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ROTARY OR SPINNING EXTRACTOR

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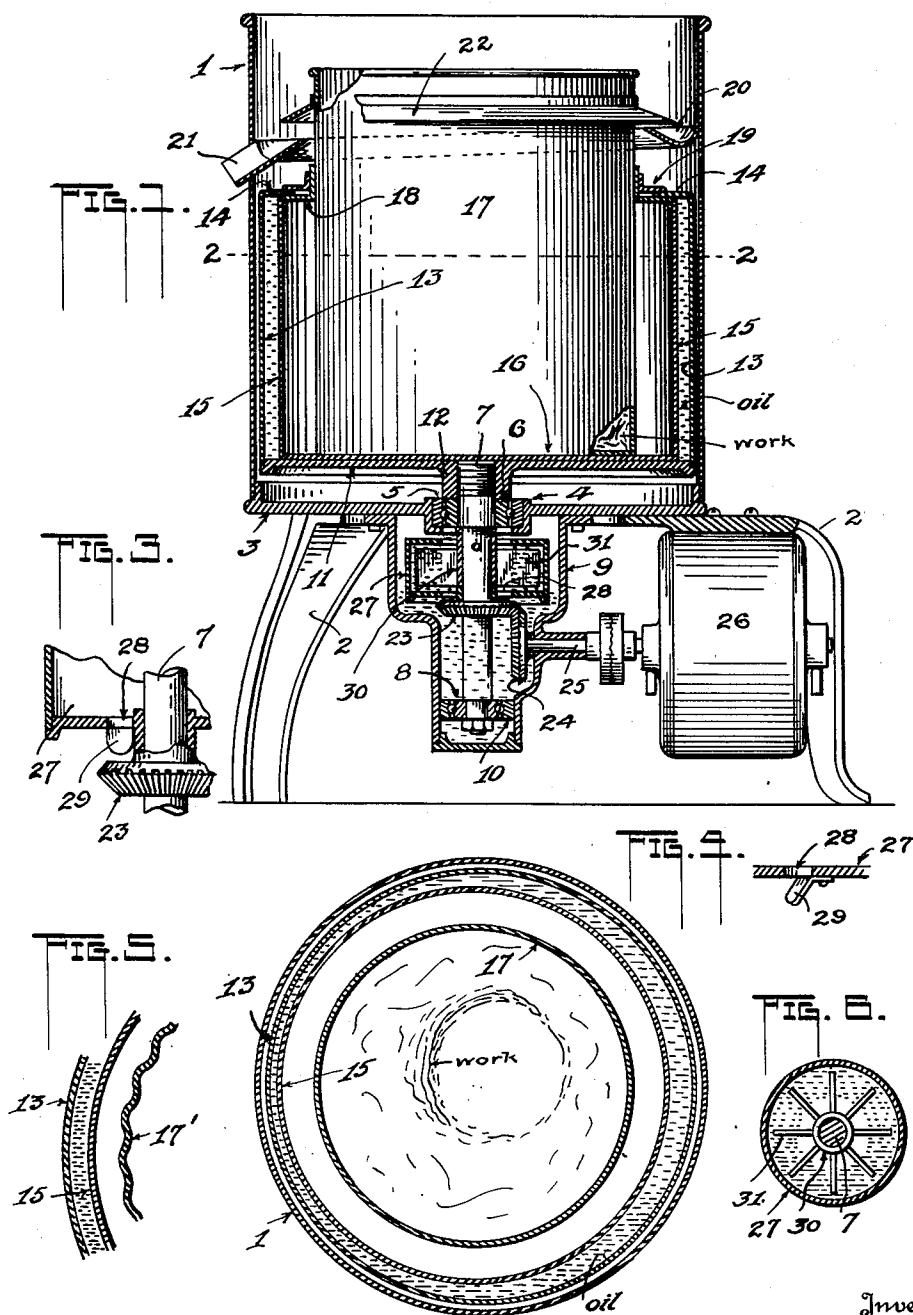


FIG. 2.

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ROTARY OR SPINNING EXTRACTOR

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This invention relates to rotary or spinning extractors particularly for use in drying clothes though adapted for other uses.

5 An object of my invention is the provision of a rotary or spinning extractor including a receiver for holding the work to be treated so arranged within a rotatable receptacle containing a liquid that under rotation of the latter said receiver with its load will
10 automatically centralize with respect to the axis of rotation of said receptacle.

