Oct. 12, 1937. J. B. KIRBY 2,095,505

LAUNDRY MACHINE

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Fig. 1a

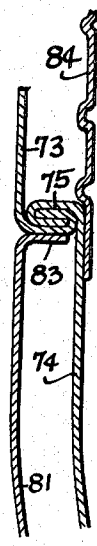


Fig. 1.

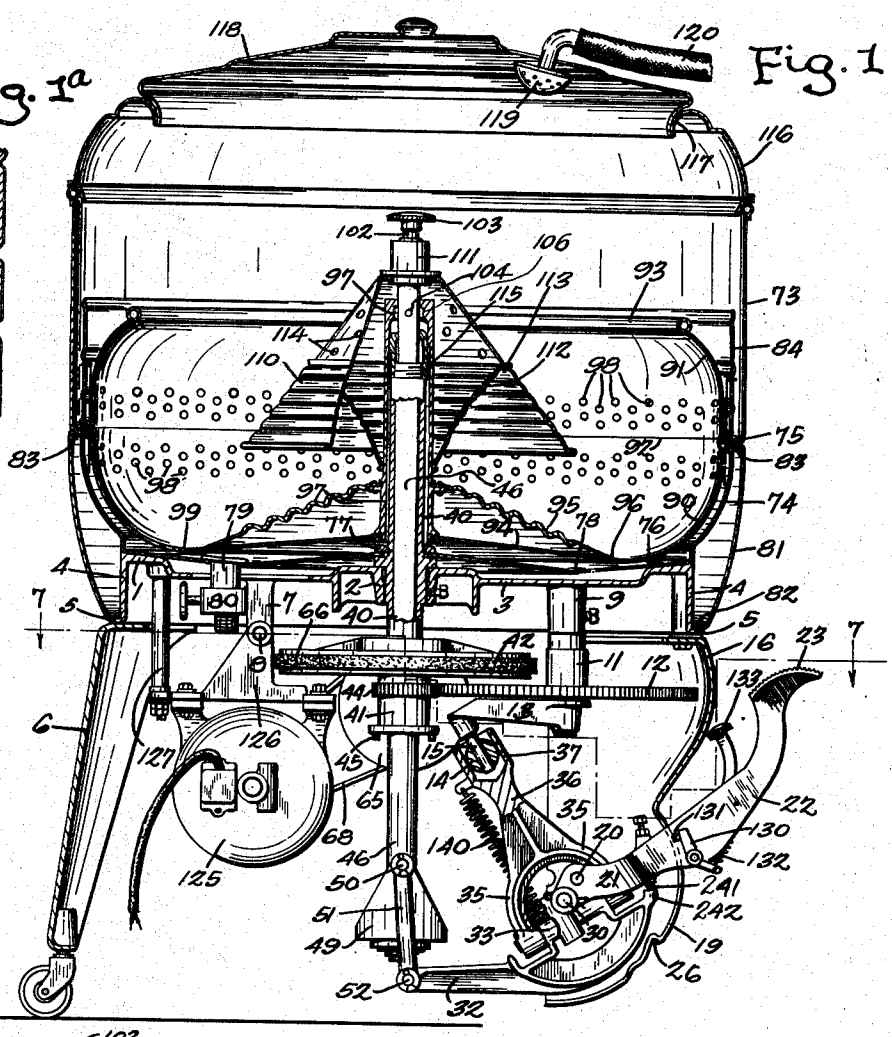


Fig. 4

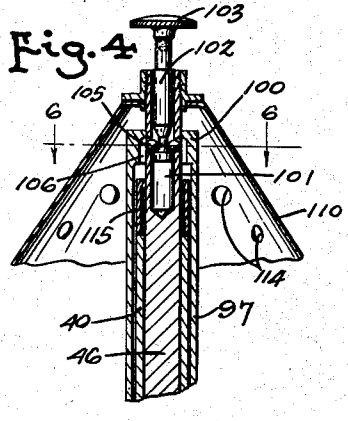


Fig. 5

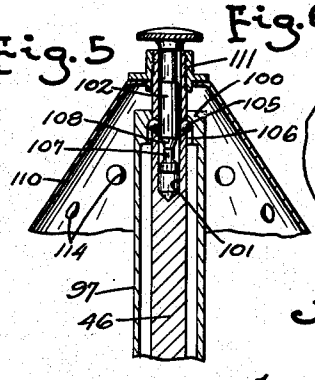
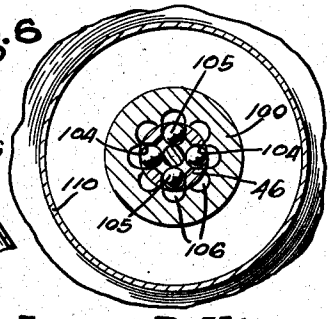


Fig. 6



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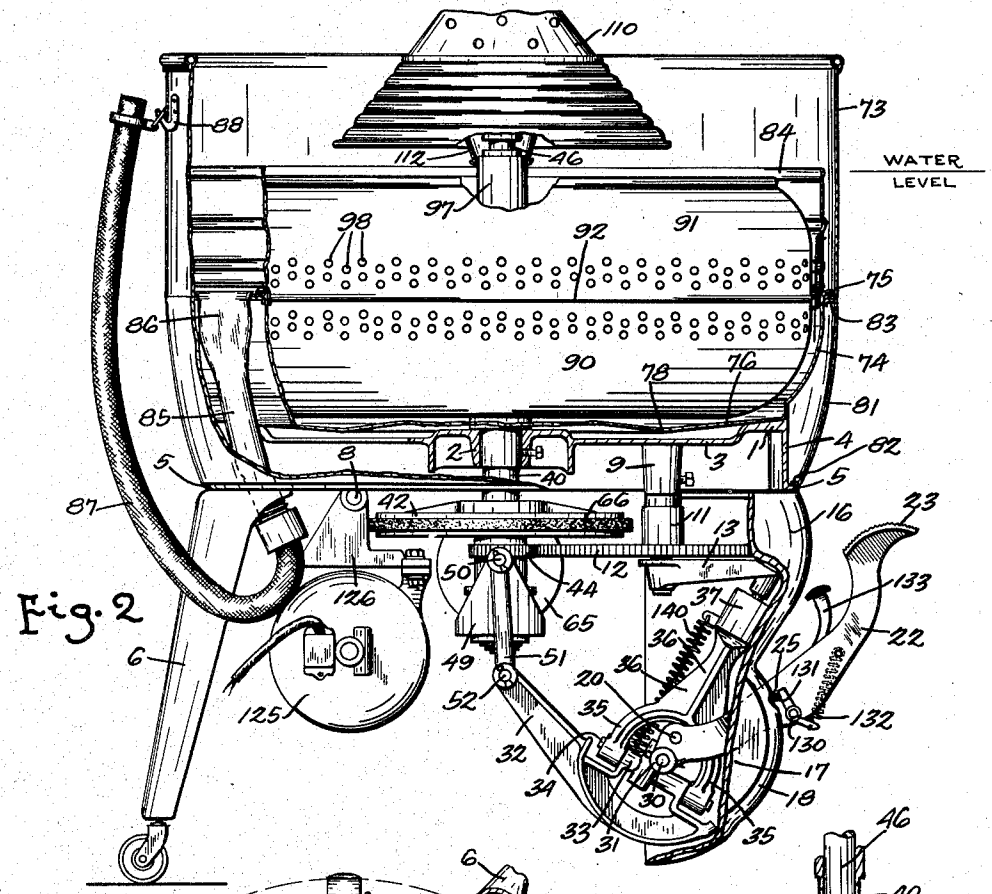


