March 10, 1936. E. R. GOULD 2,033,630

WASHING MACHINE

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Fig. 1.

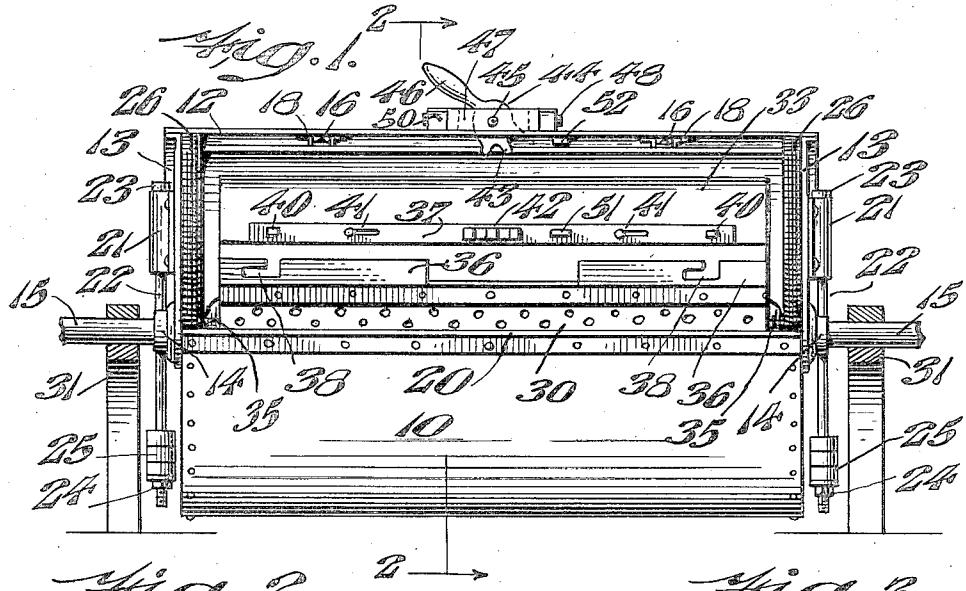


Fig. 2.

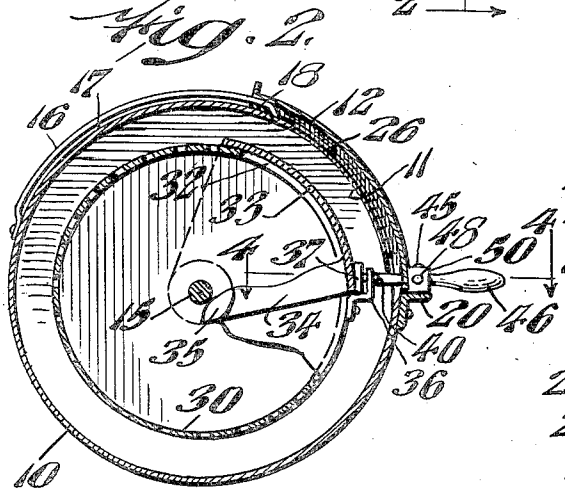


Fig. 3.

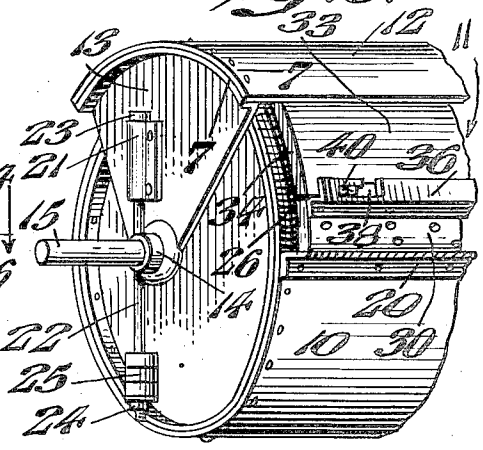
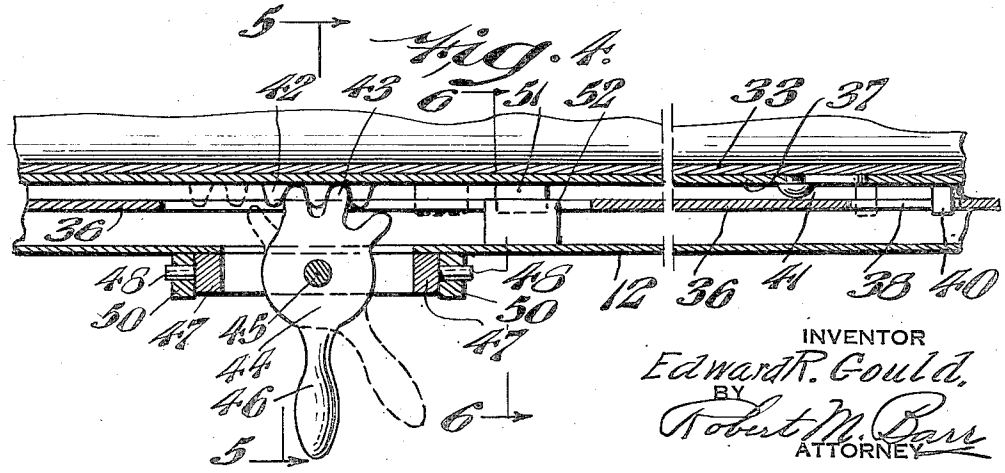


