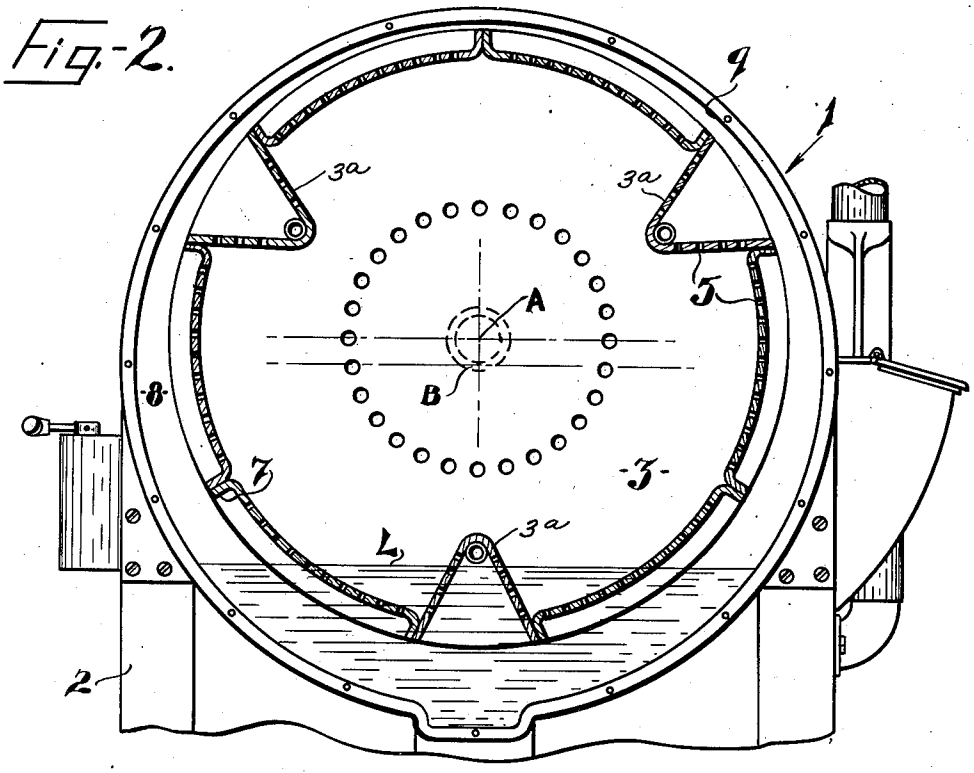
Oct. 10, 1939. L. ZIMARIK 2,175,936

WASHING MACHINE

Filed June 19, 1935 2 Sheets-Sheet 1

Fig.-2.



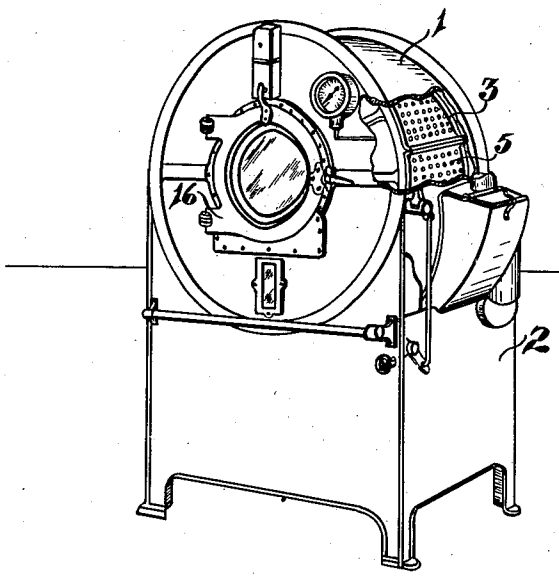


Fig.-1.

INVENTOR.
Louis Zimarik
BY
Bodell & Thompson
ATTORNEYS.

Oct. 10, 1939. L. ZIMARIK 2,175,936

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Fig. 3.