Fig. 2

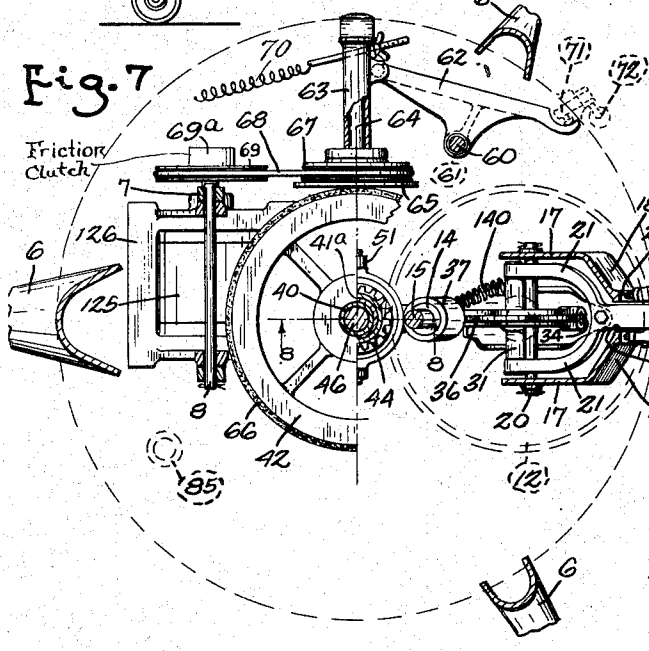


Fig. 7

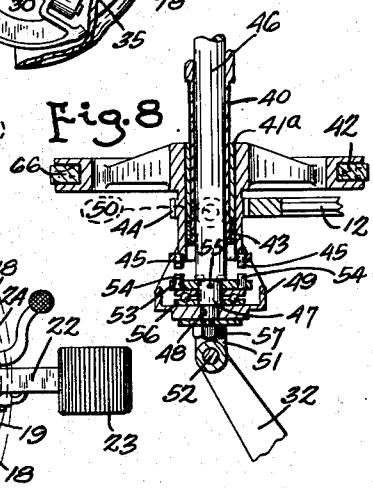


Fig. 8

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LAUNDRY MACHINE

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Fig. 3

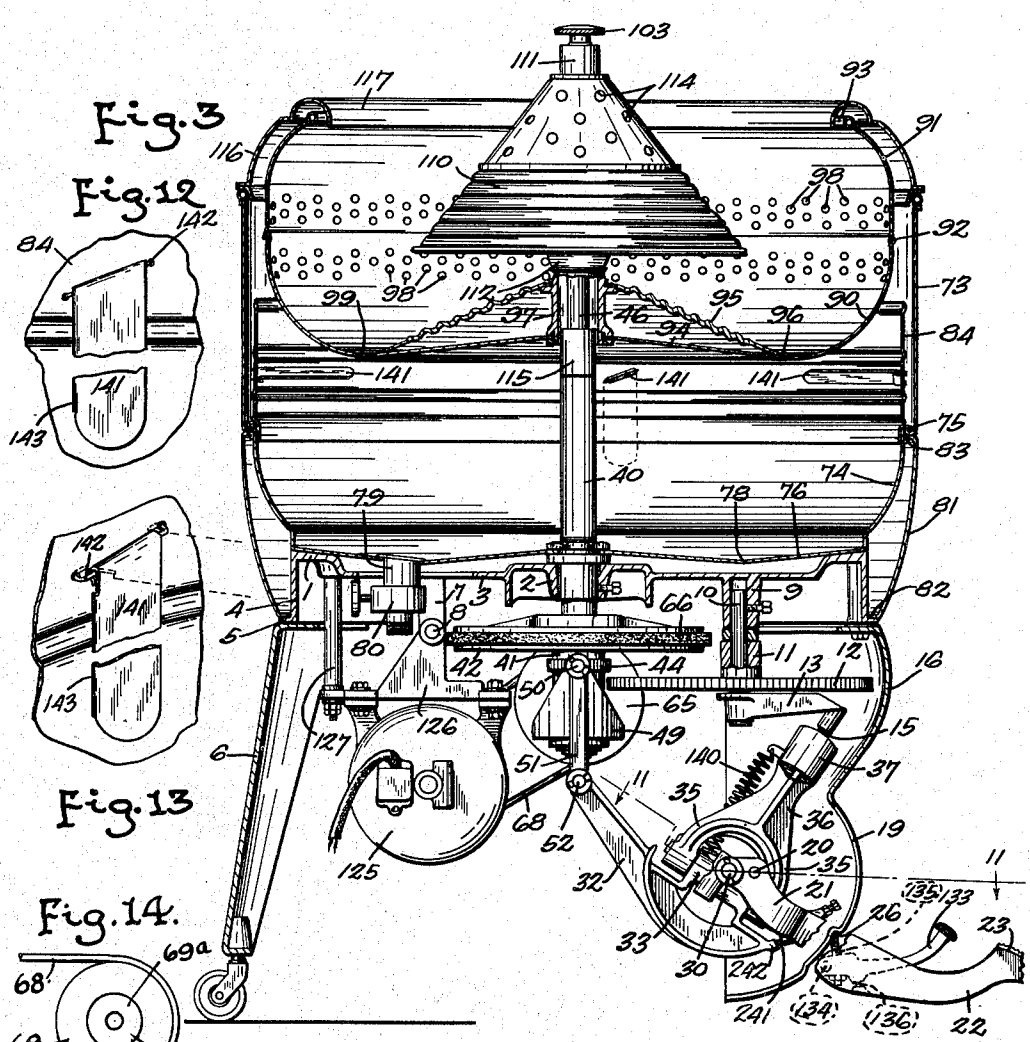


Fig. 12

Fig. 13

Fig. 14.

