Nov. 18, 1941. A. MILLER 2,262,955

APPARATUS FOR WASHING

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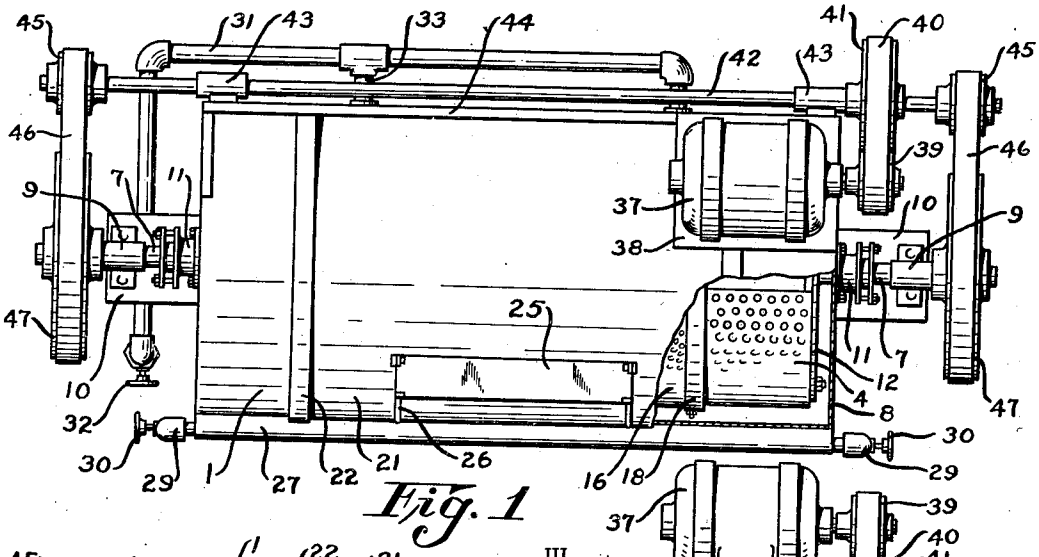