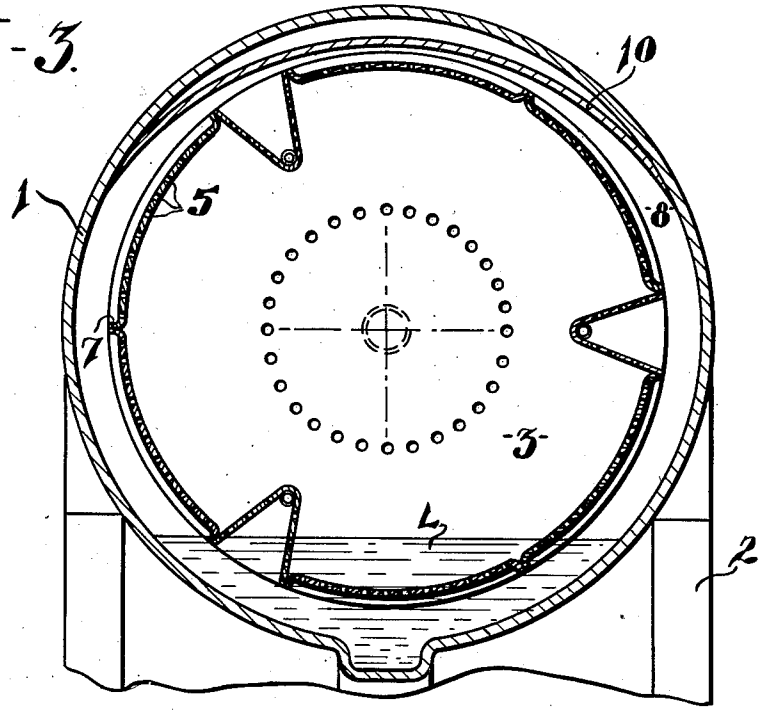
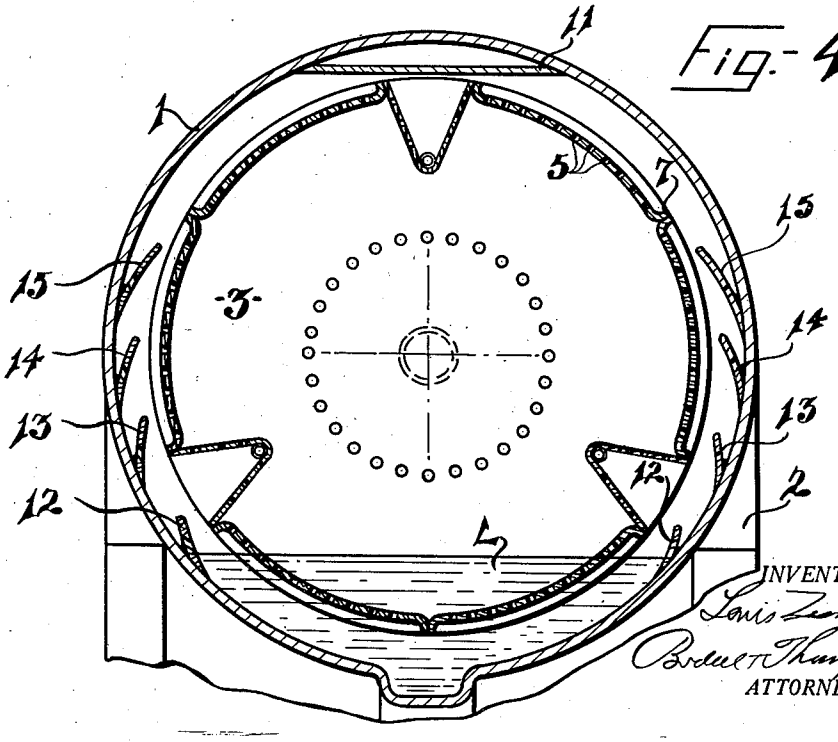


Fig. 4.



INVENTOR.
Louis Zimarik
Bodell & Thompson
ATTORNEYS.