15 An object, also, is the provision of a rotatable receptacle holding a liquid, and a receiver therein for the materials to be treated, said receiver being free to shift within the said receptacle and to rotate with it.

20 Another object is to furnish a power rotated container holding a liquid and to dispose therein a receptacle for a removable receiver for the materials to be treated, said receptacle and receiver being free to shift
25 bodily within the container whereby the center of rotating forces can coincide with the axis of rotation of such container.

30 A further object lies in providing two rotatable vessels, an inner and an outer one, so arranged that the inner one may shift with respect to the outer one, said outer vessel containing a confined liquid and having a constant position with respect to the driving axis, the position of the said inner vessel which
35 may contain a variable load being shiftable in position with respect to the said driving axis, the degree of shifting depending upon the center of the mass of its variable load and the rate of rotation with which it is driven, to the end that the center of combined load of the vessels will remain concentric with the
40 axis of rotation of such container.

45 Again, an object is to furnish a rotating or spinning extractor that may be rotated at an exceedingly high rate under load with practically no vibration in evidence.

50 In addition, the invention deals with certain structures to be pointed out herein aided by the accompanying drawing showing a preferred form of the extractor and wherein:

Figure 1 is a sectional elevation of the extractor of my invention.

Figure 2 is a transverse section of the extractor on line 2—2, Figure 1.

Figure 3 is an enlarged detail in sectional elevation of parts shown in Figure 1.

Figure 4 is a sectional elevation of parts shown in Figure 3 viewed from another angle.

Figure 5 is a transverse section of a part of a structure shown in Figure 2 with slight modification of one of the portions thereof, and Figure 6 is a plan of parts shown in Figure 1 with a portion shown in section.

In the drawing 1 designates, in this instance, an open-top drum or body suitably mounted at working height upon legs 2, the bottom 3 being preferably a casting central of which is a housing 4 to receive and retain in fixed position a ring 5 as one-half of a ball bearing structure. A ring 6 as the other half of the bearing is affixed to a vertically disposed shaft 7 to whose lower end is attached a similar ring 8. Secured to and depending from the bottom 3 is a housing 9 in which is fixed a companion ring 10 within which the said ring 8 is stationed. A plate 11 adapted to rotate in a horizontal plane has a boss 12 internally threaded to receive the threaded upper end of the said shaft 7, and said plate forms the bottom of a container 13, the walls of the latter being supported thereon in a liquid tight manner. Said container is open at its top but has an intumed rim or flange 14, and within the same is a receptacle 15 whose bottom 16 rests upon the plate or bottom 11. Likewise there is a receiver 17 for the materials to be treated, the same resting upon the bottom 16 of the receptacle 15. Said receiver is of less diameter than the said receptacle and extends well above the same and may be open at its top.

A ring 18, such as a casting, has a snug sliding fit on the walls of the receiver and overlies the top edge of the receptacle 15 and its upper surface just snugly fits beneath the ring or flange 14 of the container 13, and suitably affixed to the ring 18 is a second ring 19 which overlies part of the rim or flange 14 of the said container 13, both these rings forming a closure for the space between the container and receptacle.

The receiver 17 is fixed centrally of the receptacle 15 by means of the ring 18, the latter being suitably affixed to said receiver, and at its bottom the latter may be held from movement with respect to said receptacle. However, the receptacle and receiver are shiftable bodily with respect to the container 13 and to admit of this action the inner edge of the rim or flange 14 is spaced from the receiver 17, as shown in Figure 1, so that the said receiver and receptacle can move toward the wall of the container in any direction at will.

Affixed to the inner surface of the walls of the drum 1 is a trough 20 which is circular in form to extend entirely around and enclose the receiver 17 but spaced therefrom, and a drain lip 21 extends therefrom through the wall of the drum. Affixed to the receiver 17 is a hood 22 extending entirely around it and overhanging the said trough 20.

Mounted to rotate on the shaft 7 is a bevel gear 23 in mesh with a similar gear 24 on a shaft 25 driven by a motor 26, for example, affixed to the leg structure 2. Mounted to rotate with the gear 23 is a hollow drum-like member 27 having openings 28 in its bottom adjacent to which are depending deflector plates 29, Figures 3 and 4, and affixed to the shaft 7 is a sleeve 30 carrying a series of blades 31, the latter having a position to rotate within said member 27 free of the same.

