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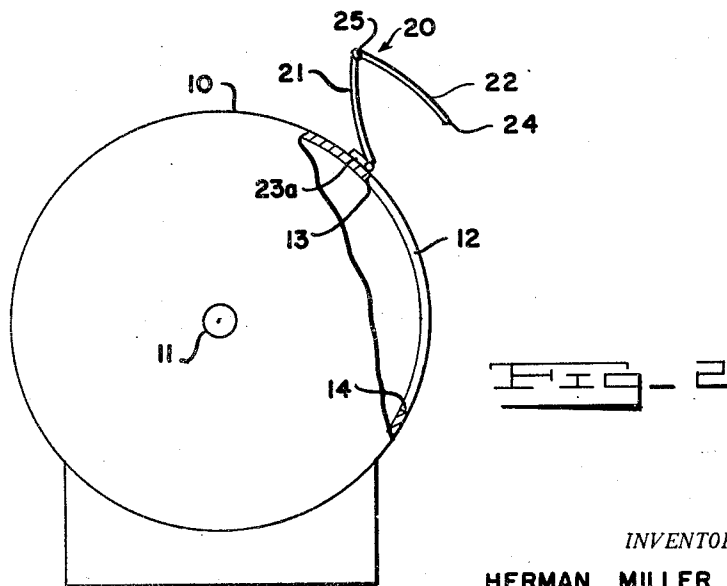
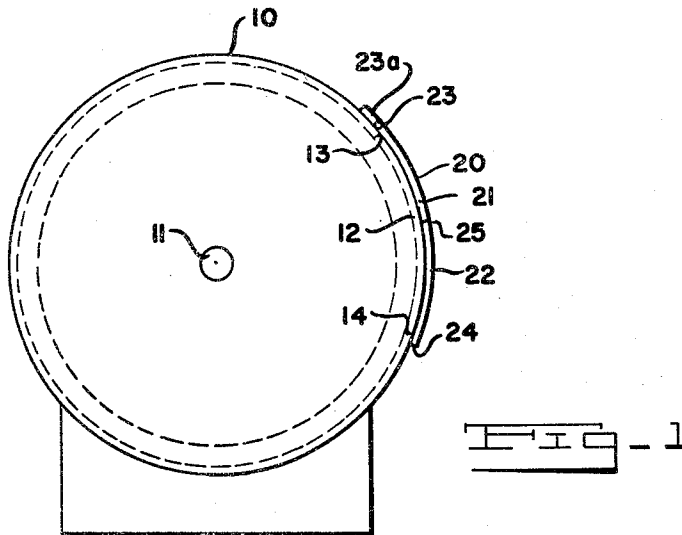
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DOOR CONSTRUCTIONS FOR LAUNDRY MACHINERY

Filed May 3, 1956

3 Sheets-Sheet 1



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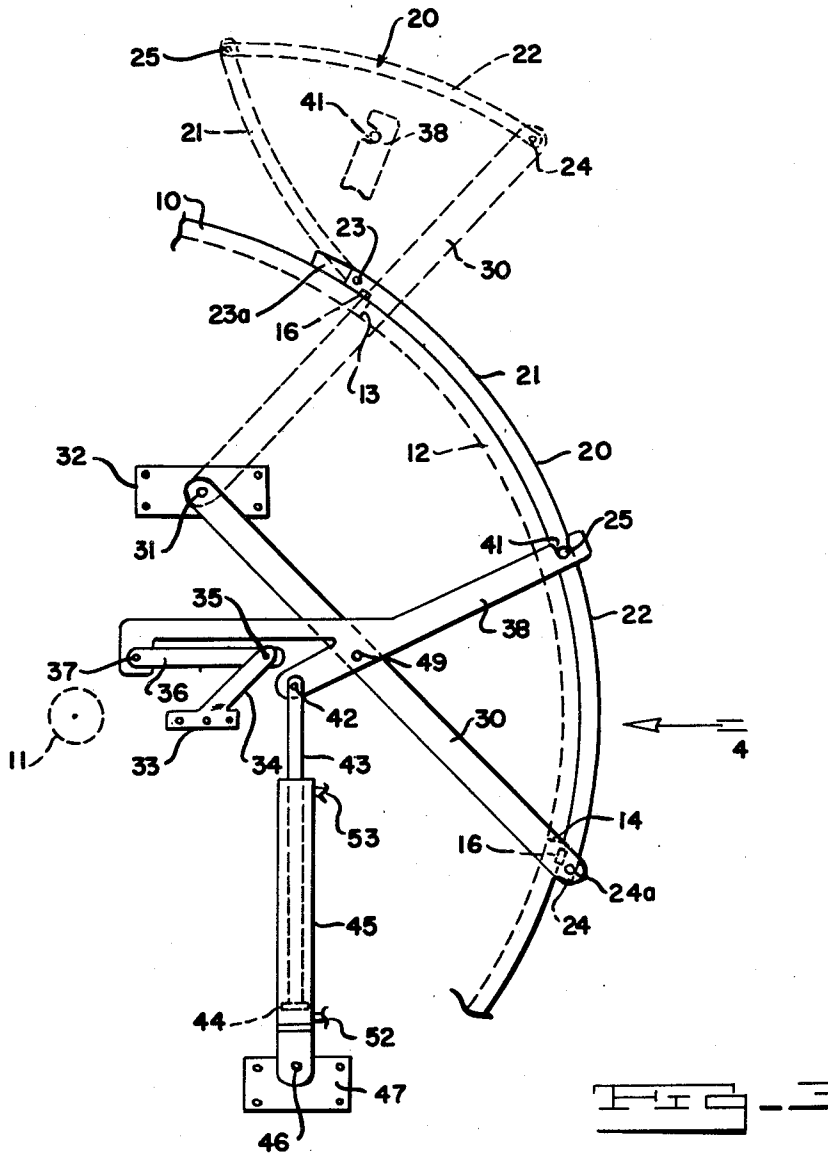
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3 Sheets-Sheet 2



