically disengaging said container from said shaft at its lowest position, said container when elevated being located above the liquid contents of the casing.
55. In a washing machine, a casing, a washing element and an extractor superposed one above the other inside said casing, vertical shafts connected to said washing mechanism and to said extractor, respectively, a single drive shaft located
- 100 beneath said casing, rotating mechanism operatively connected to said drive shaft for rotating the extractor shaft, oscillating mechanism operatively connected to said drive shaft for oscillating the other vertical shaft, said last named mechanism comprising a rack movable in a plane perpendicular to said other vertical shaft, a pinion carried by said other vertical shaft and adapted to be engaged by said rack, and control devices for said mechanisms located outside the
- 105 said casing.
56. In a washing machine, a casing having an upright pedestal carried by its bottom, a washing element and an extractor located one above the other inside said casing, two vertical shafts located in said pedestal and connected, one to said washing element and the other to said extractor, a drive shaft located beneath said casing, power transmitting mechanism located beneath
- 110 said casing and operatively connected with said drive shaft and producing motion of rotation, means for connecting said mechanism to that shaft which is connected to said container, power transmitting mechanism located beneath said casing and operatively connected with said drive
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shaft and producing back-and-forth motion, means for connecting said last mechanism to that shaft which is connected to said washing element, and control means located outside said casing
5 for disconnecting either of said mechanisms.

57. In a clothes washing and extracting machine, a casing, a clothes extracting element located in the upper part of said casing and spaced from the casing bottom to define a liquid compartment of at least as great a capacity as said
10 extracting element, a pedestal making tight contact with the casing bottom and rising above the normal level of liquid in said compartment, two vertical shafts located in said pedestal, a clothes
15 washing element attached to one of said shafts in operative relation, said clothes extracting element being attached to the other of said shafts, a drive shaft below said casing, and power transmitting mechanism from said drive shaft to said
20 vertical shafts, the mechanism which transmits power to that shaft which is connected to said extracting element containing rotation-producing devices, and the mechanism which transmits power to that shaft which is connected to said
25 washing element containing devices which produce a back-and-forth movement, and said clothes washing element being movable relative to said clothes extracting element.

58. In a washing machine for washing and extracting fabrics, a casing, a clothes container and a separate clothes washing element both located inside said casing, said container having a vertical axis and having a side wall which defines a surface of revolution about said axis, a
30 drive shaft located beneath said casing, mechanism for producing back and forth movement located beneath said casing, mechanism for producing movement of continuous rotation also located beneath said casing, power transmitting
35 means traversing the bottom of said casing for transmitting such back-and-forth movement to said washing element and for transmitting such movement of continuous rotation to said container, and controlling means located outside of
40 said casing and operative during the operation of said drive shaft for connecting said drive shaft through said first mechanism to said washing element and for connecting said drive shaft through said second named mechanism to said
45 container.

59. In a clothes washing and extracting machine, a casing, a clothes washing element and a clothes extracting element inside said casing, each of said elements separate from and movable
55 independently of the other, a driving element beneath said casing, mechanism for producing back-and-forth motion operatively connected to said driving element, said mechanism including a rack which is mounted for movement in a horizontal plane, mechanism for producing motion
60 of rotation also operatively connected to said driving element and including a member rotating about a vertical axis, two vertical shafts traversing the bottom of said casing and connected
65 to said clothes washing element and to said extracting element respectively, means for connecting said rotation producing mechanism to and disconnecting it from that shaft which is connected to said extracting element and means
70 for connecting said rack in operative relation to and disconnecting it from that shaft which is connected to said washing element.

60. In a clothes washing and extracting machine, a casing, a vertical bearing sleeve projecting through the bottom thereof, a gear housing

located at the foot of said sleeve, a vertical shaft extending up through said sleeve, a tubular shaft surrounding said first shaft and also projecting up through said sleeve, a horizontal drive shaft journaled in said gear housing,
80 spiral gears on said drive shaft, a secondary gear operatively connected to said tubular shaft and engaged with one of said spiral gears, a secondary gear journaled in said gear housing in engagement with the other spiral gear, driving
85 connections from the second secondary gear to the first mentioned vertical shaft, a clothes washing-element operatively connected to one of said shafts, and a clothes extracting element operatively connected to the other of said shafts.