A liquid, such as a heavy oil, or glycerine, for example, entirely fills the space between the walls of the receptacle 15 and those of the container 13 as shown in Figures 1 and 2, being sealed, practically, by the rings 18 and 19. Also, sufficient oil is placed in the housing 9 to partially cover the member 27. Upon applying power to the said member 27 its rotation in the proper direction causes the deflector plates 29 in-rushing through the oil in said housing 9 to be lifted into said member, and centrifugal force will hold the oil outward against the vertical walls of such member where it partially covers the blades 31 of the sleeve 30. In the rapid rotation of the oil it is clear that it will gradually start the blades into rotation and thus rotate the plate 11 with the parts resting thereon, and finally this rotation will practically equal that of the member 27, the rate of rotation being carried as high as desired or required for performing the service for which the extractor is designed.

If the container 13 is perfectly balanced it can, of course, be rotated at a high rate without vibration being present. Further, if the receiver and receptacle within the container were neither of them heavier at one side than at points diametrically opposite thereto, an ideal condition, then the exact centers of said receptacle and receiver would coincide with the axis of the driving shaft 7, and no out of balance condition would exist and no vi-

brations would be in evidence. If, however, these ideal conditions were lacking so that the named members had a heavy side, and they were secured to the plate 11 with their exact centers in line with the axis of the shaft 7, an altogether different action would result. Now, upon placing a load within the receiver 17, a quantity of clothes to be dried, for example, it is clear that it would be practically impossible to place parts of the bulk about the center of that member so that there would be no unbalance in rotation. My device is designed to compensate for this natural unbalance by permitting the center of the rotating mass to centralize with the axis of the driving shaft 7.

Many attempts have been made to construct a rotary or spinning extractor in which no vibrations would be present at the high speeds required for water extraction but so far as my knowledge extends it has always been the practice to fix the container for the materials being treated with respect to the driving axis of the machine, in consequence of which intense vibrations were present with no way of overcoming them.

Since, now, the receptacle 15 with its receiver 17 of my extractor are free to shift with respect to the container 13 it is clear that if the load in the said receiver is greatest at one side of the center of that member the center of the mass, as always, will naturally shift to centralize itself with respect to the driving axis—the shaft 7. As this results the receptacle and receiver will be bodily moved laterally against the confined body of oil in the container displacing a portion thereof and causing the displaced quantity to take up a position distributed around the receptacle 15, see Figure 2. In effect, therefore, the oil thus taking up the new position offsets the out-of-balance load of the "work" and the center of the mass, i. e., the oil, the receptacle 15, and the receiver 17 with its load, coincides with the axis of the shaft 7, as a result, the apparatus being vibrationless in consequence. Each new bulk of work treated means a different degree of compensation, ideal conditions arising in each and every instance without respect to very high rates of rotation.

The extraction of the moisture from the work can be complete due to the high velocities that may be employed, the materials being practically dry in but a few moments treatment.

The rapid rotation throws the water from such work over the walls of the receiver 17 and by the hood 22 is directed into the trough 20 and carried away.

The described bladed structure 30—31, and the member 27 merely act as a slow take up clutch, so to speak, setting the parts into rotation slowly, full speed finally resulting. It is to be understood, however, that any other type of clutch having like characteris-

tics may be employed, it being preferable to start with a slow rotation and gradually increasing in order that the center of the rotated mass be more gradually located.

5 The rings 18, 19 are provided to create a more or less perfect closure for the oil space besides centering the receiver 17 with respect to the receptacle 15. The said receiver is a separate part as herein shown in order that
10 it may be readily inserted and removed, but it may be fixed in position, or, in fact, the work could be placed in the receptacle 15 itself, though as constructed according to the drawing the free escape of the water would
15 be prevented, requiring a slight rearrangement of wall surface.

In Figure 5 is shown a portion of the wall of a container 13 as well as of the receptacle 15 while the wall of the receiver denoted at
20 17' is a slight modification of that described in that such wall is corrugated for strengthening purposes and may add to the water expressing act.

Changes of minor nature may be made in
25 the device but only such as may be deemed to lie within the invention and the claims thereto.

I claim:

30 1. An extractor including in its construction a rotatable liquid holding container, and a receptacle therein displacing a bulk of the liquid and free to shift in a lateral direction.

35 2. An extractor including in its construction an outer rotatable container for a liquid, and a receptacle therein seated on the bottom thereof displacing a bulk of the liquid, free to shift upon said bottom.