Fig. 1

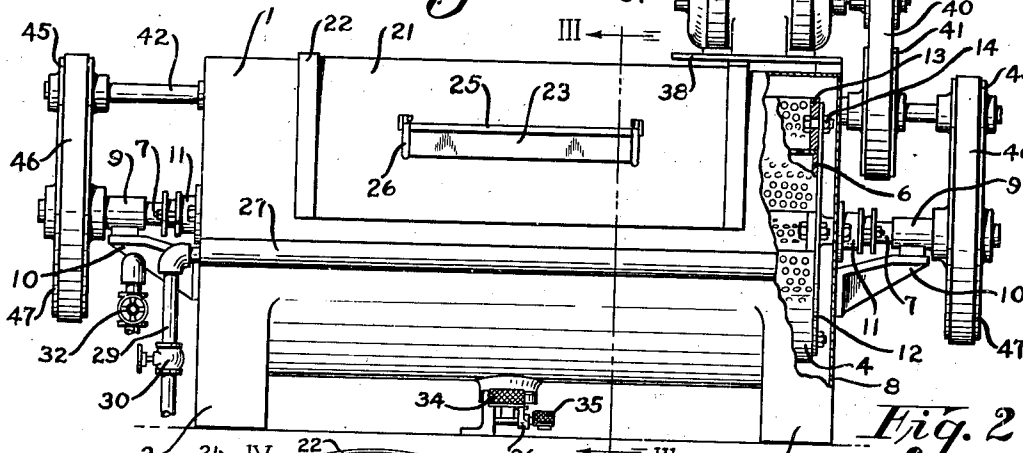


Fig. 2

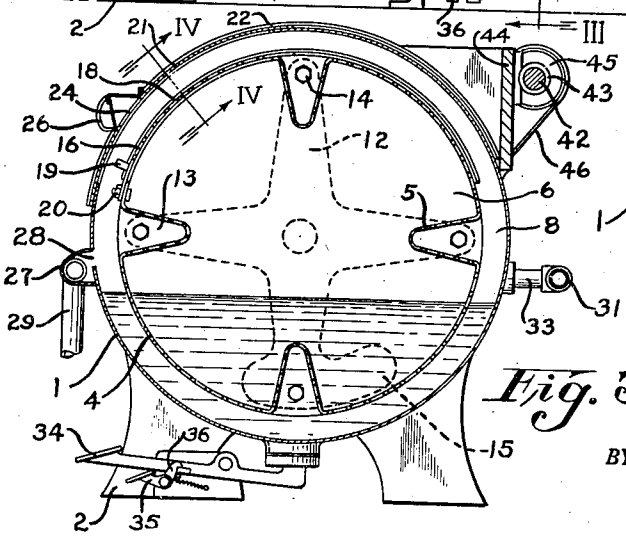


Fig. 3

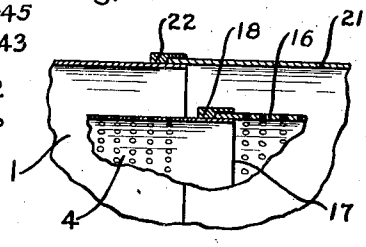


Fig. 4

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APPARATUS FOR WASHING

Abe Miller, Detroit, Mich.

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3 Claims. (Cl. 68—208)

This invention relates to washing machines, and in particular it relates to an improved washing apparatus which embodies means for facilitating the removal of impurities during the washing cycle. More particularly, the invention relates to a washing apparatus having in combination a trough extending parallel to and above the normal water level within the washer and adaptable at predetermined periods to carry away surface impurities in the water.

In washing machines particularly of the commercial type, it is generally customary to carry out both the washing and rinsing operations within the same container. After the laundry has been washed it is conventional practice to drain the cleansing water from the tank. As the water is usually drained from the lower portion of the container the soap suds and other impurities which float at the surface of the water settles on top of the washed laundry. It therefore requires repeated rinsing to dislodge and remove these surface impurities. As the element of time is an important factor in commercial laundries, any saving in the time element is of utmost importance.

In accordance with the practice of my invention I provide an apparatus which includes means for effectively disposing of surface impurities. This means includes a drain conduit disposed horizontally of the washing container and above the normal level of the water and provided with a plurality of openings open to the interior of the container. One or both ends of the horizontal conduit is provided with a shut-off valve, and these valves are closed during the washing operation. When the washing cycle is completed a valve for introducing water into the container is opened to raise the level of the water and the drain conduit valves are opened. This causes the surface water to flow toward and into the drain to carry away the surface impurities and prevent their deposit upon the laundry. The inlet water supply is dis[illegible] diagonally opposite the drain conduit, and by providing one or more inlet connections the force of the in-rushing water at or near the surface of the water level facilitates movement of the surface impurities toward the drain conduit. After a predetermined period of surface water removal, the main container drain is opened which empties the fluid contents of the container. During this operation the inlet valves may or may not be closed as directly thereafter the rinsing operation is carried on.

It is therefore among the objects of my invention to provide a washing machine which includes features for improving the cleansing of laundry; to provide a washing machine which decreases the time cycle of washing; and, to provide a washing machine which may be manufactured efficiently as new equipment, or which as an attachment may be applied to existing machines. These and other objects and advantages appear more fully in the following detailed description when considered in connection with the accompanying drawing, in which:

Fig. 1 is a plan view partly in section of the complete washing apparatus;

Fig. 2 is a side elevational view thereof, partly in section;

Fig. 3 is a transverse view in section, taken along lines III—III of Fig. 2; and,

Fig. 4 is a view in section of a portion of the washing machine door, the section being taken along lines IV—IV of Fig. 3.

Referring to the drawing and in particular to Figs. 1 and 2, I show an embodiment of my invention in the form of a commercial type laundry washing machine comprising, essentially, a horizontally disposed cylindrical tank as denoted by the reference character 1. The tank is supported from the floor by legs 2 and 3. A perforated cylindrical container 4 lies within the tank 1 and is rotatably adapted therein. This perforated container functions as a receptacle for the laundry and is made as large as possible, allowing clearance only for its rotation within the tank 1.