61. In a clothes washing and extracting machine, a casing, a vertical bearing sleeve projecting through the bottom thereof, a gear housing located at the foot of said sleeve, a vertical shaft extending up through said sleeve, a tubular shaft surrounding said first shaft and also projecting up through said sleeve, a horizontal
90 drive shaft journaled in said gear housing, spiral gears on said drive shaft, a secondary gear operatively connected to said tubular shaft and engaged with one of said spiral gears, a secondary gear journaled in said gear housing in engagement with the other spiral gear, driving
95 connections from the second secondary gear to the first mentioned vertical shaft including a swing-gear segment pivoted in said housing, a link pivotally engaged between said segment and the second secondary gear, a pinion on said first
100 shaft meshed by said segment, a clothes washing element operatively connected to one of said shafts, and a clothes extracting element operatively connected to the other of said shafts.

62. In a clothes washing and extracting machine, a gear housing, a first shaft rotatably mounted in said gear housing, a pinion operatively connected to said shaft, a tubular shaft
115 surrounding said first shaft, a second gear operatively connected to said tubular shaft, a spiral gear in said housing, a drive shaft having two spiral gears thereon one meshing with each of said last mentioned gears, a segment
120 gear meshing with said pinion, a connecting rod connecting said first spiral gear and segment gears, a clothes washing element operatively connected to one of said shafts, and a clothes extracting element operatively connected to the other of said shafts.

63. In a clothes washing and extracting machine, a casing, a hollow vertical sleeve projecting through the bottom thereof, a gear housing at the foot of said sleeve, a tubular shaft in said sleeve, an inner shaft within said tubular shaft, a high speed worm wheel operatively connected to said tubular shaft, a pinion on
125 said inner shaft, a worm shaft having a high speed worm and a low speed worm in said housing, an idle worm wheel journaled in said housing in mesh with said slow speed worm, a sector journaled in said housing and meshing said pinion, a connecting rod connecting said sector and idle wheel, said sector being journaled on one side of said worm shaft, said idle wheel and said concentric shafts being journaled on the other side of said worm shaft, a clothes washing element operatively connected to one of said shafts, and a clothes extracting element operatively connected to the other of said shafts.

64. In a clothes washing and extracting machine, in combination, a casing, a hollow verti-

cal sleeve located in the bottom of said casing, a gear housing at the foot of said sleeve, a drive shaft passing through a wall of said housing and journaled in said housing, said drive shaft extending substantially perpendicular to said sleeve, means outside said housing for rotating said shaft, concentric shafts in said sleeve and comprising a tubular shaft and an inner shaft, said tubular shaft being disposed inside said sleeve, said inner shaft being disposed within said tubular shaft, one of said concentric shafts having a gear wheel and the other having a pinion operatively secured thereto said gear wheel and pinion being disposed within said housing, first and second drive gears on said drive shaft, the first drive gear meshing said gear wheel, an idle wheel meshing said second drive gear and journaled in said housing about an axis substantially parallel to said concentric shafts, means including a gear meshing with said pinion for imparting an oscillatory motion to said pinion from said idle wheel, a clothes washing element operatively connected to one of said shafts, and a clothes extracting element operatively connected to the other of said shafts.

65. In a clothes washing and extracting machine, in combination, a casing, a hollow vertical sleeve located in the bottom of said casing, a gear housing at the foot of said sleeve, a worm shaft passing through a wall of said housing and journaled in said housing, said worm shaft extending substantially perpendicular to said sleeve, means outside said box for rotating said shaft, concentric shafts in said sleeve comprising a tubular shaft and an inner shaft, said tubular shaft being disposed within said sleeve, said inner shaft being disposed within said tubular shaft, one of said concentric shafts having a worm wheel operatively connected thereto and the other having a pinion, said worm wheel and pinion being disposed within said housing, first and second worms on said worm shaft, the first worm meshing said worm wheel, an idle worm wheel meshing said second worm and journaled in said housing about an axis substantially parallel to said concentric shafts, means including a gear meshing with said pinion for imparting an oscillatory motion to said pinion from said idle wheel, a clothes washing element operatively connected to one of said shafts, and a clothes extracting element operatively connected to the other of said shafts.