40 3. An extractor including a container adapted for rotation upon a vertical axis, a receptacle therein wholly spaced from the side walls thereof with a filling of a flowable substance interposed between their walls, said receptacle being free to shift under an unbalanced load therein with respect to the container's axis of rotation.
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4. An extractor including a container adapted for rotation upon a vertical axis, a receptacle therein, independent thereof and free to rotate therewith, the walls of both
50 being spaced apart with a flowable substance between said walls, said receptacle being free to shift under an unbalanced load therein whereby the total mass in said container may
55 centralize with the axis of rotation.

5. An extractor including in its construction a rotatable container holding a liquid, and a receptacle in the same rotated thereby and surrounded by the liquid of such container, said receptacle adapted to shift and being
60 free to shift with respect to said container.

6. An extractor including in its construction a rotatable container holding a liquid, means to rotate the same, and a receptacle
65 partially immersed in the liquid of such con-

tainer and free to shift with respect to the axis of rotation of the latter.

7. An extractor including a rotatable container holding a liquid, means to rotate the same, a receptacle having a position within
70 the container partially immersed in the liquid, its walls being spaced from those of the container, and free to shift with respect to the latter, and means for sealing the space between the walls of both the described mem-
75 bers.

8. An extractor including a rotatable container, means to rotate it, a receptacle of smaller diameter lying within such container free to shift with respect thereto, and said extractor having a free flowing substance filling
80 the space between the walls of the described members.

9. An extractor including a container adapted to rotate upon a vertical axis, a receptacle seated in the same spaced from its
85 side walls and free to shift with respect to such container, and having a flowable substance filling the space between the two members.

10. An extractor including a rotatable container mounted on a vertical axis, means to rotate it, a receptacle lying within the container free to shift with respect to the axis
90 of rotation of the said container, and a free flowing substance filling the space between the side walls of both members.

11. An extractor including a container mounted on a vertical axis, means to rotate it, a receptacle of smaller diameter than the container seated therein free to shift laterally
100 with respect thereto, a flowable substance filling the space between the walls of both members, a removable receiver seated in the receptacle, and means to prevent shifting of the receiver and receptacle relatively.

12. In an extractor, a container mounted on a vertical axis, a receptacle of smaller diameter than said container seated therein and free to shift laterally with respect thereto,
110 a flowable substance filling the space between the two members, power means, and means between the container and the power means adapted for imparting a gradual but increasing rate of rotation to said container.
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13. In an extractor, a container mounted on a vertical axis, a receptacle of smaller diameter than said container seated therein and free to shift laterally with respect thereto, a flowable substance filling the space between the
120 side walls of the members, a removable receiver in said receptacle, means to prevent shifting movement of the receiver with respect to said receptacle, means to rotate the container on its axis, power means, and means
125 to gradually start the first said means into rotation and adapted through said power means to increase the rate of such rotation.

14. An extractor of the spinning type including a container having a constant posi-
130

tion with respect to a vertical driving axis therefor, a receptacle therein for carrying loads variable in position, its side walls being spaced from the side walls of the said container, a flowable substance interposed between the two walls, the receiver under rotation adapted to move with respect to the container and its axis, the same shifting an amount of said substance within the container in proportion to the degree of such movement whereby the center of rotating forces within such container may center over said driving axis.

15. An extractor of the spinning type including a support, a container erected thereon including a drive-shaft disposed vertically, a power member for driving the shaft, means between the power member and shaft for gradually starting the container into rotation, an open receptacle within the container free to shift therein, the walls of the container and receptacle being spaced apart and having a liquid in the space between them, and a receiver in the receptacle to hold the work to be treated, the same being fixed with respect to said receptacle during rotation.

16. An extractor of the spinning type including a container adapted to be rotated on a vertical axis, a receiver therein supported thereby, the walls of both being spaced apart and having a fluid in the space between them, said receiver being free to shift in a lateral direction within the container, means to retain the fluid between the said walls of the members, and a receiver within the receptacle normally fixed with respect thereto during rotation, and removable therefrom.

17. An extractor of the spinning type including a container adapted to be rotated on a vertical axis, a receiver therein supported thereby, the walls of both being spaced apart and having a fluid in the space between them, said receiver being free to shift in a lateral direction within the container, means to retain the fluid between the said walls of the members, a receiver within the receptacle normally fixed with respect thereto during rotation, a support including a housing for containing a liquid, a shaft extending into said housing supporting the container, a series of blades affixed to the shaft, a drum-like member enclosing the blades and having an opening in an otherwise closed bottom, a deflector depending from the bottom at said opening, and power means for rotating the said drum-like member.

In testimony whereof I affix my signature.
WILLIAM G. PETERS.