Dec. 10, 1929. A. W. ALTORFER 1,738,753

WASHING MACHINE

Filed May 4, 1927 2 Sheets-Sheet 1

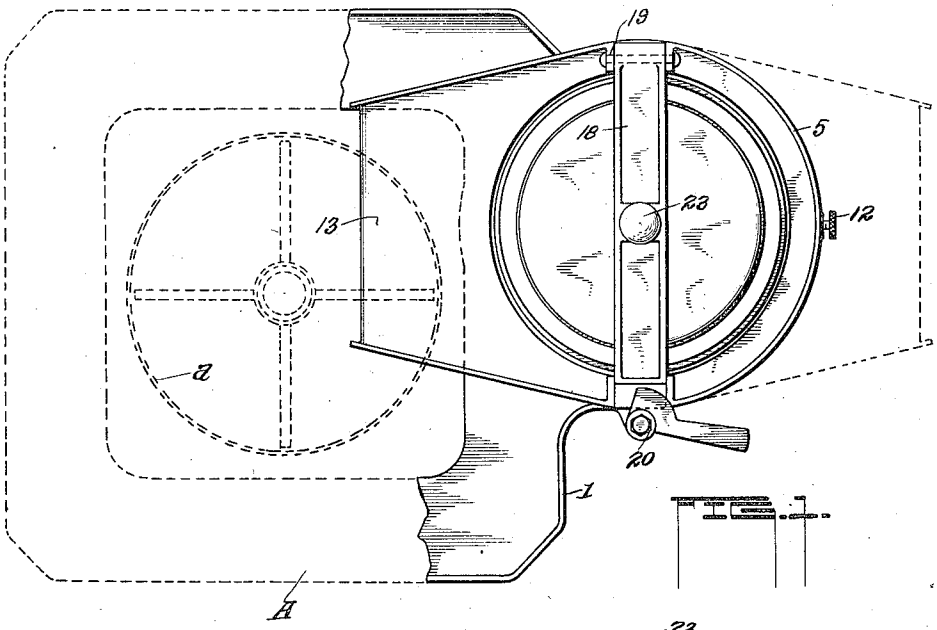


FIG. 1.

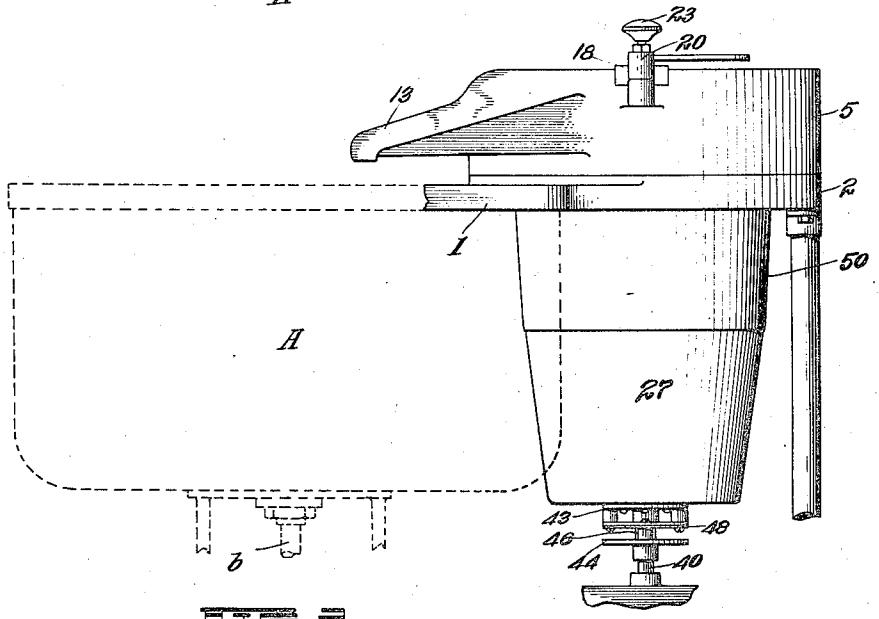


FIG. 2.