66. In a machine for washing and extracting fabrics, a casing, a vertical hollow bearing in the bottom thereof, a hollow vertical shaft in said bearing, a clothes container detachably secured to said shaft inside said container, an agitator shaft extending up through said shaft, an agitator detachably secured to said agitator shaft and operating in said container, a drive shaft located beneath said casing, oscillating gearing for operatively connecting said drive shaft to said first shaft, and rotating gearing for operatively connecting said drive shaft to said agitator shaft.

67. In a machine for washing and extracting fabrics, a casing, a vertical hollow bearing in the bottom thereof, two concentric shafts inside said bearing, a clothes container and a clothes agitator located inside said casing and operatively connected, one to the outer shaft and the other to the inner shaft, a drive shaft located beneath said casing, oscillating gearing for connecting said drive shaft to that one of the vertical shafts which operates said agitator, and rotating gearing for connecting said drive shaft to the other vertical shaft.

68. In a machine for washing and extracting fabrics, a casing, two vertical shafts traversing the bottom thereof, a clothes container and a clothes agitator located inside said casing and operatively connected, one to each shaft, a horizontal drive shaft located beneath said casing, two spiral gears of dissimilar pitch carried by said drive shaft, two secondary gears meshing one with each of said spiral gears, and operative connections from said secondary gears to said shafts, respectively, the connection to the agitator shaft including oscillating mechanism and the connection to the container shaft including rotating mechanism.

69. In a machine for washing and extracting fabrics, a casing, a clothes container mounted inside said casing upon a vertical axis, a washing element located inside said container, a drive shaft located beneath said casing, two spiral gears of dissimilar pitch carried by said drive shaft, two secondary gears meshing one with each of said spiral gears, mechanism for producing back and forth movement operatively connected to one of said secondary gears, mechanism for producing movement of continuous rotation operatively connected to the other of said secondary gears, and power transmitting means traversing the bottom of said casing for connecting said washing element in operative relation to said first named mechanism and for connecting said container in operative relation to said second named mechanism.

70. In a machine for washing and extracting fabrics, a casing, a clothes container and a clothes washing element both located inside said casing, said container having a vertical axis and having a side wall which defines a surface of revolution about said axis, a drive shaft located beneath said casing, two spiral gears of dissimilar pitch carried by said drive shaft, two secondary gears meshing one with each of said spiral gears, mechanism for producing back and forth movement operatively connected to one of said secondary gears, mechanism for producing movement of continuous rotation operatively connected to the other of said secondary gears, power transmitting means traversing the bottom of said casing for connecting said washing element to said first named mechanism and for connecting said container to said second named mechanism, and controlling means located outside of said casing for governing the connections of said mechanism.

71. In a washing machine, the combination of a casing, a container therein, an agitator associated with the container, a shaft operatively connected with and for rotating the agitator for washing fabrics in the container, means for elevating the shaft, means for operatively connecting the container with the shaft for causing an elevation of the container therewith, and rotating means for the shaft causing a rotation of the container in its elevated position only, for removing the adherent liquid from the fabrics.

72. In a washing machine, the combination of a casing, a perforated container therein, an agitator extending into the container for washing fabrics therein, a shaft operatively connected with and for rotating the agitator, said container being disconnected from the shaft in its lowered position, means for elevating the shaft, means for operatively connecting the container with the shaft for causing an elevation of the container therewith, said means connecting the container with the shaft in its elevated position only, and means for rotating the shaft for rotating the con-

tainer and removing the adherent liquid from the fabrics.