For purposes of agitation during the washing operation the perforated container 4 is shaped to provide a plurality of baffles 5 (Fig. 3) extending horizontally of the container and substantially radially of the container. End plates 6 provide an enclosure for each end of the container 4. In order to support the container 4 in an axial relationship within the tank 1 shafts 7 are mounted at each end of the tank and containers. The shafts 7 extend through end plates 8 which enclose the ends of the tank 1 and are mounted in bearings 9 supported by brackets 10 attached to the end plates 8. Also attached to each end plate 8 is a stuffing box 11 through which the shafts 7 extend. The perforated container 4 is secured to the shafts 7 by means of a flange 12 rigidly fastened to each shaft 7. The formation of the baffles 5 provides V-shaped openings into each of which are fitted and secured a heavy plate 13. The flange 12 extending from each shaft 7 lies adjacent the heavy plates 13, and bolts 14 join

these members securely together, thus completing the mechanism for rotatably supporting the perforated container 4 within the tank 1. Each flange 12 is provided with a counterbalance portion 15 for compensating for the additional weight of a sliding door, and associated members forming part of the perforated container, described hereinafter.

In order to insert and remove laundry from the perforated container 4 a sliding door 16 is provided as shown in Figs. 3 and 4. The sliding door is also perforated and is arcuate in form to suit the conformity of the wall of the container 4. In complimentary relationship with the door is an opening 17 in the wall of the container 4. The size of this opening is determined in accordance with the convenience required to insert or remove laundry from the container. Retaining members 18 are positioned on either side of the sliding door and are attached to the wall of the container 4. Each of the retaining members are provided with a recess which in combination with the wall of the container enables the door 16 to be slidably retained in a position adjacent the wall of the container 4. A handle 19 permits an operator to grasp and actuate the sliding door.

During the washing cycle it is necessary that the sliding door 16 be securely locked in position. This is accomplished by providing a bolt 20 attached to the wall of the container 4 and adaptable to engage a slot in the sliding door. A wrench may be applied to the bolt 20 for tightening or loosening the sliding door relative to the wall of the container 4.

The tank 1 is also provided with a sliding door 21. This door is substantially the same size as the sliding door 16 on the container 4 and is positioned for alignment therewith. The sliding door 21 is arcuate in form and is adapted to conform with the curvature of the wall of the tank 1. A pair of guide members 22 flank the sides of the sliding door and are attached to the wall of the tank 1. The guide members include recesses which in co-operation with the wall of the tank form slide ways for retaining the door 21 in slidable relationship with the tank wall.

Located on the sliding door 21 is a continuation wall 23 forming an enclosure around an opening 24 through the wall of the sliding door 21. The purpose of this opening is to permit the introduction of soaps or other detergents into the tank without opening the sliding door. A hinged cover 25 forms a closure for the opening 24. Handles 26 extend from the end portions of the continuation wall 23 and serve as manual means for opening and closing the sliding door 21.

Extending horizontally of the tank 1 is a conduit 27 located on the outside of the tank and at a point slightly below the central plane of the cylindrical tank. A horizontal opening 28 extends through the wall of the tank and forms a communicating passageway between the interior of the tank and the interior of the conduit. As a result of this construction a trough is formed horizontally of the tank. It is also essential that the lower edge of the opening 28 lies above the lower interior surface of the conduit 27. The opening 28 may be in the form of a continuous horizontal communication or the opening may be interrupted to form a plurality of shorter openings or rows of apertures. At one or both ends of the conduit 27 and communicating therewith is a pipe line 29 connected to a drain. A valve 30 interposed between lengths of the pipe line 29 permits the valve to be turned off during the washing cycle and when opened to allow the effective functioning of the trough conduit during the rinsing cycle. The horizontal opening or openings 28 are located above the normal level of the water contained within the tank. Generally, the water level as contained within tanks of this description lie between one-quarter and three-eights of the diameter of the tank. Thus the opening 28, being above the water level but below the central plane of the tank will lie below the central plane of the tank but above a point lying half way between the center of the tank and the bottom of the tank.

Means for introducing water into the tank is provided in the form of a conduit 31 connected to a source of water supply and equipped with a shut-off valve 32. The conduit 31 communicates with the interior of the tank through one or more pipe fittings 33. These fittings through which water is introduced into the tank are disposed substantially opposite the trough conduit 27. The purpose of this location is to permit the introduction of water at a place whereat the pressure and flow of water will assist in moving surface water in the tank in the direction of the trough conduit 27. It is preferable to provide at least two water inlets in order to distribute the force and flow of water directed toward the trough conduit.