Fig. 9

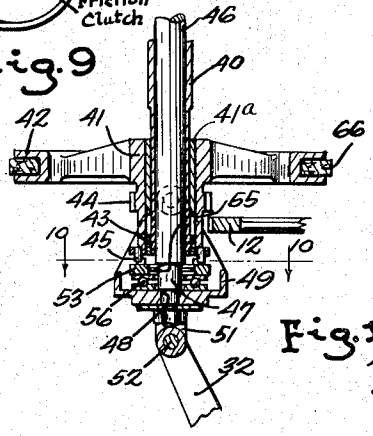


Fig. 11

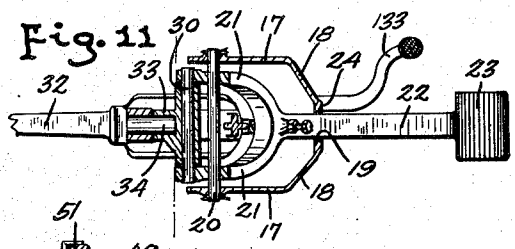
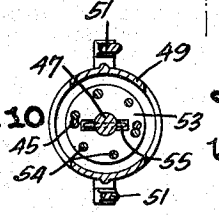


Fig. 10



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Patented Oct. 12, 1937

2,095,505

UNITED STATES PATENT OFFICE

2,095,505

LAUNDRY MACHINE

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

Application February 25, 1929, Serial No. 342,520

32 Claims. (Cl. 68—19)

This invention relates to laundry machines and especially to a domestic type of machine wherein miscellaneous clothing may be washed and centrifuged in a single compartment. The objects of the invention are the provision of an improved machine of this class wherein the entire laundering operation is performed without the necessity of handling the articles being laundered between the working and drying operations, the adding or removing of any parts at any time, or even of putting the hands into the liquid; the provision of a combined washing and extracting machine wherein the rotating parts are devoid of projections capable of injuring the operator despite inattention or lack of experience; the provision of a machine of this type having provisions for the ready removal of scum prior to extraction; the provision of a single compartment machine of this type wherein rinsing can be performed without mixing the rinsing liquid with the washing liquid; the provision of a washing machine of the pounder type combined with an extracting machine of the centrifuge type operated entirely through the centrifuge axis and wherein the transformation of the operation may be effected without stopping or disconnecting the power means; the provision of a combined washing and extracting machine of the single-compartment type, wherein the transformation of the operation is controlled by a pedal assisted by the driving motor; the provision of new and improved and simplified mechanism for the operation of a washing machine; the provision of a combined washing and extracting machine having means for preventing loss of heat from the washing liquid; while further objects and advantages of the invention will become apparent as the description proceeds.

In the drawings accompanying and forming a part of this application I have shown a specimen embodiment of my inventive idea although it will be understood that the same is intended to be merely illustrative of the principles of my invention and not exhaustive as to its practical details. Figure 1 is a vertical sectional-view through a complete washing and extracting machine showing the parts in washing-position with the pounder depressed; Figure 1*a* is an enlarged detail view illustrating certain features of the tub construction; Figure 2 is a similar view to Figure 1 showing certain of the parts more in elevation and with the pounder elevated; Figure 3 is a vertical sectional-view showing the machine with all the parts in extracting-position; Figure 4 is an enlarged detail sectional-view of the top of the pounder and operating shaft showing the parts in the position which they occupy in the washing-position; Figure 5 is a view similar to Figure 4 showing the parts in the position which they occupy during the extracting operation; Figure 6 is a horizontal sectional-view corresponding to the line 6—6 of Figure 4; Figure 7 is a sectional view corresponding to the broken line 7—7 of Figure 1; Figure 8 is a detail sectional-view of the lower part of the driving mechanism corresponding to the line 8—8 in Figure 7 and showing the parts in the position they occupy at the top of the washing-stroke; Figure 9 is a view similar to Figure 8 showing the parts in the position they occupy during the extracting-operation; and Figure 10 is a sectional view corresponding to the line 10—10 of Figure 9 and Figure 11 is a sectional-view corresponding to the broken line 11—11 of Figure 3; Figs. 12 and 13 are detail views of the splash-vanes; and Fig. 14 is a side elevation of a driving-pulley.

To facilitate the understanding of the specimen-construction herein set forth for illustrative purposes, but without intent to suggest that the invention is limited to these details, the following more particular description is presented: The liquid-casing and the operating-mechanism are both carried by a one-piece circular cast-iron frame having a rim 1, a central axially-threaded hub 2, and an integral web 3, connecting the same and preferably apertured for lightness as well as for access to the casing bottom as shown in Figures 1 and 3. The rim 1 is provided about its periphery with depending spaced projections 4 terminating in a horizontal circular flange 5 to the bottom of which are fastened the upper ends of suitable supporting legs 6; and the bottom of the web 3 is provided with supporting devices for the operating mechanism. These supports in the present embodiment comprise a pair of integral lugs 7, 7 receiving a horizontal rod 8, and a socket-member 9 carrying the fixed vertical stud 10 on which is rotatably-sleeved the hub 11 of a gear-wheel 12 with which rotates a crank-arm 13 having at its end the ball 14. This device constitutes what I call a "cone-crank", and in the preferred construction the ball 14 is supported by being slidably impaled upon a fixed stud 15 which is rigidly secured at the end of the crank and is inclined inwardly at an oblique angle to the crank-axis.

Also rigidly secured to the bottom face of the flange 5 at one side is a hollow rigid bracket having at its upper end a semi-cylindrical portion 16 which embraces the outer half of the gear-wheel 12, the lower end of said bracket being constricted to define a pair of spaced parallel cheeks 17, 17 (see Figures 7 and 11) provided at their outer edges with approaching-flanges 18, 18 whose margins are spaced from each other to define the narrow vertical slot 19. Mounted in the cheeks 17 is a horizontal cross-pin 20 on which are pivoted the two arms 21 of the pedal-lever 22 which projects through the slot 19 and terminates in the foot-pad 23. The lips 24 of

this slot are concentric with the cross-pin **20** and are provided at the upper and lower extremes of the pedal-movement with sockets **25** and **26** respectively for cooperation with suitable detents carried by the pedal as will be hereafter described. Secured between the two ends of the yoke-arms **21** is a second cross-pin **30**, parallel to the cross-pin **20** and on it is journalled the hub **31** of an operating-lever **32**. This hub also has, at one side, the transverse enlargement **33** in which is journalled the cross-pin **34** transverse to the pin **30** and close thereto; and to the ends of this cross-pin are secured the two arms **35** constituting the fork of a lever **36**, whose free-end has a longitudinal cylindrical socket **37**, rotatably and slidably receiving the ball **14**. When the pedal-lever **22** is in washing position, as shown in Figures 1 and 2, the cross-pins **30** and **34** are both approximately intersected by the extended axis of the stud **10** so that rotation of the crank **13** produces a nutating movement of the lever **36** and an oscillation of the arm **32**.

Tightly secured in the hub **2** is a vertical hollow sleeve **40** whose lower end is formed exteriorly for the reception in rotatable and slidable relation of the hub **41** of a friction-wheel **42**. Preferably this hub is provided with an anti-friction bushing **41a** though this is a comparatively unimportant detail. The bore of this hub is enlarged at its lower end, and the lower end of the sleeve is provided with a collar **43**, slidably and rotatably received in this enlargement and serving to fix the lowest position which this hub may assume (see Figures 8 and 9); the exterior of the hub is further provided with a pinion **44** adapted to mesh with the gear **12** when the hub occupies its lowest position. Below the pinion the hub is further extended and provided with longitudinal clutch-teeth **45**, here shown as consisting of separate pieces affixed to the hub to enable them to be made of harder metal than the hub.