73. In a washing machine, the combination of a casing, a perforated container therein, a shaft extending into said container, an agitator fixed on said shaft, and extending into the container for washing fabrics therein, means for elevating said shaft and container, means for rotating said shaft, said shaft being rotatable independently of the container in the lowered position thereof, and means for connecting said container with said shaft for causing a rotation thereof in its elevated position.

74. In a washing machine, the combination of a casing, a perforated container therein, an agitator extending into said container, a shaft for elevating said agitator and container, and for rotating said agitator in the lowered and elevated positions thereof, and means for connecting said shaft with said container, only in the elevated position thereof, said shaft causing a rotation of the agitator, only, in the lowered position and of the agitator and container in the elevated positions.

75. In a washing machine, the combination of a casing, a perforated container therein, a shaft extending into said container, an agitator secured on said shaft and extending into said container, means for elevating said agitator and container, means for connecting said shaft with said container, only in the elevated position thereof, and means for rotating said shaft causing a rotation of the agitator in the lowered position and of the agitator and container in the elevated positions.

76. In a washing machine, the combination of a casing, a container therein, a shaft extending into said container, an agitator fixed on said shaft and extending into said container, means for elevating said shaft, agitator and container, means for oscillating said shaft and agitator in their lowered positions for washing fabrics in said container, means for causing the rotation of said shaft and agitator in their elevated positions, said shaft being rotatable independently of the container in the lowered position thereof, and means for causing a connection between said container and shaft in their elevated positions for actuating the container to remove the adherent liquid from the fabrics.

77. In a washing machine, the combination of a casing, a container therein, a shaft extending into said container, an agitator mounted upon said shaft, means for elevating said shaft and container, a driving shaft, means connecting said driving shaft with said first-mentioned shaft for causing an oscillation thereof to wash fabrics in the container in its lowered position, and means connecting said driving shaft with said first-mentioned shaft in its elevated position for causing a rotation of said shaft and container to remove the adherent liquid from the fabrics.

78. In a laundry machine, a casing, an upright sleeve therein, a vertical shaft slidably and rotatably mounted in said sleeve, a container concentric with said sleeve, a washing element in said container, means for raising and lowering said shaft, mechanism for oscillating said shaft when lowered and for rotating it continuously when raised, interfitting driving means carried by said shaft and washing element, and other interfitting driving means carried by said shaft and container, said last means being automatically disengaged when said shaft is lowered and automatically engaged when said shaft is raised.

79. In a combined washing machine and extractor, in combination, a casing, an upright bearing member in said casing, a container located in said casing, a driving element located beneath said casing, an oscillatable dasher located in said container, a rotatable element journaled in said bearing member and connected to said dasher, mechanism for connecting said elements selectively in oscillating relation and in rotating relation, means for securing said rotatable element to said container during the time that said elements are connected in rotating relation and means for disconnecting said rotatable element from said container when said elements are connected together in oscillating relation.

80. In a combined washing machine and extractor, in combination, a casing, an upright bearing member in said casing, a shaft journaled in said bearing member, a container located in said casing, a mechanical washing device located in said container, means for connecting said shaft to said container and for disconnecting the same therefrom, means for connecting said shaft to said washing device, a driving element located beneath said casing, and selectively actuable operative connections between said element and said shaft for rotating and oscillating the shaft.

81. In a combined washing machine and extractor, in combination, a casing, an upright bearing member therein, a container located in said casing, an oscillatable dasher located in said container, a driving element located beneath said casing, a shaft secured to said dasher and slidably and rotatably journaled in said bearing member, an oscillating member and a rotating member connected to said driving element, a wheel carried by said shaft adapted to engage said oscillating member and said rotating member selectively according to the elevation of said shaft, and means operative upon the elevation of said shaft for connecting said shaft to said container, and also operative upon the lowering of said shaft to disconnect said shaft from said container.

82. In a combined washing machine and centrifuge, in combination, a casing, an upright bearing member carried by the bottom thereof, a container in said casing, a dasher in said container, a shaft in said bearing member, means for securing said shaft to said dasher, and for securing said shaft to and releasing it from said container, a driving shaft, and two trains of mechanism between said shafts for oscillating and rotating said first shaft, one train including oscillating devices and the other train including rotating devices.