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DOOR CONSTRUCTIONS FOR LAUNDRY MACHINERY

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6 Claims. (Cl. 220—34)

This application relates to laundry machinery and more particularly to automatic double door constructions for such machinery.

The door construction is disclosed herein in association with a horizontal washing machine of a size and type used in commercial laundry and known as a low front opening horizontal washing machine characterized by the provision in the horizontal cylindrical shell containing the rotating cylinder of a large front opening having the upper and lower edges well above and well below the water level within the shell with such openings normally closed by a door.

In a presently known construction, the door used in such devices is a sliding arcuate door which slides around the shell on arcuate tracks, up and down, to open and close the door opening. Because it is necessary to have an extremely tight and effective seal between the door and the shell when the door is closed it becomes necessary for the door to be close fitting within the track with attendant disadvantages and problems due to friction and the necessity for maintaining perfect alignment. In addition, the movement of the door in the direction indicated causes considerable wear on the seal with the result that it becomes increasingly difficult as time goes on to maintain satisfactory sealing. Likewise, because of the great friction required in a close fitting door and track construction it is difficult to raise and lower the door and this in turn makes it quite undesirable to attempt to raise and lower the door by automatic equipment.

In this application there is disclosed for machines of this general character an automatic double door construction characterized by the fact that the door is split into two halves horizontally on a center line and these halves are folded and swung upwardly for exposing the opening and likewise lowered to form a continuous door for closing the opening. In addition, there is provided a means for moving the door, when closed, radially towards the shell for effectively sealing the door to the shell at such times.

The actuating or operating means for the mechanism that raises or lowers or swings the door and folds it or extends it as the case may be is a single operating mechanism preferably of the piston and cylinder type which provides automatic actuation for all of the parts and because of the specific formation of the mechanism actuated by such piston and cylinder device the opening and closing movements are compound. Thus, for example in the opening movement the first part of the movement is the movement of the door radially away from the shell to remove the door from the seal and the second part of the movement is to swing and fold the doors upwardly. Reversely, when the door is to be closed the first part of the movement is to unfold the doors and to swing them down to closing position after which another movement of the parts takes place to move the door radially toward the shell for effective sealing.

A better understanding of the invention will be ob-

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tained upon reference to the appended drawings disclosing a preferred embodiment. In these drawings,

Fig. 1 is a diagrammatic small scale end view of the shell and door construction in closed position;

5 Fig. 2 is a similar view but showing the door open;

Fig. 3 is an enlarged view showing the operating mechanism in full lines in closed position and in dotted lines in open position;

10 Fig. 4 is a front view as if from the right of Fig. 3 on arrow 4;

Fig. 5 is a fragmentary section view as if on line 5—5 of Fig. 4.

The drawings show a horizontal cylindrical shell 10. This may contain a rotating cylinder, and may be equipped for use as a washing machine, or if desired for use as a tumbler. The rotating cylinder is not shown, for purposes of clarity.

The shell is mounted horizontally to contain the cylinder which rotates on a center axis 11 and has a front opening 12 bounded by horizontal edges 13—14 and vertical edges 15, only one of which is shown in Fig. 4. Surrounding and framing the edges 13, 14, and 15 which form the opening 12 in the shell 10 is a sealing means 16 in the form of a strip of sealing material such as 25 rubber and sometimes known as a gasket.

For closing the opening 12 whose upper and lower edges are well above and well below the axis 11 of the cylinder and whose vertical edges 15 are near the flat ends 17 of the shell, such opening being known as a large low front opening, there is provided a front door construction 20 now to be described. The door construction includes an upper half 21 and a lower half 22. The upper half is hinged at its upper edge 23 to a strip 23a fixed to the shell near but somewhat above the edge 13 of the opening. The lower half has its lower edge 24 sometimes positioned near but below the edge 14 of the opening 12. Both halves 21 and 22 are hinged to each other on a hinge line 25 near the center of the opening 12.

The construction is such that the upper half can swing up on its upper edge 23 as a pivot from the full line position to the dotted line position shown in Fig. 1 to expose the opening. At the same time and therewith the lower half 22 can swing up on its upper edge as a pivot to the dotted line position of Fig. 1 to overly the upper half 21. Both halves 21 and 22 can swing down together to form a continuous door 20 to close the opening 12.