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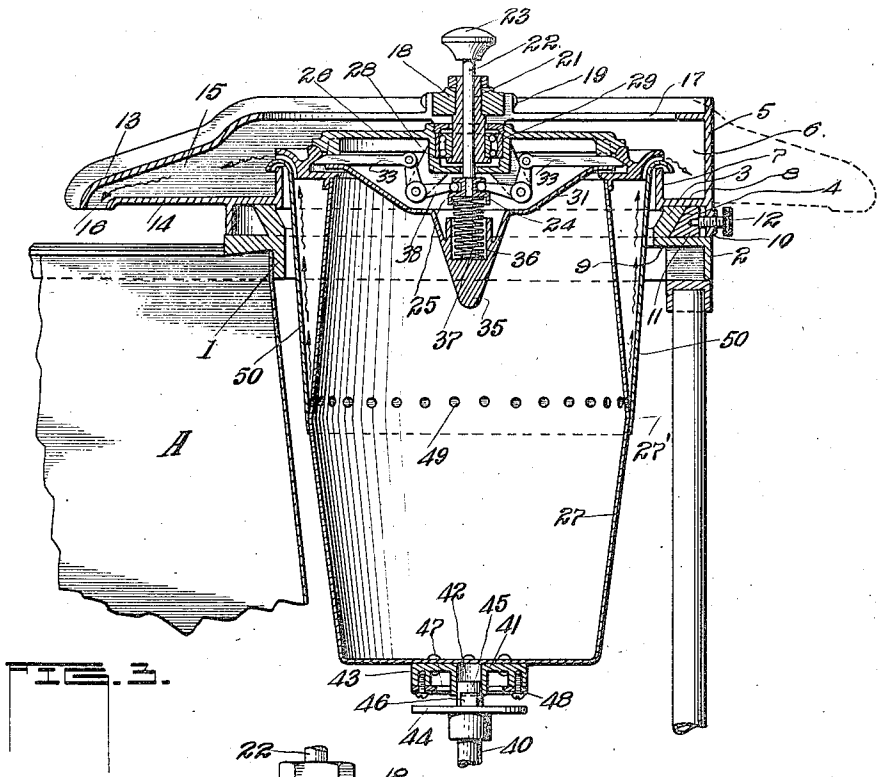


FIG. 3.

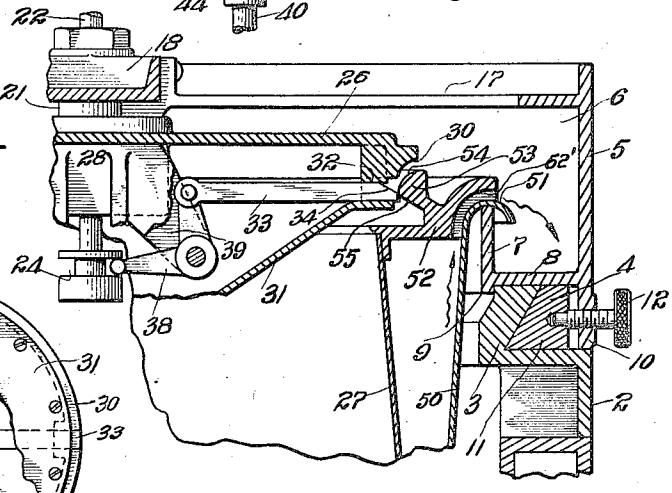


FIG. 4.

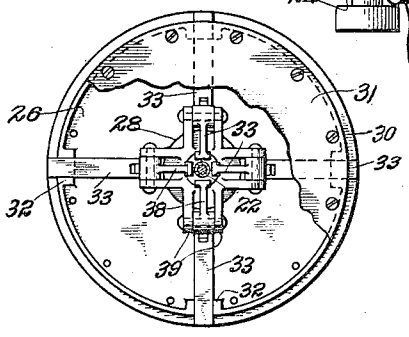


FIG. 5.

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UNITED STATES PATENT OFFICE

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WASHING MACHINE

Application filed May 4, 1927. Serial No. 188,688.

This invention has reference to washing machines and it relates more particularly to that type of machine including a centrifugal dryer.

The invention has for its principal object to improve the construction of the centrifugal dryer; its method of expelling water therefrom, the supporting means; closure, and the means for discharging water expelled by the extractor, at different points circumferentially about the dryer.

The invention has for a further object to provide a rotatable extracting element where the water is expelled at a point considerably removed from the loading opening therein, and to provide means for receiving and directing such expelled water vertically of such member and then radially and finally by a circumferentially adjustable conduit discharge such water into a washing tub or other receptacle or receptacles.

A further object of the invention is to provide a rotatable extracting receptacle surmounted by a circumferentially adjustable water receiving housing arranged to receive water expelled by said receptacle and to discharge the same at different points about such receptacle; said receptacle being vertically movable, whereby in one of its positions a water seal is provided to prevent leakage around the outside of the receptacle, during the loading thereof.