Slidably and rotatably received inside the sleeve **40** is a vertical shaft **46**, the lower end of which is reduced as shown at **47** and inserted through an aperture **48** in the bottom-plate of a stirrup **49** whose sides are pivoted at **50** to the arms **51** of a yoke articulated at **52** to the end of the arm **32**. Surrounding the reduced portion **47** of the shaft **46** is a circular plate **53** provided on its upper face with projections **54** adapted to engage the clutch-teeth **45** in driven-relation, and itself secured to shaft **47** in driving-relation by suitable means such as the pin **55**. Between the bottom-face of the plate **53** and the bottom of the stirrup is interposed a thrust-bearing **56**. A nut **57** secured to the lower end of shaft **46** retains the stirrup **49** in position on the shaft **46**.

Also depending from the web **3** is a rigid vertical stud **60** (see Figure 7) on which is pivoted the hub **61** of a horizontal lever **62**, one end of which rigidly carries the horizontal bearing **63** in which is journalled the horizontal shaft **64** whose inner end carries the flat circular friction-disc **65** which operatively engages the circular tire **66** of the friction-wheel **42**. This shaft also carries the belt-pulley **67**, connected by the belt **68** to the pulley **69** of the driving-motor **125**.

A suitable spring **70** tends to force the disc **65** into contact with the tire **66**, while a suitable cam **71**, movable by a conveniently-located handle **72**, serves, when desired, to swing the lever **62** against the tension of the spring and displace the disc out of engagement with the friction-wheel. It is a substantial advantage of the arrangement herein set forth, that all the parts heretofore described can be completely assembled and tested before the tub is attached.

This tub in its present form comprises a substantially-cylindrical upright sheet-metal wall **73** seamed at its lower margin to the upper brim of an upwardly-flared bottom-portion **74** in such wise as to define a horizontal circumferential shoulder **75**, the bottom-part being abruptly offset inwardly as regards the wall **73**. The portion **74** is shown as integral with a circular web-portion **76**, apertured at its center for the sleeve **40**. This web constitutes the true bottom of the tub and is supported by the circular rim **1**, being held thereto most simply by means of the nut **77** screwed on the exterior of the sleeve **40**. I have shown this web **76** as depressed circularly to define a shallow gutter **78** between its center and circumference, and with this communicates a waste-pipe **79**, provided with a suitable waste-cock **80** which depends through suitable holes in the web **3**.

Surrounding the lower part of this tub is a circular sheet-metal band or shield **81**, formed at its lower margin with an in-turned flange **82** resting on the upper face of the flange **5** and formed at its upper margin with an in-turned flange **83** underlying the shoulder **75** in supporting relation, the outer wall of the shield **81** constituting preferably a substantial continuation of the surface defined by the wall-portion **73**. This shield has two main advantages, namely of shielding the tub against injury, and of protecting its contents to a considerable degree against loss of heat, both of which tendencies are considerable since the tub is ordinarily made of copper, while the shield **81** is preferably made of steel, and comes at a height to protect against most blows. Tightly secured inside the brim of the bottom-portion **74** is an upright cylindrical sheet-metal coaming **84** spaced from the wall **73** to form therewith an annular gutter adapted for the receipt of liquid; and leading from the bottom of this gutter is an independent drain-pipe **85**, flattened toward its upper end as indicated at **86** (Figure 2) where it passes between the shield and tub, and threaded at its lower end for the reception of a discharge-hose **87** which when not in use, is best disposed of by having its free-end attached to a hook **88** carried by the tub-exterior at a point above the level of the coaming **84**.

The sleeve **40** preferably rises into the tub a sufficient distance to stand above the liquid-level at all times, while the upper end of the shaft **46** projects above the upper end of the sleeve **40** at all times. The washing and extracting operations are performed in a separate perforated container located inside the main tub or casing and movable both vertically and rotatably. This container preferably exhibits the shape of the equatorial zone of a very oblate spheroid, and is most conveniently formed of a lower-part **90** and an upper-part **91** seamed together equatorially at **92**, this seam exhibiting a substantial effect in strengthening and stiffening the structure. The top-margin of the portion **91** terminates in a rolled rim **93**; while the bottom-part comprises two circular sheet-metal plates **94** and **95** meeting circumferentially and tightly braced together at **96**, and also having their center parts secured tightly to axially separated portions of a vertical central sleeve **97** which loosely surrounds the sleeve **40**. One of the portions **94** or **95** is integral with the part **90** and the other constitutes a bracing-element therefor. The side-

wall of this container is formed for a short distance at each side of the seam 92 with water-discharge perforations 98; and the bottom-member may also, if desired, be formed, outside of the double-wall portion, with a very limited number of water-discharge perforations 99.

The upper end of the sleeve 97 is formed with an internal flange 100 overlapping the upper end of the sleeve 40 and closely embracing the shaft 46. The upper end of the shaft is also hollowed out as shown at 101 (Figures 4 and 5) for the reception of a longitudinally movable plunger 102 provided with a knob 103 at its top by which it may be grasped. The sides of the shaft 46 intermediate the length of this plunger are apertured as shown at 104 for the reception of steel balls 105, whose diameter is greater than the thickness of these walls; and the interior of the lower part of flange 100 is notched as shown at 106 for the reception of the protruding part of these balls, the body of the plunger being also formed at one point with a reduced portion 107 adapted for the reception of the inwardly-protruding part of these balls, one wall of the reduced portion being tapered as at 108. When the plunger is elevated, as shown in Figures 1 and 4, the balls are enabled to withdraw inwardly within the limits of the shaft periphery. When the plunger is depressed as shown in Figures 3 and 5, the balls are pushed out into position to engage the flange 100 in lifting and driving relation.

The washing element herewith employed is of the pounder type and in the illustrative embodiment consists of a single central cone or suction-cup 110 formed as a surface-of-revolution concentric with the axis of the shaft 46. Preferably this cone is secured in place by means of a terminal sleeve 111 screwed to the upper end of the shaft 46. I have found it of substantial advantage to secure to the interior of this cone, at a point intermediate its height, the larger end of a second inverted cone 112 whose vertex is apertured to receive slidably the exterior of the sleeve 97 as shown in Figure 1. The height of the cone 112 is so chosen as still to surround said sleeve at the upper limit of dasher-movement as shown in Figure 2. I have also found it advantageous to corrugate circumferentially the portions of both cones below their junction point 113 and also to form apertures 114 in that part of cone 110 which is above such junction-point. The corrugations exhibit an advantageous effect upon the washing-action in that they tend, possibly in conjunction with the conical container-bottom, to roll the clothes over more vigorously. The apertures 114 have no washing-function, but reduce the tendency to pump liquid down the shaft 40 which tendency is further opposed by a suitable packing-gland 115 (Figures 1 and 4).