Patented Oct. 10, 1939

2,175,936

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WASHING MACHINE

Louis Zimarik, Syracuse, N. Y., assignor to The Prosperity Company, Inc., Syracuse, N. Y., a corporation of New York

Application June 19, 1935, Serial No. 27,370

13 Claims. (Cl. 68—139)

This invention relates to washing machines of the type in which the clothes container is a drum, or in the general form of a drum, or hydro-wheel, movable about an axis in the casing in which a cleaning fluid is placed to a given level, and has for its object a means, or an arrangement of the drum and the casing, which means, during movement of the drum about its axis, causes the fluid to be carried around the drum, and in addition forced radially inward through the perforated wall of the drum into the interior thereof from the space between the drum and the casing.

The cleaning fluid used in a washing operation is filled into the casing to a level considerably below the axis of the container, thereby providing a relatively low level of cleaning fluid within the casing. It will be seen, therefore, that less cleaning fluid is required in the present machine as compared to washing machines now on the market using a relatively high level of cleaning fluid which extends substantially to the axis of the container and consequently requiring the use of considerably more cleaning fluid in order to fill the washing machine to substantially the axis of rotation of the container. In the present washing machine the use of less cleaning fluid results in considerable savings of water, detergents and other cleaning fluids, but due to the characteristics of the machine the clothes or other material therein are thoroughly cleansed in a minimum amount of time.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a perspective view, partly in section, of a washing machine embodying this invention.

Figure 2 is an enlarged, transverse, sectional view through the clothes container drum, or hydro-wheel, the casing and contiguous parts of the base of the machine being also shown.

Figures 3 and 4 are views similar to Figure 2 of other embodiments of the invention shown in Figure 2.

Insofar as this invention is concerned, the machine comprises a casing for receiving a washing fluid, solvent etc., to a given level by partly submerging the clothes in the container, or drum, with a space around the drum between it and the casing, the drum being rotatable about an axis and being foraminous, or perforated, or reticulated, and means for causing the fluid to be forced inward into the drum while being carried through the space around the drum during the movement of the drum about its axis.

The washing fluid may be water, with or without soap, or chemicals, or a dry cleaning solvent. The casing is preferably in the general form of a complete cylinder and preferably arranged with its axis extending horizontally.

1 designates the stationary, cylindrical, horizontal casing mounted on a suitable base 2.

3 is the clothes container, drum, cage, or hydro-wheel, mounted in the casing to move about a horizontal axis A. During the washing operation, the drum is oscillated about its axis, or moved several times in one direction about its axis, and then several times in the other direction, this turning first in one and then in the other direction being repeated throughout the washing period, or operation. The drum 3, or at least the circumferential wall thereof, is foraminous, or formed with slots or perforations, and the term "perforated" is used in its general sense, and intended to comprehend any open work, or mesh, construction, wherein the wall of the drum permits the fluid to pass as freely as possible therethrough. As here shown, the drum is formed of sheet metal having perforations 5 therethrough located close together. The perforated cylindrical wall of the drum is also formed with inwardly extending hollow perforated ribs, or buckets 3ª which facilitate the lifting and tumbling of the clothes during the movement of the drum about its axis. The ribs extend lengthwise of the drum from end to end and the space between the hollow walls thereof open through the periphery of the cylindrical wall forming an inlet for a copious supply of fluid lifted or circulated up through the passages on opposite sides of the drum. The ribs or buckets also provide means whereby the cleaning fluid is forced therethrough directly upon the clothes or other material in the drum. The drum is also formed with peripheral blades or paddles 7 which act to carry, or pump, the fluid upward from the bottom portion of the casing around the drum, as the drum moves in one direction or the other about its axis.

The forcing of the fluid radially inward into the drum through the foraminous perforated, or reticulated, wall of the drum as the fluid is carried, or pumped, upward around the drum by the movement of the drum about its axis, includes means as a wall of the casing located nearer the periphery of the drum than the remainder of

the casing, so that it restricts the passage of the fluid through the space around the container on one side, as the upper side of the drum, so that due to the restriction, the fluid is forced, or squeezed, radially inward to the drum against the centrifugal force imparted to the fluid. The pressure of the fluid is greatly increased by the pumping action of the drum, due to the paddles 7.