A still further object of the invention is to provide a rotatable extracting receptacle surmounted by a housing circumferentially adjustable about said receptacle and to receive water discharged therefrom, said housing having a drain-board and discharge outlet adapted to be positioned in different positions about said receptacle, and a closure for said receptacle including means for moving the extractor bodily on its support, whereby it is suspended for free rotation with its driving element, a flexible connection being provided between said receptacle and its driving element to permit such bodily movement.

Fig. 1 is a top plan view of a machine embodying my invention, that part of the washing machine not included within the scope of the invention being shown in dotted lines, and the drain-board being shown by full lines and dotted lines in different positions;

Fig. 2 is an elevation of what is shown in Fig. 1;

Fig. 3 is a vertical sectional view of the dryer and associated parts;

Fig. 4 is an enlarged sectional detail of the upper part of one side of the extracting receptacle, the closure therefor and the locking means for such closure which also functions to lift and bodily suspend the receptacle, and,

Fig. 5 is a plan view, partly broken away and partly in section, showing the underside of the closure for the receptacle.

Like characters of reference denote corresponding parts throughout the figures.

In the drawings I have shown how the dryer would be mounted in the same support with a washing machine tub, the latter designated A having a washing element *a* operated from a vertical shaft *b* journaled through the bottom of the tub. The top frame 1 for the tub extends laterally therefrom in the form of a ring-like extension 2 to serve as a support for certain elements constituting the dryer, and said extension 2 is formed or provided with an upstanding annular ring or flange 3, the peripherial surface of which is tapered downwardly and inwardly, as at 4 for a purpose to be explained.

Rotatably adjustable about the ring or flange 3 and supported by said extension 2 is a casing or housing 5 which is provided with an annular water conduit or chamber 6, formed by the outer annular wall of the casing or housing and a spaced but shorter upstanding annular wall 7 and a bottom portion 8 connecting the same. Said bottom portion normally rests and rides on the ring or flange 3 with an inner depending projection 9 lying next adjacent the inner face of said ring or flange 3 and an apron 10 projecting downwardly from and forming part of the outer wall of the casing or housing 5 rests and rides on the extension 2, spaced outwardly from the tapered surface of said ring or flange 3, see Fig. 4. Blocks like that indicated at 11 may be interposed in the space between the tapered surface of the ring or flange 3 and the

apron 10 to prevent chattering or rattling of the casing or housing on its support; such blocks having inner tapered surfaces to correspond to the tapered surface of said ring or flange 3, and associated with one of such blocks may be provided a locking screw 12 to cause such block to have an impinging and locking engagement with the ring or flange 3, whereby the casing or housing 5 may be held in different adjusted positions about the upper end of the dryer, it being understood that said casing or housing is supported to be manually and circumferentially adjusted about said dryer.

Extending radially from the casing or housing 5 is a shelf portion or extension 13 to provide a drain-board and said extension, together with an extension 14 of the bottom 8 of said casing or housing provides a discharge passage 15 of the conduit 6 to direct water from the conduit 6 and to discharge the same through a downwardly directed outlet 16 at the outer end of said shelf portion 13. The casing or housing 5 may be swung to position the shelf portion 13 and its outlet 16 over the tub A, as shown in full lines in the figures, or over a receptacle or receptacles, as shown in dotted lines, (although the receptacles have been omitted), whereby the attendant doing the washing and drying operation may select the point of discharge of the water from the dryer. While the passage 15 conducts the water from the conduit 6 to the point of discharge, the shelf portion 13 will catch drippings from clothes or other materials passed over the same from the tub or other receptacle to the dryer, and conduct such drippings from the shelf to the tub or other receptacle.

The top of the casing or housing 5 is provided with an enlarged annular opening 17 for the placing or removal of the extracting receptacle, to be described, and through which there also has movement a lid or cover for such receptacle, as will be explained.

Normally overlying and extending diametrically across the opening 17 of the casing or housing 5 is a support 18, which is hinged at 19 to one side of the housing to permit said support to be raised and lowered and a locking means, as at 20, is adapted to secure said support in place, when lowered. Secured through said support and preferably mediate its ends is a tubular member 21, see Fig. 3 and reciprocally carried through said tubular member is a push rod 22 having a button 23 secured to its upper outer end, and connected with its lower inner end is an annular grooved member 24 provided with a seat 25. Carried by said tubular member 21 is an annular plate 26 forming a lid or closure for the upper end of a vertically disposed rotatable extracting container or receptacle 27. Said plate 26 has a central hub structure 28 to receive a suitable self aligning ball bearing connection 29 between said plate and said tubular member 21. The outer edge of said plate 26 is formed or provided with a preferably under-curved bearing portion or surface 30, see Fig. 4.