At the lower terminus of the tank is a foot operated valve 34, of a quick-opening conventional type. A secondary foot pedal 35 includes a latch member 36 which retains or releases the valve 34 upon actuation of one or the other foot pedal. In washing machines of this type it is generally customary to provide a trough (not shown) in the floor below the valve 34 to facilitate the rapid draining of the tank.

During the washing cycle the perforated container 4 is rotated continuously, or by means of electrical timing devices (not shown) the drive for rotating the perforated container may be reversed so as to cause a periodic reverse rotation of the container. An example of a drive is illustrated in the form of a motor 37 supported on a plate 38 attached to the top of the tank 1. Through a motor pulley 39, belt 40 and pulley 41 a countershaft 42 is driven. The countershaft is supported by bearings 43 secured to a plate 44 attached to the tank. Keyed to each end of the countershaft is a pulley 45 which through a belt 46 drives a pulley 47 keyed to each of the shafts 7, thus causing rotary movement to be imparted to the perforated container 4.

In the operation of the washing machine the tank is partially filled with water, the laundry inserted, soap added, and the perforated container is rotated. This constitutes the washing cycle and during this period the valves 30 are closed. After the washing cycle it is generally customary to drain the water from the tank and refill it with clear water, after which the container is again rotated. This operation is repeated several times until the laundry is adequately rinsed. However, in accordance with the practice of my invention instead of draining the dirty water from the tank one or both valves 30 are opened and thereafter the inlet valve 32 is opened. This operation results in a rise in the water level until the surface water flows into the trough conduit 27 from whence it is conveyed to a drain. At the same time the force and flow of the inlet water, being located at the water level and opposite the trough conduit, assists in caus-

ing a movement of the surface water in the direction of the trough conduit. Thus, dirt and impurities which ordinarily float on top of the water and which would otherwise be redeposited on the laundry are removed. After a short period of water introduction the valve **32** is closed and the principal drain valve **34** is opened. Thereafter fresh water may be introduced into the tank and after a short rinsing operation the surface overflow cycle may be repeated.

By an apparatus as herein described it is possible to reduce the number of rinsing operations customarily required, thus reducing the time cycle for the entire operation, resulting in a saving in the consumption of water and ultimately obtaining a whiter laundry.

While I have thus shown and described a preferred embodiment of my invention it is to be understood that it is susceptible of modifications and that I contemplate those modifications which appear related and which appear within the scope of the appended claims.

Having thus described my invention which I claim is:

1. In a washing machine comprising a horizontally disposed cylindrical tank and a perforated cylindrical container rotatable within the tank, an enclosed drain conduit extending horizontally of the tank and having an opening along substantially the entire length of the conduit forming a communication between the conduit and the interior of the tank, and a water inlet pipe communicating with the interior of the tank and lying on the opposite side of the tank in substantially the same horizontal plane as said conduit whereby water from the inlet pipe is directed in a straight path toward the drain conduit.

2. In a washing machine comprising a horizontally disposed cylindrical tank and a perforated cylindrical container rotatable within the tank, an enclosed drain conduit extending horizontally of the tank and having an opening along substantially the entire length of the conduit forming a communication between the conduit and the interior of the tank, said horizontally extending conduit lying below the central plane of the tank and above a point lying midway between the horizontal central plane of the tank and the bottom of the tank, and a water inlet pipe communicating with the interior of the tank and lying on the opposite side of the tank in substantially the same horizontal plane as said conduit, whereby water from the inlet pipe is directed in a straight path toward the drain conduit.

3. In a washing machine comprising a horizontally disposed cylindrical tank and a perforated cylindrical container rotatable within the tank, an enclosed drain conduit extending horizontally of the tank and having an opening along substantially the entire length of the conduit forming a communication between the conduit and the interior of the tank, the lower inner surface of the conduit lying below the lower edge of said opening, said horizontally extending conduit lying below the central plane of the tank and above a point lying midway between the horizontal central plane of the tank and the bottom of the tank, and a water inlet pipe communicating with the interior of the tank and lying on the opposite side of the tank in substantially the same horizontal plane as said conduit, whereby water from the inlet pipe is directed in a straight path toward the drain conduit.

ABE MILLER.