Fig. 4.



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Fig. 5.

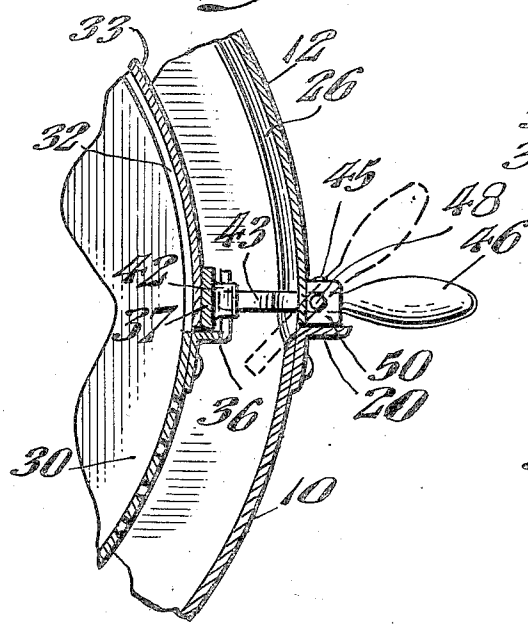


Fig. 6.

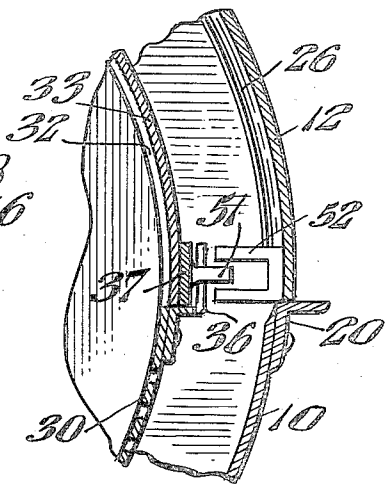


Fig. 7.

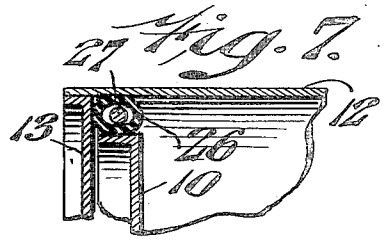
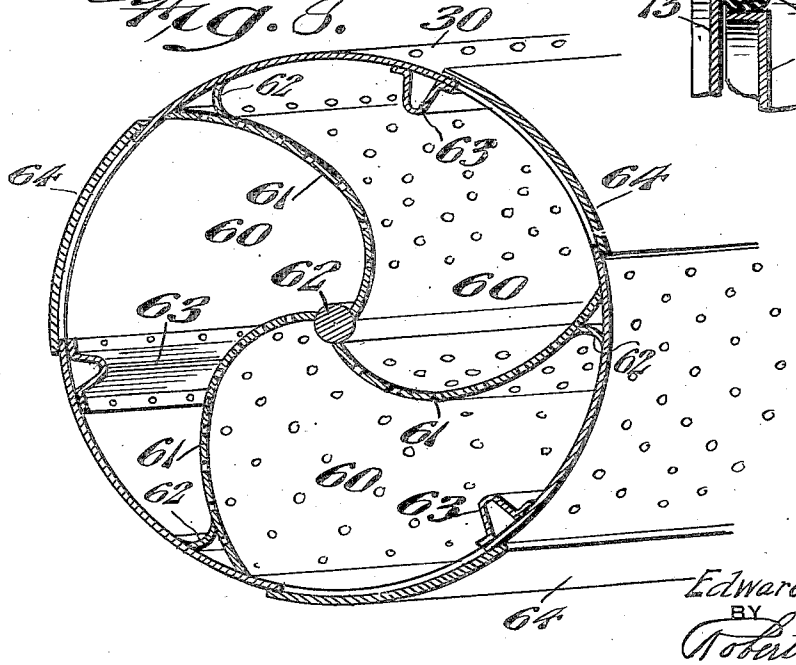