Secured to the under side of the plate 26 is a plate 31, which, at diametrically opposite points, in positions transversely disposed with respect to each other, are pairs of guides 32, see Figs. 4 and 5 for reciprocally arranged locking and supporting bars 33 having tapered outer ends, as at 34. This plate 31 is so shaped by pressing or otherwise, as to be inclined away from the lower end of the tubular member 21, and formed or provided in axial alignment therewith, with a depending cone-like portion 35 having a seat 36 facing the seat 25 in the grooved member 24 on the end of the push rod 22, see Fig. 3. In said seats 25 and 36 is carried a coil spring 37 normally expanded to retain the push rod 22 in its upper extended position, as shown in Fig. 3. The bars 33 have pivotally connected to their inner ends bell-crank levers 38, the opposite ends of which operate in the annular groove of the grooved member 24 on the end of the push rod 22, and said levers are fulcrumed on supports 39 extending radially downwardly from the hub 28 on the plate 26. When these parts are in normal operative position, the bars 33 are in their outward extended positions, see Fig. 3. When the push rod 22 is depressed, compressing the spring 37, the bars 33 are retracted, in inoperative position, see Fig. 4.

The plates 26 and 31 provide an enclosure or housing in which is located the operative parts for actuating the bars 33, as will be seen from an examination of Figs. 3 and 4, and said enclosure or housing and said operating parts, including the bars 33 being carried by the support 18 hingedly connected to the casing or housing 5, it is obvious that the same may be swung from within the casing or housing 5 to an upper position, or lowered therein to a closed and operative position, the self aligning ball bearing connection between the plate 26 and the tubular member 21 permitting the enclosure, including the plates 26 and 31 and operative parts therewithin to rotate about the axis of said tubular member 21.

The extracting receptacle 27 which is disposed vertically and adapted to be rotated at a speed to bring about the centrifugal action desired for drying clothing and other materials therein and for expelling the water extracted therefrom into the conduit 6 of the casing or housing 5, comprises a container open at its upper end for loading the same and closed at its lower end and adapted to have connection with a driving element 40. Such driving connection preferably includes a plate 41 secured to the bottom of the receptacle 27 and the same is formed or pro-

vided with a depending axially disposed open ended bearing 42, and also depending from said plate 41 at diametrically opposite points are a pair of lugs 43; and it further includes a plate 44 secured to the element 40 having an upstanding axially disposed stud 45 which centers in the bearing 42 of the plate 41, and said plate is formed or provided with the diametrically disposed upstanding lugs 46, like the lugs 43 but normally at transverse positions thereto, and connected to and lying between the said lugs 43 of the upper plate 41, and the lugs 46 of the lower plate 44 is a flexible connection, comprising an annular ring of flexible materials 47, preferably of fiber and a very thin annular ring 48, preferably of steel. This connection, while providing a driving connection between the element 40 and the container 27 permits a flexing of such connection, whereby the container or receptacle 27 may have a slight vertical bodily movement imparted thereto and yet maintain such driving connection between these elements.

The container or housing 27 for the greater part of its lower portion is preferably of inverted truncated-cone-shape, while its upper portion is more or less truncated-cone-like in shape. In other words I prefer to construct said container or receptacle with a bulge-like body, the greatest diameter being about midway in its length. This may be accomplished by shaping the wall of the container or receptacle with the more or less well defined angular part 27′, or with a rounded bulge, although not shown, but will be understood, such shape being left to a question of practice with the manufacturer. At or adjacent the point of the bulge 27′ and preferably in the upper part of the body wall of said container or receptacle I provide the annular row of discharge openings 49 for the egress of the water extracted from the clothes or other materials loaded within such receptacle. Surrounding, preferably the upper half of the container or receptacle I provide the spaced encircling wall 50, connected at its lower end to the wall of the container or receptacle 27 at or about the point 27′, the space between the two walls being greater at the upper end than at the lower end of wall 50 due to said wall being carried upwardly at about the same inclination as the wall forming the lower portion of the container or receptacle 27, as is best seen in Fig. 3. The upper end of the wall 50 is preferably turned outwardly and downwardly, as at 51, being more or less arcuate in shape, and such curved portion 51 overlies the upper end of the ring or flange 7 of the housing 5, see Figs. 3 and 4. Connecting the upper ends of the wall 50 and the wall forming the container or receptacle, is a ring 52, its outer portion formed or provided with water passages 52′ between the two meeting surfaces, while an inner angular portion 53 of said ring has a convex surface 54 to provide a rest or seat for the curved surface 30 of the plate 26 adapted to act as the lid or closure for the upper end of the receptacle 27, when the same has been lowered into operative contact therewith, it being understood that when the plate 26 is brought into impinging contact with the ring 52 said plate 26 and parts carried thereby will be caused to rotate with said container or receptacle, when rotative movement is imparted thereto.