In the construction shown in Figure 2, the restricted passages 8 are provided on opposite sides of the drum by the upper portion 9 of the cylindrical wall of the casing being located nearer the axis A of the drum than the remainder of said wall of the casing, and this is accomplished by mounting the drum with its axis A eccentric to and above the axis B of the cylindrical casing.

In Figure 3, the drum is mounted concentric with the axis of the casing, but the restriction of the passages 8 is effected by providing an arcuate wall, partition or plate 10 around the upper side of the drum, the center of the arc of this partition or plate being below the common axis of the casing and the drum.

In Figure 4, a baffle, or partition 11 is shown in the casing above the drum to restrict the passages 8, this baffle, or partition being shown as a flat plate located in the chord of an arc of the curve of the casing.

Also, as shown in Figure 4, the means for forcing the fluid radially inward into the drum may comprise, or include, a series of deflectors 12, 13, 14, 15, secured to the wall of the casing on opposite sides of a vertical plane containing the axis, or axes, of the drum and casing, the inner edge of each deflector terminating nearer the periphery of the drum than the preceding deflector of the series from the lowermost deflector 12 of each series toward the uppermost deflector 15.

The casing is here shown as formed with an axial loading and unloading door 16 which is alined with an axial door, or door opening in one head of the drum. The drum is supported in the casing and actuated in any suitable manner. Neither the door, nor the supporting and actuating mechanism of the drum, form part of this invention.

In any form of the invention, during the rotation of the clothes container, the fluid is carried from the lower portion of the casing 1 upwardly above the normal level of the fluid into one or the other of the contracting passages where it is forced or squeezed radially through the perforated periphery of the container into the container and onto the clothes, this forcing-in operation taking place for the most part in the upper portion of the container, adjacent to where it runs closest to the top wall of the casing.

In operation, the fluid is filled into the lower portion of the casing to a level L, a considerable distance below the axis of the container. During movement of the drum about its axis, the fluid is carried from the lower, or sump portion of the casing up one or the other of the passages 8, and during its movement through either of these passages is forced inward through the perforations of the casing, due to the restriction of these passages at the upper portion of the casing.

By this invention, the washing operation is greatly facilitated due to the forcing action of the fluid radially inward directly upon the clothes or other material in the drum.

What I claim is:

1. In a washing machine, a cylindrical casing for receiving a cleaning fluid, a cylindrical container of relatively large diameter mounted in the casing to provide tapering substantially arcuate passages between the exterior container wall and the inside wall of the casing at each side of the container, the periphery of the container being perforated, said perforations being substantially over the entire circumferential area, closures for the ends of the container, a plurality of spaced buckets, each having an opening substantially flush with the walls of the container and extending radially inwardly a substantial distance, the walls of the buckets being perforated substantially throughout their area and providing continuous, simultaneous spraying of liquid from the exterior walls of the buckets inwardly thereof and also through the perforated walls of the container intermediate of the buckets, whereby there is a continuous spraying through the walls of the container and the buckets during the rotation of the container in one direction or the other.

2. A washing machine as described in and by claim 1 wherein radially outwardly extending paddles are formed on the container wall intermediate of the buckets.

3. A washing machine as described in and by claim 1 wherein paddles are formed on the container wall intermediate of the buckets, the said paddles being integral with and a part of the container wall and extending radially outwardly beyond the periphery of the container wall.

4. In a washing machine, a casing for receiving a cleaning liquid, a perforated cylindrical container mounted in the casing to move about a horizontal axis, the container and the casing being arranged relative to each other to provide passages on opposite sides of the container, the outer walls of which passages contract toward the periphery of the container and force the liquid inwardly through the perforations of the container during rotation of the container about its axis in one direction or the other, the lower portion of the casing serving as a sump for the cleaning liquid and being free of obstruction, whereby the liquid is carried up into one or the other of said passages during the rotation of the drum and forced radially inward by the outer walls of said passages.

5. In a washing machine, a casing for receiving a cleaning liquid, a perforated container mounted in the casing to move about a horizontal axis, a partition in the upper part of the casing between the interior wall of the casing and the exterior wall of the container, the said partition being arranged so as to provide passages on opposite sides of the container, the outer walls of which passages contract toward the periphery of the container and force the liquid inwardly through the container during rotation of the container about its axis in one direction or the other, the lower portion of the casing serving as a sump for the cleaning liquid and being free of obstruction, whereby the liquid is carried up into one or the other of said passages during the rotation of the drum and forced radially inward by the outer walls of said passages, and enabling use of a low liquid level of the cleaning liquid in the casing.