Fig. 8.



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2,033,630

WASHING MACHINE

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Application June 22, 1934, Serial No. 731,812

7 Claims. (Cl. 68—18)

The present invention relates to laundry machinery and more particularly to a washing machine of the rotary cylinder type.

Washing machines as at present in use consist generally of an outer stationary shell of cylindrical shape in which the wash water is contained. Within this shell is a coaxially mounted perforated cylinder for holding the material to be washed. Both the shell and the cylinder are provided with a door for access to the interior thereof and such doors have heretofore been either of the sliding or hinged type. Such doors have been found cumbersome to operate, difficult to lock and unlock, and waste the time and energy of the operators, as well as introducing needless hazards.

Some of the objects of the present invention are to provide improvements wherein provision is made for overcoming the foregoing disadvantages; to provide an improved door construction for the shells of washing machines; to provide an improved door construction for the cylinders of washing machines; to provide an improved locking means for washing machine doors; to provide means for quickly and effectively interlocking the cylinder and shell doors of a washing machine so that both doors can be simultaneously opened and closed; to provide a novel leak-proof joint for the doors of washing machines; to provide an improved cylinder construction; to provide means for compensating for and balancing the weight of washing machine doors; and to provide other improvements as will hereinafter appear.

In the accompanying drawings Fig. 1 represents a front elevation of a washing machine embodying one form of the present invention, the door of the shell being shown in open position; Fig. 2 represents a section on line 2—2 of Fig. 1; Fig. 3 represents a perspective of an end of the same showing the shell door open and the cylinder door closed and locked; Fig. 4 represents a sectional detail, on an enlarged scale, of the door lock control mechanism; Fig. 5 represents a section on line 5—5 of Fig. 4; Fig. 6 represents a section on line 6—6 of Fig. 4; Fig. 7 represents a sectional detail on line 7—7 of Fig. 3; and Fig. 8 represents a section of a modified form of cylinder.

Referring to the drawings one form of the present invention consists of a washing machine having a shell 10 of cylindrical shape and mounted in fixed position upon any suitable supports. This shell 10 serves the usual purpose of containing the wash water, access to the interior thereof being by way of a longitudinally disposed opening 11. This opening 11 is arranged to be closed by a door 12 in the form of an elongated segment of proper radius and size to act as a complete closure for the opening 11 when in closed position. As here shown the door 12 is supported at its ends upon sector shaped plates 13 which are respectively carried by hub members 14 rotatably mounted upon the machine shaft 15. At suitable locations upon the shell 10 guide bars 16 are riveted to the shell, each being spaced therefrom to provide a slot 17 within which rides a stirrup 18 carried by the door 12. This construction provides the desired reinforcing and bracing of the door as it moves from one position to the other. The guide bars 16 also limit the swing of the door 12 in both directions of movement. Furthermore it is preferable to provide a stop flange 20 which is riveted or otherwise fastened to the shell 10 along the limit edge of the opening 11 so that at this point the shell is materially braced and reinforced while serving as an abutment for the door in its closed position.

In order that the door 12 can be made relatively easy to swing from one position to another the sectors 13 each have a socket 21 riveted or otherwise fastened thereto to receive a rod 22 having a head 23 at one end and an adjustable follower at the opposite end. In assembled condition the rod 22 passes through the socket 21 and its head 23 seats on the end of the socket while the follower 24 at the opposite end is used as a support for counter-weights 25 by means of which the weight of the swinging parts is substantially balanced. Preferably the number of weights 25 is such as to overbalance the weight of the door 12 since, as will later appear, these also have the dual function of counter-balancing the door of the inner cylinder.