83. In a combination washing machine and extractor, a container, a support therefor, a vertical shaft concentric with said container, means for either rotating or oscillating said shaft, means for raising and lowering said shaft, and means operative at one elevation of said shaft for connecting said shaft to said container for rotation, means operative at another elevation of said shaft for disconnecting it from said container for oscillating, and a washing element adapted to be secured to said shaft and to be operated by its oscillating movement.

84. In a combined washing and extracting machine, a casing, a container inside said casing, a washing element inside said container, a vertical driving shaft concentric with said container, a control device, means operative by said control device for connecting said shaft to said container and disconnecting it therefrom, and means

for connecting said shaft to said washing element.

85. In a combined washing and extracting machine, a casing, a container inside said casing, a washing element inside said container, a driving shaft, a pair of toothed members operatively connected to said shaft, the connections including means whereby the one member is rotated and the other reciprocated, an upright shaft, a toothed wheel carried by said upright shaft, means whereby said toothed wheel can be engaged selectively with either of said toothed members, and means for securing said washing element to said upright shaft, and means for also connecting said upright shaft to said container at the same time that said toothed wheel is engaged with said rotating member.

86. In a combined washing and extracting machine, a casing, an upright shaft traversing the bottom thereof, a container inside said casing, a washing element inside said container, means for connecting said shaft to said washing element in operating relation, a lever, connections between said lever and shaft for raising and lowering said shaft, interfitting connections between said shaft and container for connecting the same in driving relation at one extreme of the vertical movement of said shaft, a pinion on said shaft, a driving shaft, mechanism connecting said driving shaft to said pinion and affording a rotating motion thereto when said shaft is at that limit of its vertical movement corresponding to its driving connection to said container, and mechanism connecting said driving shaft to said pinion adapted to afford an oscillatory movement to said pinion when said shaft is at the other limit of its vertical movement.

87. In a laundry machine, a casing, a vertical bearing in its bottom, a shaft rotatably and slidably mounted in said bearing, a container in said casing, means for raising and lowering said shaft, means for securing said container to said shaft to rise and rotate therewith and for disengaging said container from said shaft at its lowest position, said container when elevated being located above the liquid contents of the casing, a washing element, means for attaching said washing element to said shaft, a pinion carried by said shaft, and mechanism beneath said casing for driving said pinion, said mechanism including a rotating member engaged by said pinion when in its uppermost position and a reciprocating member engaged by said pinion at its lowermost position.

88. In a combined washing machine and extractor, in combination a vertical shaft, an upright stationary sleeve surrounding said shaft, a dasher carried by the upper end of said shaft, a container surrounding said dasher and having a hub surrounding said shaft, means for selectively rotating or oscillating said shaft about its axis, and means adapted to connect said shaft to said container while rotating and leave the same free for oscillation.

89. In a combined washing machine and extractor, in combination a vertical shaft, an upright stationary sleeve surrounding said shaft, a dasher carried by the upper end of said shaft, a container surrounding said dasher and having a hub surrounding said shaft and engaging said sleeve in supported relation, and means for selectively rotating or oscillating said shaft about its axis, said shaft and hub being formed with engaging means adapted to cause the container to rotate with the shaft.

90. In a combined washing machine and extractor, in combination a vertical shaft, an upright stationary sleeve surrounding said shaft, a dasher carried by the upper end of said shaft, a container surrounding said dasher and having a hub surrounding said shaft and engaging said sleeve in supported relation, and means for selectively rotating or oscillating said shaft about its axis, said shaft being formed with a projection and said hub with a recess provided with coupling means to receive said projection and cause said container to rotate with said shaft, said container resting motionless on said sleeve during the oscillation of said shaft.

91. In a combined washing machine and centrifuge, in combination, a casing for liquid, an upright sleeve projecting above the bottom thereof, a vertical shaft movable in said sleeve, a container for clothes and liquid coaxial with said sleeve and having a central vertical bearing through which said shaft passes, a washing element carried by the upper end of said shaft inside said container, means for selectively rotating said shaft or oscillating it about its axis, and means including interfitting projections on said shaft and bearing for causing said container to rotate with said shaft.