When the container or receptacle is being revolved it is preferable that it be caused to assume the position seen in Fig. 3, with the curved upper end of the container or receptacle raised slightly above the ring or flange 7 of the casing or housing 5, but when in inoperative position, being the loading position, it is preferable to have such curved portion 51 resting on the ring or flange 7, as shown in Fig. 4. In this latter position there is little or no chance of water or suds dripping from the clothes or other materials, being loaded into the receptacle, finding their way out of the conduit 6 of the casing or housing, or the upper edge of the ring or flange 7 and streaking down the outer wall 50 and onto the main wall of the casing or container and marring the exterior surface thereof.

Furthermore the structure shown, provides in effect, for the suspension of the container or receptacle from the enclosure, including the plates 26 and 31, and support 18, and permits when the lid 26 is in closed and locked position to lift the container bodily, raising the curved part of the wall 50 from off the ring or flange 7, and when said plates 26 and 31 are in open position the container or receptacle may drop slightly and the curved portion 50 of the container or receptacle rest on the ring or flange 7 and provide a seal against the escape of water or suds from the conduit 6 of the housing over the ring or flange 7.

In operation, the attendant, when lowering the support 18 and plates 26 and 31 will depress the rod 22 which will compress the spring 37 and at the same time actuate the levers 38 and withdraw the bars 33 into inoperative position, permitting said bars to be lowered, past the angular portion 53 of the ring 52 connected to the main wall of the container or receptacle and the wall 50. When the support is in closed position and the rod 22 is released the spring 37 acts to move the levers 38 and force the bars 33 outwardly, their tapered ends 34 riding under a like tapered surface 55 on the angular portion 53 of the ring 52 and lock the plates 26 and 31 into operative position with the ring 52 and container or receptacle and slightly raise the latter so as to lift the curved portion 51 of the wall of the container or receptacle from off the ring or flange 7 of the housing. The

flexible connection between the lower end of the container or housing permitting the vertical bodily movement of the container or receptacle, due to the action of locking and releasing the plates 26 and 31 with the container or receptacle, as it is believed will be understood.

The water expelled through the openings 49 in the container or receptacle, is, by centrifugal action carried to the top of the container or receptacle and between its main wall and outer wall 50 and discharged radially therefrom through the passages 52′ and deposited into the conduit 6 of the housing 5, from which it finds outlet through the radial passage 15 and outlet 16 into the tub A or other receptacle, depending on the position of the casing or housing 5 and the shelf portion 13 thereof.

The shape of the container or receptacle tends to crowd the clothing or other materials down into the lower part thereof, assisted by the inverted cone-like portion 35 depending from the plate 31 which has a tendency to crowd same equally about the center of the container or receptacle and more evenly balance the same.

What I claim is:—

1. In a centrifugal extractor, a rotatable receptacle having a body bulging circumferentially intermediate its ends and with water discharge openings in proximity to such bulging portion, a casing encircling said receptacle with one end joined thereto providing a water conducting chamber between said casing and receptacle and adapted to receive water expelled through the openings in said receptacle, and a member manually and circumferentially adjustable about said receptacle and having a conduit to receive water expelled from said water conducting chamber and provided with a discharge outlet adapted to be selectively positioned for the discharge of water at different positions circumferentially of said receptacle.

2. In a centrifugal extractor, in combination, a rotatable receptacle, a driving element, a flexible driving connection between said receptacle and element to permit the receptacle to be moved axially, a member supported at the top of the receptacle for receiving water expelled from the receptacle and in conjunction with the receptacle adapted to provide a seal when the receptacle is in loading position, a removable closure for the receptacle, and means for securing said closure to rotate with the receptacle and for lifting the receptacle to break said seal and to suspend said receptacle from said closure.