As a means for preventing leakage of wash water from the shell 10 by way of the joints between the shell 10 and the door 12, that portion of the head of the shell 10, which bounds the end of the opening 11, is preferably provided with a strip 26 of rubber or other resilient material and, as here shown, this strip is in the form of a segment of a tubular member which may be fixed in position along the aforesaid joint by means of a wire 27 passing through the aforesaid member 26 and being fastened in any desirable way to the shell. It will thus be seen that both heads of the shell have a portion of the rim covered by a packing strip, such as the tube member 26, and as the door 12 moves to closed position the members 26

are compressed and form a leak-proof joint at each end of the door 12.

The material holding part of the washing machine consists of a cylinder 30 formed of perforated material and mounted for rotation upon the shaft 15, the latter, as will be understood, being rotatably mounted in trunnion bearings 31 at opposite ends of the machine. The cylinder 30 is provided with a longitudinally disposed opening 32 which is arranged to be opened and closed by a swingably mounted shutter 33 which travels in close proximity to the outer face of the cylinder 30. Sector plates 34 support the shutter 33 and are respectively carried by hub members 35 journalled upon the shaft 15, so that the shutter is co-axially mounted with respect to the cylinder 30.

The means whereby the shutter 33 of the cylinder 30 is locked in its closed position consists of one or more keeper plates 36, (preferably two) which are riveted or otherwise made fast to the outer face of the cylinder 30 and substantially coincident with one edge of the opening 32. These keepers 36 are preferably Z-shaped in cross section so that the keeper plate itself is spaced from the cylinder 30 a sufficient distance to receive a latch bar 37 and allow the latter to freely slide back and forth. Each keeper 36 is provided, in the present instance, with a bayonet slot 38, the cooperating member of which consists of a pin 40 located on the latch bar 37. There will, of course, be one pin 40 for each bayonet slot 38 and the location of these pins on the latch bar 37 is such that when the shutter 33 is moved to its closed position these pins will respectively enter the bayonet slots 38. The latch bar 37 is attached to the shutter 33 by a pin and slot connection 41 to allow the bar to move longitudinally from unlocked to locking position and vice versa.

For operating the latch bar 37 it is provided, preferably at its central portion, with rack teeth 42 which are fixed thereon in a position to be engaged by a gear segment 43. This gear segment 43 is formed as a part of a disc 44 pivoted for rotation about a pivot pin 45 and having a handle 46 by which it is rocked from one position to another. The pivot 45 is mounted in a yoke 47 having journal pins 48 projecting respectively from its ends and mounted in bearings 50, which are welded or otherwise made fast to the door 12. The journal of the pins 48 is at right angles to the journalling of the pivot 45 so that the disc 44 is capable of two movements—one a rocking movement about the pins 48 and the other a like movement about the pin 45. The first movement, that about the pins 48, is for the purpose of either swinging the gear segment 43 into or out of mesh with the rack 42, and the second movement, that about the pin 45, is to lock or unlock the latch bar 37. The movement about the pins 48 is quite important because it allows the disc 44 to be shifted to a position out of the path of the cylinder 30 or its parts so that no interference can take place when the cylinder 30 is rotating. When the cylinder is at rest with the two door openings 11 and 32 in register, the handle 46 can be swung to the full line position of Fig. 4 so that the latch 37 will be caused to move in a direction to anchor the pins 40 in the bayonet slots 38 and thus lock the door 33 of the cylinder 30.

For the purpose of simultaneously opening both the shutter 33 and the door 12, the latch bar 37 is provided with a lug 51 which in locked position of the shutter 32 is in alinement with a passage between two spaced lugs 52 attached to the inner side of the shell 10. When the latch bar 37 moves to unlocked position it will bring the lug 51 between the lugs 52, thus interlocking the door and shutter, so that as the door 12 is swung to open position it will also carry with it the shutter 33.