6. A washing machine as defined in and by claim 5 wherein, spaced perforated buckets are provided in the container and extend radially inwardly thereof.

7. A washing machine as defined in and by claim 5 wherein, radially outwardly extending

spaced paddles are provided on the exterior wall of the container.

8. In a washing machine, a casing for receiving a cleaning liquid, a perforated container mounted in the casing to move about a horizontal axis, spaced perforated buckets extending radially inwardly of the container, spaced paddles extending radially outwardly of the container, a partition in the upper part of the casing between the interior wall of the casing and the exterior wall of the container, the said partition being arranged so as to provide passages on opposite sides of the container, the outer walls of which passages contract toward the periphery of the container and force the liquid inwardly through the container and buckets during rotation of the container about its axis in one direction or the other, the lower portion of the casing serving as a sump for the cleaning liquid and being free of obstruction, whereby the liquid is carried up into one or the other of said passages during the rotation of the drum and forced radially inward by the outer walls of said passages, and enabling use of a low liquid level of the cleaning liquid in the casing.

9. In a washing machine, a casing for receiving a cleaning liquid, a perforated container mounted in the casing to move about a horizontal axis, a partition in the upper part of the casing between the interior wall of the casing and the exterior wall of the container, the said partition being arranged so as to provide passages on opposite sides of the container, the outer walls of which passages contract toward the periphery of the container and force the liquid inwardly through the container during rotation of the container about its axis in one direction or the other, the lower portion of the casing serving as a sump for the cleaning liquid and being free of obstruction, whereby the liquid is carried up into one or the other of said passages during the rotation of the drum and forced radially inward by the outer walls of said passages, and deflectors positioned on the horizontally diametrically opposite interior walls of the casing below the said partition to provide additional contracting passages for forcing the liquid inwardly through the container during rotation thereof about its axis in one direction or the other, and enabling use of a low liquid level of the cleaning fluid in the casing.

10. A washing machine as defined in and by claim 9 wherein, spaced perforated buckets are provided in the container and extend radially inwardly thereof.

11. A washing machine as defined in and by claim 9 wherein, radially outwardly extending spaced paddles are provided on the exterior wall of the container.

12. In a washing machine, a casing for receiving a cleaning liquid, a perforated container mounted in the casing to move about a horizontal axis, spaced perforated buckets extending radially inwardly of the container, spaced paddles extending radially outwardly of the container, a partition in the upper part of the casing between the interior wall of the casing and the exterior wall of the container, the said partition being arranged so as to provide passages on opposite sides of the container, the outer walls of which passages contract toward the periphery of the container and force the liquid inwardly through the container and buckets during rotation of the container about its axis in one direction or the other, the lower portion of the casing serving as a sump for the cleaning liquid and being free of obstruction, whereby the liquid is carried up into one or the other of said passages during the rotation of the drum and forced radially inward by the outer walls of said passages, and deflectors positioned on the horizontally diametrically opposite interior walls of the casing below the said partition to provide additional contracting passages for forcing the liquid inwardly through the container during rotation thereof about its axis in one direction or the other, and enabling use of a low liquid level of the cleaning fluid in the casing.

13. In a washing machine, a casing for receiving a cleaning liquid, a perforated cylindrical container mounted in the casing to move about a horizontal axis, the container and the casing being arranged relative to each other to provide passages on opposite sides of the container, the outer walls of which passages contract toward the periphery of the container and force the liquid inwardly through the perforations of the container during rotation of the container about its axis in one direction or the other, the lower portion of the casing serving as a sump for the cleaning liquid and being free of obstruction, whereby the liquid is carried up into one or the other of said passages during the rotation of the drum and forced radially inward by the outer walls of said passages, and enabling use of a low liquid level of the cleaning liquid in the casing.

LOUIS ZIMARIK.