3. In a centrifugal extractor, in combination, a rotatable receptacle, a driving element, a flexible driving connection between said receptacle and element to permit the receptacle to be moved axially, a member supported at the top of the receptacle for receiving water expelled from the receptacle and in conjunction with the receptacle adapted to provide a seal when the receptacle is in loading position, a removable closure for the receptacle, means for securing said closure to rotate with the receptacle and for lifting the receptacle to break said seal and to suspend said receptacle from said closure.

4. In a centrifugal extractor, in combination, a rotatable receptacle, a driving element, a flexible driving connection between said receptacle and element to permit the receptacle to be moved axially, a housing supported at the top of the receptacle in a manner to adapt said housing to be manually and circumferentially adjusted about the receptacle and having a conduit for receiving water expelled from the receptacle and provided with a radial drain board extension and water conducting passage to be selectively positioned at different points about the receptacle, said housing having means acting in conjunction with the receptacle to provide a seal when the receptacle is in loading position, a removable closure for the receptacle, and means for securing said closure to rotate with the receptacle and for lifting the receptacle to break said seal and to suspend said receptacle from said closure.

5. In a centrifugal extractor, in combination, a rotatable receptacle, a driving element, a flexible driving connection between said receptacle and element to permit the receptacle to be moved axially, a member supported at the top of the receptacle for receiving water expelled therefrom and in conjunction with said receptacle adapted to provide a seal when the receptacle is in loading position, a support movably connected with said member, a closure rotatably connected with said support and adapted when the support is in one position to have an engaging relation with the receptacle to rotate therewith, means for securing said closure in closed position on the receptacle and for lifting the receptacle to break said seal and to suspend said receptacle from said support, and means for releasing said closure from the receptacle permitting the latter to move to loading position.

6. In a centrifugal extractor, in combination, a rotatable receptacle having a body bulging circumferentially intermediate its ends and with water discharge openings in proximity to such bulging portion, a casing encircling said receptacle with one end joined thereto providing a water conducting chamber between said casing and receptacle adapted to receive water expelled through the openings in said receptacle, and means movably supported in relation to the upper end of said receptacle and provided with an element adapted to extend into the receptacle for compressing materials placed within the receptacle to aid in the proper extraction of water from such materials, whereby such

water is discharged through the openings in said receptacle.

7. In a centrifugal extractor, in combination, a rotatable receptacle having a body bulging circumferentially intermediate its ends and with water discharge openings in proximity to such bulging portion, a casing encircling said receptacle with one end joined thereto providing a water conducting chamber between said casing and receptacle adapted to receive water expelled through the openings in said receptacle, a ring member connecting the corresponding ends of the receptacle and casing and so related to the casing as to provide water conducting passages for expelling water from the chamber radially of said receptacle, a housing supported to be manually and circumferentially adjusted about said receptacle and provided with a water conducting conduit and an outlet to receive and discharge water expelled by the receptacle at selected points thereabout, a support movably connected to said housing, a closure for the receptacle rotatably connected with said support and adapted to engage said ring for rotation therewith and with said receptacle, means for locking said closure in operative position in said ring, and means for releasing said locking means.

8. In a centrifugal extractor, a material holding receptacle closed at its lower and open at its upper end, means to rotate said receptacle from its lower end, means to flexibly connect the lower end of said receptacle with said rotating means, whereby to permit axial movement of the receptacle, liquid conducting means at the upper end of said receptacle adapted to receive liquid discharged from said receptacle, means to provide a seal between the upper end of said receptacle and said conducting means, and means to move the receptacle axially to effect and break said seal.

9. In a centrifugal extractor, a receptacle for drying clothes and other materials which is closed at its lower and open at its upper end and having an enclosing wall tapered outwardly from its ends to provide a mediate bulging portion with an annular row of water discharging openings in proximity to such bulging portion, a casing encircling said receptacle with one end joined thereto providing a water conducting chamber between said casing and receptacle and adapted to receive liquid expelled through the openings in said receptacle, and a closure for the open end of said receptacle having an element adapted to extend into the receptacle for compressing materials placed within the receptacle to aid in the proper extraction of water therefrom.

10. In a centrifugal extractor, a rotatable receptacle, means to receive liquid expelled from said extractor, a closure for the receptacle, a movable support for the closure, radially adjustable means to secure the closure to said receptacle, and means to actuate said radially adjustable means.

In witness whereof, I have hereunto affixed my hand this 30th day of April, 1927.

ALPHEUS W. ALTORFER.