92. In a combined washing machine and centrifuge, in combination, a casing for liquid, an upright sleeve projecting above the bottom thereof, a container for clothes and liquid coaxial with said sleeve and adapted to rest thereon, said container having a central vertical bearing sleeve and outer walls concentric therewith and imperforate below a certain level, a vertical shaft projecting through both said sleeve and said bearing, a washing element inside said container, means for securing said element to said shaft, a driving shaft beneath said casing, gearing operatively connecting said driving shaft to said upright shaft so as selectively to rotate the same or impart to the latter a back and forth movement, and means for connecting said upright shaft to said container in driving relation during its rotation and for freeing said shaft from said container during the back and forth movement.

93. In a washing machine, the combination of a casing, a container therein, agitating-means associated with the container, upright shaft-means operatively connected with said agitating-means and connectible with said container, and provisions for moving said shaft-means and container vertically, one relative to the other for connecting said shaft-means to and disconnecting it from said container, and mechanism for transmitting through said shaft-means an oscillating motion to said agitating-means or a rotating motion to said container, selectively.

94. In a combination clothes washing machine and extractor, in combination, an upright sleeve, an open-topped upright container concentric with said sleeve and having a hub part connected to its bottom, washing means within said container, mechanism for producing rotating and oscillating movements, vertical shaft-means within said sleeve for imparting such movements to said container and washing means, said shaft-means and container having a vertically sliding movement one relative to the other, and means operable by such sliding movement for connecting said container hub to and disconnecting it from said rotating means.

95. In a combined clothes washing machine and centrifuge, in combination, a casing for liquid, an upright sleeve carried by the bottom of

said casing, vertical shaft means located in said sleeve, a container coaxial with said sleeve and having a central vertical bearing through which said shaft-means extend, a washing element within said container, means beneath said casing for producing oscillating and rotating movements, and for imparting such movements to said shaft-means, and interfitting provisions for connecting said washing-element and said container to said shaft means, certain of said provisions being vertically movable to connect said container to and disconnect it from said shaft means.

96. A clothes-washing and extracting machine comprising in combination, a casing having a bearing in its bottom, a container in said casing, a washing blade inside said container, a drive-shaft beneath said casing, transmission-mechanism comprising an oscillating-element and a rotating-element operatively connected to said drive-shaft, said mechanism comprising two spiral gears carried by said drive-shaft, vertical shaft-means located in said bearing and operatively connected to said container and blade, and manually-operated control means for said mechanism located outside of said casing and engaging said transmission-mechanism.

97. In a combined clothes-washing and extracting machine, a clothes container mounted on a vertical axis and having its side-wall defining a surface of revolution about said axis and formed for the centrifugal discharge of liquid, a liquid-agitating blade inside said container, shaft-means coaxial with said container and operatively secured thereto, rotation-producing means and oscillation-producing means located adjacent to said shaft-means and comprising spiral gears of dissimilar pitch, a common drive-shaft for said spiral gears, a motor operatively connected to said drive shaft, and means for transmitting such rotation and such oscillation to said shaft-means selectively.

98. In a combined clothes-washing and extracting machine, a casing, a container in said casing, a liquid-agitating blade in said container, a drive-shaft perpendicular to the axis of said container and having thereon two spiral gears of dissimilar pitch, an oscillatable element operatively connected to one of said gears in driven relation, a rotating element operatively connected to the other of said gears in driven relation, vertical shaft-means coaxial with said container and operatively attached thereto, means operative from the exterior of said casing for connecting said shaft-means in driven relation to said rotating-element and to said oscillating-element selectively, and means connecting said shaft-means to said container and blade whereby said blade is oscillated during the connection of said oscillating-means to said shaft-means and whereby said container is rotated during the connection of said rotating-means to said shaft-means.