The top of the wall 73 is surmounted by an annular sheet-metal band or shield 116, made of a height to accommodate the container even when elevated to the position shown in Figure 3, said shield being here shown as formed at its upper margin with an inwardly-rolled rim 117 defining an annular groove adapted to receive the rim 93 of the container when elevated as shown at the left-handed side of Figure 3, thus decreasing the likelihood of danger to the operator, and rendering it impossible to drop finished laundry outside of the container. Fitted to the top of the band or shield 116 is a removable sheet-metal cover 118, also of sufficient height to allow both the ordinary elevation of the shaft 46 during washing-operation, and the excessive elevation during extraction. Carried by this cover is a spray-head 119 to which is attached flexible hose 120 adapted for connection to a source of hot or cold water (not shown). The parts 73, 74, 81 and 116 constitute generally the casing of the machine.

The driving-motor is shown at 125, and is bolted to a supporting-frame 126 pivoted to rod 8 and movable thereabout, to tighten the belt, by means of a tension-rod 127 secured to the web 3.

The pedal 22 is provided on the one side with a pivoted dog 130 formed at one end with a blunt tooth 131 adapted to engage the notch 25 during the washing-operation as shown in Figure 2, and provided at its opposite end with a tension-spring 132 whereby such engagement is effected. The opposite side of the pedal is provided with a tripper-lever 133 pivoted to the pedal on a transverse axis 134, and provided with a pawl 135 adapted to engage the notch 26 when the parts are in extracting-position, together with a spring 136 to move said pawl to engaging-position.

The operation of the device is as follows: Assuming the parts to be in the position shown in Figure 1, the knob 103 elevated as shown in Figure 4, and a sufficient amount of clothing in the container and a sufficient amount of liquid in the casing; any person with a moderate experience with washing-machines will know the proper amount of clothing, and besides excess of clothing will do no harm excepting to arrest the washing-action as hereafter described; the cam 71 is manipulated to cause the disc 65 to engage the friction wheel 66, and the parts are so positioned that this engagement occurs at such a distance from the center of the disc 65 as, combined with the motor-speed and pulley-ratio affords the desired washing-speed. The engagement of the pinion 44 and the gear wheel 12 rotates the crank 13, nutates the lever 36, oscillates the arm 32, and reciprocates the shaft 46 with its attached pounder. I have found that the type of pounder herein disclosed affords a very thorough washing and a very uniform distribution of the clothing in the container. Inasmuch as the arm 32 is pivoted to the pedal-lever 22, it will be seen that no effective blow can be given by the former unless the latter is held against movement, and this is the function of the dog 130. At the same time it is desirable that some safety-provision be made available in case the machine becomes clogged by too much clothing or by the catching of some accidental article beneath the pounder. For this reason the sides of the notch 25 are preferably made, not abrupt, but slanting at such an angle that upon the occurrence of any clogging, the pedal will become released thus reducing the vigor of motion of the arm 32 and protecting mechanism and operator from injury. It happens, with this particular machine, that when such a stoppage occurs the machine automatically calls the operator's attention by waving the pedal up and down and grunting though this is not a criterion of the invention.

Preferably the top of the container is about on a level with the top of the coaming 84 during the washing-operation, and this level is further employed to define the optimum water-level for the washing-operation. It is well known that, particularly in the case of water which has been coagulated for filtration purposes, the washing-liquid at the end of the operation becomes cov-

ered with a mass of floating scum which is very injurious to clothing and should be removed prior to the extracting-operation. To do this it is only necessary to let down the hose **87** and introduce a small amount of water through the spray-head **119** until the floating scum has been driven out over the coaming **84**. To extract the liquid from the clothing, the cover **118** is removed momentarily and the knob **103** depressed. Cautious people will stop the machine before doing this, but failure to do so entails no penalty. As a result, the next succeeding up-thrust of the shaft **46** by the motor causes the sleeve **97**, and entire container, to accompany the motion. Ordinarily the motor is unable to do this without assistance, owing to the great weight of the container due to its liquid contents and to the suction caused by the liquid in the casing; however the operator now presses on the pedal and it is found that a very small amount of effort is needed to supplement the force of the motor and elevate the container and its contents to the position shown in Figure 3, at which point it is detained by the engagement of the pawl **135** with the notch **26**. It will be noted that not only is it not necessary to stop the motor **125** or disconnect the mechanism, but such a course would be a distinct mistake since the motor is expected to do most of the work of raising the container. That this is the case is due to the same operation of the cone crank mechanism as that which raises and lowers the rod **46** during the washing operation; when this rod is also connected to the clothes container, its elevating effect is necessarily exerted upon this element also. On the other hand it is unnecessary and unwise to employ a motor of such size as itself to raise the container, for which reason a friction clutch (**69a**) is preferably introduced between the pulley **67** and disc **65** or, what is in some ways the same thing, the belt-groove is made of such a shape that slippage can occur in case the operator should be dilatory in coming to the motor's assistance.

Owing to the fact that the cross-pin **30** is located beyond the pivot-pin **20**, depressing of the pedal serves to lift the shaft **46** to a point beyond the range of its ordinary reciprocation, and the last part of this movement brings the projections **54** into engagement with the clutch-teeth **45**, and also elevates the pinion **44** out of driving-engagement with the gear wheel **12**, and further moves the friction-wheel **42** to a point nearer the periphery of the disc **65** where it will be rotated at an increased speed. The disengagement of the gear-teeth stops the action of the cone-crank, and instead the teeth **45** rotate the shaft **46** and its attached container at a gradually increasing speed, slippage during the accelerating-period being procured either by the friction-clutch already mentioned or by a slipping of the belt. The height of the coaming is so adjusted relative to the perforations **98** that the latter are all above the former during the extraction as shown in Figure 3. In case the hose **87** be held up, all of the liquid will be returned to the casing excepting such quantity as served to fill the gutter and as soon as the washing-liquid has been fully extracted, and without stopping, rinsing-liquid, preferably hot, is introduced through the hose **120**. During the rinsing it is desirable to lower the hose **87** and discard the rinse-water and it is also desirable to stop the machine and fluff up the clothing by hand two or three times during the rinsing-operation. If care be taken not to introduce water through the spray-head excepting while the container is rotating and the hose **87** thus lowered it will be found that none of the rinse-water enters the washing-liquid and it is even possible to blue the clothing in the rotating container without contaminating the wash-water. It is highly desirable, and it is largely for this reason that a spray-head is provided in the cover, that hot rinse-water be employed, since this is far more effective than cold water in removing soap from the fabrics, and a comparatively small amount of hot water if applied in this way, is more effective than a much larger amount of cold water employed in the usual manner. As soon as these operations are completed the power is turned off and the container allowed to come to rest, the clothing removed and a new batch of laundry introduced, whereupon the container is allowed to sink to its washing-position by placing the foot on the pedal **22** and touching the tripper **133** with the toe of the same foot. The only other step necessary to be taken is to pull up on the knob **103** but it makes no special difference as to the order in which these steps are performed. If the knob be raised while the container is elevated the worst that can happen is that the container may fall with a splash; if the operator forgets to pull the knob, the motor promptly tries to raise the container again and shows that something is wrong but without doing any damage.