Now to be described is a means for swinging the halves together up or down, and also a means for moving the halves after they are in closing position radially towards the axis 11 of the shell 10 to seal the halves tightly against the shell and the shell sealing means 16 for sealing the opening 12 at that time closed by the door 20. The door swinging and door sealing means comprises a link 30 whose lower end is pivotally connected by means of a pin 24a at the lower edge 24 of lower half 22. The upper end of link 30 is connected by a fixed pivot 31 to a bracket 32 on the flat end 17 of shell 10. A bracket 33 also on shell end 17 carries a fixed arm 34 whose upper end is connected by a fixed pivot 35 to a link 36 connected by a floating pivot 37 to a Y-shaped link 38 one of whose ends is formed with a cam notch as shown at 41 to receive the hinge pin 25 which connects the upper and lower door halves. The third end of the Y link 38 is connected by a floating pivot 42 to the piston rod 43 whose piston 44 is within cylinder 45 pivotally mounted at 46 on a bracket 47 secured to the end 17 of the shell.

The links 30 and 38 intersect each other to form an X and are pivotally connected to each other by a floating pivot 49.

Operation

Starting with the door in the closed full line position of Fig. 1, the door may be opened automatically by the admission of air into the air inlet 52 of the double acting cylinder 45. Piston 44 moves up and in the first part of its movement causes the cam notch 41 of link 38 to release the hinge pin 25 and thus release the door 20 from the seal 16. Further movement of the piston in response to air at inlet 52 causes link 30 to rotate counter-clockwise (Fig. 1) on its pivot 31 to swing the door halves quickly to the dotted line position of Fig. 1 for full opening.

For door closing, air is admitted into the double acting cylinder 45 at inlet 53 to move the piston down and to swing the link and the door halves from the dotted line open position of Fig. 1 to the full line closed position.

The final part of the movement of the piston 44 downward in cylinder 45 causes engagement of the hinge pin 25 in the cam notch 41 of link 38 and also causes link 38 to move radially towards the axis 11 of the shell 10 and thus to cause by a cam action at 41—25 the door halves 21—22 likewise to move radially toward the axis 11 and tightly against the seal 16.

Now having described the construction and operation of the preferred embodiment herein disclosed reference should be had to the claims which follow.

I claim:

1. In a combination including a horizontal cylindrical shell having a front door opening where vertical edges are near the flat ends of the shell and whose horizontal edges are well above and well below the center axis of the shell to define a large low front opening, and including a front door construction for closing and exposing said opening, said door construction including an upper half hinged at its upper edge to the shell near but above the upper edge of the door opening and a lower half having its lower edge sometimes positioned near but below the lower edge of the door opening, with both halves hinged to each other near the center of the opening, the construction being such that the upper half can swing up on its upper edge as a pivot to expose the opening and at the same time and therewith the lower half can swing up on its upper edge as a pivot to overlie the upper half, and both halves can swing down together to form a continuous door to close the opening and including means for swinging the halves upwardly together or downwardly together to expose or close the opening, in such a combination sealing means for moving the halves after they are in position to close the opening towards the axis of the shell to seal the halves tightly against the shell for sealing the opening then closed by the door.

2. A construction according to claim 1 wherein the swinging and sealing means comprise parts of a single operating mechanism operated in successive movements by a single operating means.

3. A construction according to claim 1 wherein the swinging and sealing means comprise parts of a single operating mechanism operated in successive movements by a single operating means and the operating mechanism comprising a linkage having a cam member for moving the hinge line connecting the halves radially towards the axis after the linkage has moved the halves to closing position.

4. A construction according to claim 1 wherein the swinging and sealing means comprise parts of a single operating mechanism operated in successive movements by a single operating means and the operating mechanism comprising a linkage having a cam member for moving the hinge line connecting the halves radially towards the axis after the linkage has moved the halves to closing position and wherein a piston-cylinder means is the operating means.

5. A construction according to claim 1 wherein the swinging and sealing means comprise parts of a single operating mechanism operated in successive movements by a single operating means and the operating mechanism comprising a linkage having a cam member for moving the hinge line connecting the halves radially towards the axis after the linkage has moved the halves to closing position and wherein a piston-cylinder means is the operating means, the linkage including an X of pivotally connected links, one of which is connected to the lower edge of the lower half and the other of which carries the cam member for releasably engaging the hinge connecting the halves and moving such hinge radially towards the shell axis after the halves are in closing position, with the piston-cylinder being connected to one of the links.

6. A construction according to claim 1 wherein the swinging and sealing means comprise parts of a single operating mechanism operated in successive movements by a single operating means and the operating mechanism comprising a linkage having a cam member for moving the hinge line connecting the halves radially towards the axis after the linkage has moved the halves to closing position and wherein a piston-cylinder means is the operating means, the linkage including an X of pivotally connected links, one of which is connected to the lower edge of the lower half and the other of which carries the cam member for releasably engaging the hinge connecting the halves and moving such hinge radially towards the shell axis after the halves are in closing position, with the piston-cylinder being connected to one of the links, namely, the link having the cam for releasably engaging the hinge connecting the halves.

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