In Fig. 8 a modified form of cylinder is shown wherein the interior thereof is divided into a plurality of compartments 60 by means of a partition of novel shape. As here shown the partition consists of three perforated wings 61, forming three compartments 60, emanating from the main shaft 62 of the cylinder and terminating at the inner periphery of the cylinder. Each wing 61 is generally concave in shape, starting radially from the shaft 62 to merge into an arc of relatively large radius so as to reverse its direction to meet the cylinder periphery at an acute angle. Since all of these wings 61 are complementarily arranged the shape of each chamber 60 is that of a broad arc at one end which tapers on smooth curves to a relatively narrow end. To carry out the general curved construction and to avoid a sharp angle pocket at the narrow end, it is preferable to provide an arc shaped bridge piece 62 for each chamber located as shown and which is welded or otherwise fastened to the cylinder and partition. At intermediate points longitudinally arranged shoulders 63 are fastened to the inner wall of the cylinder to serve as abutments against which the material is projected during the washing operation. It should be noted by reason of the novel contour of the chambers 60 that the material alternately shifts into the two end portions, so that when thrown into the contracted or narrow end the material will be automatically squeezed and then when thrown into the larger end it will be opened up. Both of these working actions, by reason of the curved shapes, take place without strain upon the fabrics.

Since there are three chambers or compartments 60 there will be three doors 64, one for each compartment, and these may be of the type heretofore described in conjunction with Figs. 1 to 7.

In this form of the invention attention is called to the fact that the shaft 62 which rotates the cylinder extends axially therethrough from one end to the other as a continuous shaft giving the advantage of a strong axial construction to brace the partition and ensure each compartment retaining its predetermined contour so that the desired function is carried out.

While only two forms are shown in which this invention may be embodied, it is to be understood that the invention is not limited to any specific construction, but might be applied to various forms without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, I claim:—

1. In a washer, the combination of a shell having an opening therein, a door exterior of said shell, means co-axial with said shell for mounting said door to open and close said opening, a cylinder rotatably mounted in said shell having an opening therein, a shutter mounted on said cylinder for opening and closing said cylinder opening, means to lock said door and shutter together whereby both can be simultaneously opened and closed, and means to counter-balance said door and shutter.

2. In a washer, the combination of a shell having an opening therein, a door arranged on said shell to open and close said opening, a cylinder rotatably mounted in said shell having an opening therein, a shutter mounted on said cylinder

for opening and closing said cylinder opening, means including a latch bar for locking said shutter in closed position, and means carried by said door for operating said latch bar when said door and shutter are closed.

3. In a washer, the combination of a shell having an opening therein, a door arranged on said shell to open and close said opening, a cylinder rotatably mounted in said shell having an opening therein, a shutter mounted on said cylinder for opening and closing said cylinder opening, means including a latch bar for locking said shutter in closed position, means carried by said door for operating said latch bar when said door is closed, and means operated by said latch bar while moving to unlocked position for locking said door and shutter together.

4. In a washer, the combination of a shell having an opening therein, a door arranged on said shell to open and close said opening, a cylinder rotatably mounted in said shell having an opening therein, a shutter mounted on said cylinder for opening and closing said cylinder opening, means including a latch bar for locking said shutter in closed position, a rack on said latch bar, a gear segment for engaging said rack, and a handle pivotally mounted on said door and connected to said gear segment whereby movement of said handle causes said latch bar to lock and unlock said shutter according to its direction of movement.

5. In a washer, the combination of a shell having an opening therein, a door arranged on said shell to open and close said opening, a cylinder rotatably mounted in said shell having an opening therein, a shutter mounted on said cylinder for opening and closing said cylinder opening, means including a latch bar for locking said shutter in closed position, a rack on said latch bar, a gear segment for engaging said rack, a yoke, a handle attached to said segment and pivoted to said yoke for causing said segment to actuate said rack, and means pivoting said yoke to said door on an axis at right angles to the pivot of said handle to permit said segment to move out of engagement with said rack.

6. In a washer, the combination of a shell having an opening therein, a door exterior of said shell, means co-axial with said shell for mounting said door to open and close said opening, a cylinder rotatably mounted in said shell having an opening therein, a shutter mounted on said cylinder for opening and closing said cylinder opening, means including a latch bar for locking said shutter in closed position, and a device actuated by said latch bar for locking said shutter and door together when said shutter is unlocked.

7. In a washer, the combination of a shell having an opening therein, a door exterior of said shell, means co-axial with said shell for mounting said door to open and close said opening, a cylinder rotatably mounted in said shell having an opening therein, a shutter mounted on said cylinder for opening and closing said cylinder opening, means including a latch bar for locking said shutter in closed position, and interlocking means operatively connected with said door and said shutter and actuated by said latch bar for locking said shutter and door together when said shutter is unlocked.

EDWARD R. GOULD.