I have shown a coiled spring **140** as connecting the lever **36** to one end of the hub **31** which carries the same. This spring is not at all necessary to the ordinary and proper use of the machine as above described but is added solely for the following reasons: due to the weight of the parts the machine always tends to stop with the cone-crank on dead center as shown in Figures 1 and 7, assuming that such spring were not present. Under such conditions it is impossible for the operator to elevate the container when the motor is at rest or the friction-clutch disengaged, and timid people sometimes prefer to do this themselves rather than risk the motor's assistance. Accordingly I have provided the spring **140** which prevents the machine from stopping on dead center.

It is not possible for the motor to lift or assist in lifting the container clear to the top of its extracting position, since the motor's assistance is terminated by the disengagement of the gears **44** and **12** as shown in Figure 3. The last inch, or thereabouts, of movement is effected solely by the pedal, a set-screw **241** carried thereby coming into engagement with an abutment **242** formed at the rear end of lever **32**. During the washing-operation the oscillations of lever **32** stop short of this set-screw as shown in Figure 1. A set-screw at this point is not imperative, but adjustment of the same serves to vary the extracting speed by determining the relative positions of the friction-wheel **42** and friction-disc **65**.

In order to prevent any splashing or whirlpool action of the liquid in the casing due to splashing against or air friction with the bottom of the rotating container during the extracting operation, I have shown some splash-guards in Figs. 3, 12, and 13, consisting of vanes **141** carried by the inside wall of the casing at or near the level of the liquid during the extracting operation and adapted to catch the liquid as soon as it begins to swirl. It is enough in many cases that these vanes should be fixed rigidly to the side wall, especially if they be slanted at their

upper ends as shown in Fig. 12 so as to throw swirling liquid downwardly; but I prefer to pivot them at their upper ends on a slanting wire 142 so that upon contact with the swirling liquid they may be raised toward horizontal position as shown in Figs. 13 and 3 so as to present a large surface to the swirling liquid during the extracting operation while permitting free lowering of the container for washing purposes. If these be made of wood the buoyancy helps elevate them while if made of metal I preferably warp one edge as indicated at 143 so that the current may raise them. Another reason for pivoting these vanes instead of making them rigid is to facilitate cleaning.

It will be noted that in several instances I have illustrated and described with considerable particularity the details chosen for the purpose of explaining my invention. This is not because those details are, in themselves, important to my invention, but because an understanding of such details is essential to an understanding of the mode of operation of this particular machine, although the essentials of my invention may be embodied in a structure of very different construction and exhibiting very different details. For example, in an effort to show the particular way in which I designed and constructed the pedal herein I have devoted an amount of space wholly out of proportion to the importance of the same, since many parts of my invention can be employed without any of those features. It will therefore be understood that I do not limit myself to any details except as the same are specifically pointed out and recited in my several claims and rendered necessary by the prior state of the art.

Having thus described my invention what I claim is:

1. In a combined clothes washing and extracting machine, a liquid holding casing, a vertical sleeve in the bottom thereof, a vertical shaft in said sleeve, a clothes-container concentric with said shaft inside said casing and movable vertically alternatively into and out of liquid contact, a washing element in said container operatively connected to said shaft, a driving element located below said casing, two selectively operable driving connections between said driving element and shaft, one of said connections serving to rotate and the other serving to reciprocate said shaft vertically, said washing element being of a type to be actuated by such reciprocation, means for detachably connecting said shaft to said container whereby said container may be elevated and rotated, means independent of said shaft for supporting said container during the washing operation, a lever operatively connected to said driving connections for raising and lowering said shaft, and means operative upon determined changes in position of said lever to connect said driving element to said shaft through one or the other of said driving connections.

2. In a combined clothes washing and extracting machine, a liquid holding casing, a vertical sleeve in the bottom thereof, a vertical shaft in said sleeve, a clothes-container concentric with said shaft inside said casing and movable vertically alternatively into and out of the liquid, a washing element in said container operatively connected to said shaft, means for detachably connecting said container to said shaft whereby the container may be raised and rotated for extracting adherent liquid from its fabric contents, means independent of said shaft for supporting said container during the washing operation, a pedal for raising and lowering said shaft, a driving element located beneath said casing, two selectively operable driving connections between said driving element and shaft, one of said connections serving to rotate and the other to reciprocate said shaft vertically, said washing element being of a type to be actuated by such reciprocation and means operatively connected with said pedal for automatically connecting said driving element and shaft through one or the other of said connections according to the position of said pedal.

3. In a washing machine, a liquid holding casing, a vertical bearing sleeve therein, a clothes container inside said casing adapted to rest upon a stationary part of said casing during the washing operation, a washing element in said container adapted to be moved up and down to effect the washing operation, a single shaft projecting through said sleeve, driving connections between said shaft and washing element, means for connecting said shaft to said container, a lever located for actuation by the operator, operative connections from said lever to said shaft for elevating said shaft to lift said container out of contact with the washing liquid, a driving element, means operative when said lever is in one position for connecting said driving element to said shaft in a manner to produce vertical reciprocation thereof relative to said container, and means operative when said lever is in another position for connecting said driving element to said shaft in a manner to rotate the same continuously in one direction.

4. In a combined clothes washing and extracting machine, a casing, a container therein, a vertical shaft traversing the bottoms of both said casing and container, a driving element below said casing, operative connections between said driving element and said shaft adapted to impart to said shaft either a motion of vertical reciprocation or a motion of rotation, a washing element in said container and connected to said shaft during both the working and the extracting operations of the machine and means for securing said shaft detachably to said container in rotating relation, said washing element being generally circular in horizontal cross-section.

5. In a combined clothes washing and extracting machine, a casing, an upright container located therein, an upright shaft traversing the bottom of said casing and coaxial with the container, means including an electric motor carried by the casing for reciprocating said shaft vertically, a washing element carried by said shaft and working inside said container, means for connecting said shaft to said container, means for lifting said shaft to a position above the range of its reciprocating movement, and means including the same motor for thereafter rotating said shaft and container.

6. In a device of the character described in combination, a frame, an upright bearing sleeve carried thereby, a casing carried by said frame and surrounding said sleeve and adapted to hold detergent liquid, a vertical shaft transversing said sleeve, a washing element detachably connected to said shaft, a container for clothing detachably connected to said shaft inside said casing and surrounding said washing element, a horizontal wheel rotatable about said shaft, a bracket carried by said frame at one side of said shaft, a pedal pivoted thereto, an operating lever pivoted to said pedal, the end of said lever being

articulated to said shaft, a second lever pivoted to said first lever upon an axis which is transverse to the axis between said first lever and pedal, a horizontal crank journaled above the intersection of said axes and articulated to said second lever, means for driving said crank from said wheel, means for locking said pedal at upper and lower limits of its movement, and means operative upon the movement of said pedal for disconnecting said wheel from said crank and connecting it to said shaft.