99. A combined clothes-washing and extracting machine, comprising, in combination, a container having a side-wall formed as a surface of revolution about a vertical axis and adapted for the centrifugal discharge of liquid upon rotation, a liquid-agitating blade located therein, shaft-means coaxial with said container, a driving-shaft perpendicular to said shaft-means and having fixed thereon two spiral gears of dissimilar pitch, two gear-trains for connecting said spiral-gears to said shaft-means, one train including rotating-devices only and the other train including oscillating-devices, a casing surrounding said container, and means located outside of said cas-

ing for controlling the connection of said shaft-means to said gear-trains selectively.

100. In a clothes washing and extracting machine, in combination, a casing, an upright bearing therein, shaft-means rotatable in said bearing, a driving element beneath said casing, an oscillating member and a constantly rotating member operatively connected to said driving element and located adjacent to said shaft at different heights, power-transmitting means adapted to connect said shaft-means to said members selectively, means for raising and lowering said power-transmitting means to thereby connect it to said members selectively, a container for clothing located inside said casing, a liquid-agitating blade located inside said container, and means whereby said blade is oscillated about a vertical axis when said driving means engages said oscillating member and said container is rotated about said axis when said driving means engages said rotating member.

101. A combined clothes washing and extracting machine comprising, in combination, a casing, a clothes-container located inside said casing and having a vertical axis, a liquid-agitating blade inside said container, a drive-shaft beneath said casing, vertical shaft-means traversing the bottom of said casing, operative connections between said shaft-means and said container, an oscillating-member and a rotating-member supported adjacent to said shaft-means at different levels below said casing, mechanism for driving said oscillating-member comprising a spiral gear fixedly carried by said drive-shaft, means for driving said rotating-member comprising a second spiral gear carried by said drive-shaft, power-transmitting means for connecting said shaft-means selectively to said oscillating and rotating members, and means for moving and positioning said power-transmitting means.

102. A combined clothes-washing and extracting machine comprising, in combination, a casing having a bearing in its bottom, a vertical shaft in said bearing, a container and a washing-element located inside said casing coaxial with each other and with said shaft, a drive-shaft beneath said casing having thereon two spiral gears of dissimilar pitch, rotating-means and oscillating-means located beneath said casing adjacent to said shaft, each of said means including one of said spiral gears, and power-transmitting means operatively connected to said shaft and adapted for engagement by said rotating and said oscillating means selectively, one of said means being movable relative to another of said means to effect such selective engagement.

103. In a combined clothes washer and centrifuge, in combination a casing for holding washing liquid, a clothes container and a liquid-agitating device located therein upon the same vertical axis, said container having a substantially unobstructed top and said liquid-agitating device comprising a radially projecting blade of substantially uniform thickness and of substantial vertical extent, means for raising and lowering said container along its axis, means for oscillating said agitating device about its axis for agitating and circulating the washing fluid and the clothes suspended therein, and means for rotating said container to extract its liquid contents.

104. In a combined washing machine and extractor, in combination, a casing, an upright bearing member extending above the bottom thereof, a sleeve journaled in said bearing mem-

ber, a container secured to said sleeve, a shaft inside said sleeve, a mechanical washing device operatively secured to said shaft, a driving shaft, two spiral gears on said driving shaft, other gears meshing therewith, and connections from said last gears to said shaft and sleeve respectively.

105. In a washing machine and centrifuge, the combination with a liquid-containing casing and a centrifuge-container and an oscillatable dasher inside said casing of two coaxial spiral gears of dissimilar pitch, means for driving said gears, secondary gears meshing continuously with said first gears, and selective connections from said secondary gears to the washing and centrifuging

devices, one of the connections including a reciprocating element.

106. In a washing machine, an oscillatable agitator, a rotatable drier, separate drive shafts for said agitator and drier, one of said shafts being provided with a gear and the other with a second gear, a rack for actuating said first gear, means for separating said rack and first gear at will, eccentrically operated means for actuating said rack, said means being provided with a third gear, a drive shaft provided with separate gears cooperating with said second and third gears, and means for driving said last named drive shaft.

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