7. In a combined washing machine and centrifuge, in combination, an upright liquid containing casing, an upright container located therein, an upright shaft traversing the bottom of said casing and coaxial with the container, means including an electric motor carried by said casing for producing a vertical reciprocating movement of said shaft, a washing element in said container operatively secured to said shaft, means for securing said shaft to said container, means for elevating said shaft to a position outside the range it occupies during its reciprocating movement, and means including the same motor for thereafter rotating said shaft.

8. In a combined clothes 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 pivoted on a horizontal axis at one side of said shaft and operatively engaging the lower end of said shaft in supporting relation, means for operating said lever to raise and lower said shaft, means for connecting said shaft to said container whereby said container may be elevated, a driving element, and operative connections between said driving element and shaft imparting a rotating motion to said shaft and container when the shaft is at the uppermost limit of its vertical movement and imparting a vertical reciprocating movement to said shaft and washing element when the shaft is lowered below its uppermost limit of movement.

9. In a combined clothes washing and extracting machine, a casing, an upright container located therein, a washing element located inside said container, a driving element located beneath said casing, a vertical shaft working through the bottom of said casing, means connecting said shaft to said washing element, means for connecting said shaft to said container, a pedal pivoted on a horizontal axis below said casing, an operating lever, means operatively connecting said lever to said shaft, said lever being pivoted to said pedal so as to be moved bodily when said pedal is moved, driving connections between said driving element and lever for oscillating said lever about its pivot when said pedal stands in one position, and alternative driving connections between said driving element and shaft for rotating said shaft about its axis when said pedal stands in another position.

10. In a clothes washing and extracting machine, a casing, a container for clothes and liquid inside said casing, a washing element inside said container, reciprocating mechanism for said element and rotating mechanism for said container located below said casing and working through the bottom thereof, a pedal pivoted on a horizontal axis beneath said casing, means controlled by said pedal and operative when said pedal stands at one limit of its movement for causing the actuation of said reciprocating mechanism, and operative when said pedal stands at the other limit of its movement for causing the actuation of said rotating mechanism, means connecting said washing element to said reciprocating mechanism for producing a washing operation, means securing said container to said rotating mechanism for producing an extracting operation, an arcuate sector for said pedal, and means for holding said pedal in spaced positions corresponding to the washing and extracting positions, the means whereby said pedal is retained in extracting position being releasable only by the operator and the means whereby said pedal is retained in washing position being also releasable by overstrain.

11. In a combined clothes washing and extracting machine, a casing, a container therein, a vertical shaft working through the bottom of said casing, a washing element in said container, means connecting said shaft to said washing element, a lever pivoted on a horizontal axis and articulated to said shaft, a driving element, oscillation producing connections from said element to said lever, means for connecting said shaft to said container whereby said driving element is compelled to raise the same, lever means operatively connected to said first lever whereby the operator may assist said driving element in such raising, said lever means having a wider angle of motion than said oscillating connections, and means operative upon the arrival of said shaft at the limit of its reciprocating movement for interrupting said oscillating connections and connecting said element to said shaft in rotating relation.

12. In a clothes washing and extracting machine, a casing, a hollow vertical sleeve in its bottom, a vertical shaft in said sleeve, a drive wheel outside said sleeve, a container in said casing, a washing element in said container, operating connections geared to said drive wheel at one side of said sleeve for producing vertical reciprocation of said shaft, means for raising said shaft above the limit of such reciprocating movement and connecting it directly to said drive wheel in rotating relation and disconnecting said wheel from said operating connections, means connecting said shaft to said washing element and means for connecting said shaft to said container in rotating relation.

13. In a combined clothes washing and extracting machine, a casing, a container therein, a vertical shaft traversing the bottoms of both said casing and said container, a driving element below said casing, operating connections between said driving element and shaft adapted to impart to said shaft either a motion of reciprocation or a motion of rotation, a washing element in said container, means for connecting said washing element to said shaft, and means working through the center of said shaft lengthwise thereof for securing said shaft detachably to said container.

14. In a combined clothes washing and extracting machine, a casing, a container therein, a washing element inside said container, a vertical shaft traversing the bottoms of both said casing and said container, a driving element below said casing, operating connections between said driving element and shaft adapted to impart to said shaft either a motion of reciprocation or a motion of rotation, a washing element in said container, means for connecting said washing element to said shaft, means for securing said shaft detachably to said container, and

a controlling element for said last named means carried by said shaft and movable relative thereto and comprising an operating member projecting above said shaft.

15. In a combined clothes washing and extracting machine, a casing, a container therein, a washing element inside said container, a vertical shaft traversing the bottoms of both said casing and said container, a driving element below said casing, operating connections between said driving element and shaft adapted to impart to said shaft either a motion of reciprocation or a motion of rotation, a washing element in said container, means for connecting said washing element to said shaft, and manually operable means working axially of said shaft and operable without interference by or with said element for securing said shaft to and releasing it from said container.

16. In a clothes washing machine, a container having a vertical post of relatively small diameter rising from its bottom, a vertically reciprocable pounder surrounding said post and having a tapered sleeve at its underside with the smaller end of the sleeve at the bottom and slidably embracing said post, the larger end of said sleeve being spaced inwardly a substantial distance radially and above the outer margin of the pounder at its underside, and means including a shaft inside said post working through the bottom of said container for moving said pounder up and down, said post being but slightly larger than said shaft and surrounding the same.

17. In a clothes washing machine, a container having a vertical post rising from its bottom, a pounder comprising a hollow cone smallest at the bottom, slidably embracing said post, and a second larger cone, reversed in position joined to the margin of said smaller cone, and means working through said post for moving said pounder up and down.

18. In a clothes washing machine, a container having a bottom forming a shallow annular trough with its side slanted outwardly and inwardly, in combination with a pounder concentric with said container and having an annular, downwardly facing recess located above said trough with the deepest portion of said recess located substantially midway between the axis and the outermost portion of the pounder, and means for reciprocating said pounder up and down.

19. In a clothes washing machine, a container having the portion of its bottom adjacent its center slanted outwardly and downwardly, in combination with a pounder of annular shape concentric with said container, and having inner and outer slanting walls defining a downwardly facing annular trough, said walls being circumferentially corrugated, and means for reciprocating said pounder up and down.

20. In a laundry machine, a casing having a circular bottom formed with an upwardly rounded side wall terminating in an outstanding ledge, a circular shielding and supporting member surrounding said rounded portion and underlying said ledge, and a side wall member carried by said supporting member and extending upwardly from said ledge, said side wall member being joined to said ledge in fluid tight relation.

21. In a combined clothes washing and extracting machine, a casing, a vertically movable container located therein with its axis vertical and having its side wall formed with liquid discharge apertures, said container being provided above said apertures with an inwardly projecting clothes retaining wall means for supporting said container in a raised position with the apertured side walls of said container projecting above the side walls of the casing, and an annular, sheet metal part of a shape conforming to the shape of the projecting part of said container, said part being supported removably on the side wall of said casing and extending around said container and overlapping the top rim of said container in protecting relation.

22. In a combined clothes washing and extracting machine, in combination, a cylindrical walled liquid casing, a container therein supported for rotation about the casing axis, there being a liquid space below the container during its rotation, means for raising and lowering the container inside said casing, and vanes hinged to the casing wall at a level which is below the bottom of the container when the latter is elevated, said vanes projecting into the casing beneath said container in obstructing position with reference to the swirling of the liquid, the hinged attachment permitting the lowering of the container past the same.

23. In a combined clothes washing and extracting machine, in combination, a cylindrical walled liquid casing, a container therein supported for rotation about the casing axis, means for raising and lowering said container and for rotating it when raised so as to discharge its liquid contents, and vanes hinged to the casing wall adapted to fold down to permit the lowering of the container or to become raised to retard swirling of the liquid contents of said casing.

24. In a washing machine, the combination with a frame, of a revoluble receptacle for containing the articles to be washed mounted on the frame, said receptacle having a central post, a reciprocating hollow centrally located washing device for agitating the contents of said receptacle and a vertically reciprocable operating member working through said post and operatively connected to said washing device, said washing device having a hollow central part surrounding said post and working up and down thereover.

25. In a laundry machine, a casing for holding detergent liquid, a vertically movable rotatable container mounted on a vertical axis inside said casing and having apertures in its side walls, the upper part of said container being provided with an inwardly projecting clothes retaining wall, means for selectively dashing clothing inside said container and for rotating said container to discharge its liquid contents, and an annular, removable metal band closely surrounding the upper part of said container and conforming to the contour thereof, said band having a flange depending inside said casing and an inwardly-flaring top portion overlying the peripheral portion of said container and defining a working opening, the side wall of said container when in upper position extending above the side wall of said casing and the diameter of said working opening being smaller than the diameter of the opening with which the top of said container is formed.

26. In a laundry machine, a centrifugal extractor having provisions for the discharge of liquid therefrom, means for washing clothes in said container, means for rotating said container for extracting liquid from the clothes in said container, an annular shield surrounding said extractor adapted to receive liquid discharged therefrom, and a casing surrounding said ex-

tractor adapted to receive liquid discharged on said shield, said shield being removably connected to said casing and having a liquid shedding portion depending inside said casing, said extractor projecting above said casing and the top of said shield overlapping said extractor and having a flange depending inside said extractor at a point adjacent to the upper rim thereof.

27. In a combined clothes washing and extracting machine, a casing, a container rotatably mounted therein and adapted during the operation of the machine to be selectively supported at either one of two different fixed elevations comprising a lower position corresponding to the fixed elevation occupied by the container during the washing operation and an upper position corresponding to the fixed elevation occupied by the container during the extracting operation, means for supporting said container in its washing position, and power-operated mechanism comprising reciprocating means for agitating the contents of said container in performing the washing operation and revolving means for rotating said container in performing the extracting operation, and means associated with said reciprocating means for connecting the same to said container and lifting said container from washing to extracting position and thereafter connecting it in driven relation to said revolving means, said last named means including as one of its elements a manually operable member on said reciprocating means inside said casing for connecting or disconnecting said container with respect to said reciprocating means.

28. A combined washing and extracting machine including a tank, a basket rotatably mounted therein and adapted during the operation of the machine to be supported selectively at either one of two different fixed elevations, an agitator mounted in said basket, means for supporting said basket at a fixed elevation during the washing operation, power-operated means operatively connected to said agitator and basket for driving said agitator with a to-and-fro movement in effecting the washing operation and for rotating said basket in effecting the extracting operation, and means associated with said power-operated means effective during the actuation of said agitator for connecting the same to said basket and lifting said basket from washing to extracting position, said last named means including as one of its elements a manually operated member on said reciprocating means inside said tank and movable with said basket when it is lifted to its elevated position for connecting said basket to said power-operated means.

29. A combined washing and extracting machine including a tank, a basket rotatably mounted therein and adapted during the operation of the machine to be supported selectively at either one of two different fixed elevations, an agitator mounted for movement in said basket, means for supporting said basket at a fixed elevation during the washing operation, power-operated means comprising oscillating and rotating mechanism for driving said agitator with a to-and-fro movement in effecting the washing operation and for rotating said basket in effecting the extracting operation, and means for connecting said power-operated means to said basket and for lifting said basket from washing to extracting position effective at the same time for disconnecting said agitator from said oscillating mechanism and connecting said basket to rotating mechanism, said last-named means including as one of its elements an operator-operated member for connecting said basket to said power-operated means.

30. A combined washing and extracting machine including a tank, a basket rotatably mounted therein and adapted during the operation of the machine to be supported selectively at either one of two different fixed elevations, an agitator mounted for to-and-fro movement in said basket and having its movement guided by a bearing member fixed to said basket, means for supporting said basket at a fixed elevation during the washing operation, power-operated means operatively connected to said agitator and said basket for driving said agitator with a to-and-fro movement in effecting the washing operation and for rotating said basket in effecting the extracting operation, said agitator being adapted to rotate with said basket during the extracting operation, and operator-operated means associated with said power-operated means for lifting said basket from washing to extracting position, said last named means including a control member carried by said agitator for connecting said power-operated means and agitator to said basket.

31. A combined washing and extracting machine including a tank, a basket rotatably mounted therein and adapted during the operation of the machine to be supported selectively at either one of two different fixed elevations, an agitator mounted for movement in said basket, means for supporting said basket at a fixed elevation during the washing operation, power-operated means comprising oscillating and rotating mechanism for driving said agitator with a to-and-fro movement in effecting the washing operation and for rotating said basket in effecting the extracting operation, the washing operation of said agitator being effected independently of any movement of said basket, and operator-operated means associated with said power-operated means for lifting said basket from washing to extracting operation, said operator-operated means comprising separate selectively operable control devices, one outside said tank and the other located centrally within said basket for disconnecting said agitator from the oscillating mechanism and for connecting said basket to said power-operated means and rotating mechanism.

32. A combined washing and extracting machine including a tank, a basket rotatably mounted therein and adapted during the operation of the machine to be supported selectively on either one of two different fixed elevations, an agitator mounted in said basket, means for supporting said basket at a fixed lower elevation during the washing operation, power-operated means comprising oscillating and rotating mechanism for driving said agitator with a to-and-fro movement in effecting the washing operation and for rotating said basket in effecting the extracting operation, and means including a control device carried by said agitator for disconnecting said agitator from said oscillating mechanism and for connecting said basket to said power-operated means to utilize the same during a part at least of the operation of lifting said basket from washing to extracting position.

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