This invention relates to improvements in unloading structures for garment cylinders.

In commercial laundries and dry-cleaning establishments the removal of garments from the drum of a washing machine or other clothes handling cylinder is a difficult and time-consuming task. If a large size washing machine is filled to capacity there may be as much as nine hundred pounds of wet garments to be removed. This usually involves about twenty minutes of hard manual work. In addition it is particularly inconvenient and difficult to get at the last batch of garments.

It is, therefore, a general object of the present invention to provide in a cylinder having an end door, means for facilitating the removal of garments therefrom.

A further object of the invention is to provide in a garment cylinder a novel arrangement of ribs in combination with a special door opening of such size and so arranged with respect to the ribs as to provide for movement of garments toward and out of the door opening when the cylinder is being rotated and when the door is open. The structure for accomplishing this function may include ribs which are spirally arranged to cause movement of the garments in a desired direction, or may include ribs of decreasing height and cross section toward the door opening, or ribs which are otherwise formed to direct the clothes toward the discharge end as the cylinder rotates.

A further object of the invention is to provide a device of the class described which, in one form of the invention, is arranged to cause movement of the garments either toward the inner end of the cylinder or toward the discharge end depending upon the direction of rotation.

A still further object of the invention is to provide a device as above described, including means for swinging a relatively large door to a position where it is entirely clear of the end of the cylinder to thereby facilitate the unloading of the garments.

With the above and other objects in view, the invention consists of the improved unloading structure for garment cylinders, and all its parts and combinations, as set forth in the claims, and all equivalents thereof.

In the accompanying drawings, illustrating complete embodiments of preferred forms of the invention, in which the same reference numerals designate the same parts in all of the views,

Fig. 1 is a front elevational view of the improved device, parts being broken away and shown in section, and the dot-and-dash lines indicating the open position of the door;

Fig. 2 is a vertical longitudinal sectional view taken approximately on the line 2—2 of Fig. 1, parts being broken away;

Fig. 3 is a plan view of the door swinging arm;

Fig. 4 is a fragmentary longitudinal sectional view through a garment cylinder, on a reduced scale, illustrating a modified form of unloading rib; and

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

Referring more particularly to the drawings, the numeral 10 designates a suitable supporting frame having legs 11. Spaced bearings 12, near one side of the frame, rotatably support a shaft 13, and spaced bearings 14, near the other side of the machine, rotatably support a shaft 15.

A motor 16, or other source of motion, may transmit rotating movement through endless belt 17 to a pulley 18 rigidly mounted on a stud shaft 19. Through a gear 20, rigidly mounted on the stud shaft 18, which meshes with a gear 21 on the shaft 13, the latter shaft is driven. The stud shaft 19 also has a sprocket wheel 22 thereon, which is connected by an endless chain 23 with a sprocket wheel 24 rigidly mounted on a stud shaft 25. The latter shaft is suitably geared to the shaft 15 to drive the latter in unison with the shaft 13. The shafts 13 and 15 have rigidly mounted thereon drum supporting rollers 26.

A washing cylinder or drum 27 is positioned for rotation on a horizontal axis. The drum is equipped with external peripheral bands or tracks 28 which are cooperating with the flanged rollers 26. It is apparent that rotation of the roller supporting shafts 13 and 15 will, through the medium of the rollers 26, cause rotation of the drum in a selected direction depending upon the direction of rotation of the prime mover 16.

The peripheral wall portion 29 of the cylinder is preferably imperforate, and the front end is provided with a loading and discharge opening 30. It is to be noted that the diameter of the opening 30 is nearly as great as the diameter of the cylinder. Heretofore garment cylinders have been provided with relatively small openings, where such openings are located in an end wall.

The opening 30 is adapted to be closed by a door 31 which is suitably reinforced by radial ribs 32. These ribs are pressed outwardly from the outer face of the door and provide radial recesses 33 on the inner side. Movable in the recesses 32 are latching rods 33 which have latches 34 at their outer ends. These latches are...
operative through openings 35 in the periphery of the door to co-act with a circular recess 36 in the door frame. In Fig. 2 one of the latches is illustrated inlocking position. The inner ends of the latch arms 33 are pivotally connected to a disc 37 positioned centrally of the door. The disc is rigidly connected to the inner end of a shaft 38, and the latter shaft is rotatable in a bearing 39 suitably located adjacent the front of the door. The shaft 38 and disc 37 may be partially rotated through manipulation of a hand wheel 40 to cause locking or unlocking of the latches 34. When the door is closed and in locked condition, the door proper may rotate with the cylinder and during such rotation the shaft 38 and hand wheel 40 will also rotate in the stationary bearing 39.

A door swinging arm has a L-shaped horizontal portion 41 (see Fig. 3) and an upright portion 42. The inner end of the horizontal portion 41 is pivoted on a pin 43 suitably connected to the door frame 19. The upper end of the vertical arm portion 42 has a pivot pin 44 projecting upwardly therefrom (see Fig. 2), and this pin is rotatable in a sleeve 45 which projects downwardly from the bearing 39.

It is thus apparent that when the cylinder is in a condition of rest, the door may be unlocked by partially rotating the hand wheel 40. Then by pulling outwardly on the hand wheel, the door supporting arm portion 41 may be swung from the full line position of Fig. 1 to the dotted-dash line position therein. At the same time the door may be swung on the pivot 44 to cause it to assume the open position of Fig. 1 adjacent a side of the cylinder. The door is therefore entirely out of the way, and the front opening 39, which has a diameter nearly as great as the diameter of the cylinder, is completely exposed for the loading or unloading of garments.

The construction illustrated is a washing cylinder. The invention, however, is equally applicable to drying cylinders or other rotatable garment handling drums. In the washing cylinder illustrated there is at the end opposite to the end having the door opening, a solid wall portion 46, and an inner perforated wall or partition 47. The partition 47 is spaced inwardly from the wall 46 to provide a liquid discharge chamber 48 therebetween. The liquid discharge chamber 48 has its periphery formed with discharge openings 49 which are adapted to be opened or closed by the action of a hand valve 50. The operation of the hand valve forms no part of the present invention and is more completely illustrated and described in application Serial Number 479,599, filed March 18, 1945, by J. P. Jorgenson, now Patent 2,486,455 issued August 26, 1947.

Washing fluids may be introduced through the pipe 51 to flow into the auxiliary chamber 46, the valve 50 being closed. These fluids then pass through the perforated partition 47 into the main washing chamber.

The important feature of the present invention resides in the use of specially formed or arranged ribs within the main chamber for causing movement of the garments. Referring to Figs. 1 and 2, there are preferably utilized three ribs 53 which are hollow and perforated, as at 54. The ribs extend from the door opening 30 rearwardly to the partition 47 where they communicate with opposite ends of the ribs so that any water within the ribs may drain into the discharge chamber 48. The proper movement of this liquid within the ribs is augmented by the solid partitions 55.

In the invention the ribs extend at spiral angles, as illustrated, or they may be funnel-shaped, as in Fig. 4. It is also to be noted by reference to Fig. 1 that the tops of the ribs project radially inwardly well beyond the margin of the door opening 30. As a result of this arrangement, after garments have been loaded into the cylinder at the start of a washing operation, then by rotating the cylinder in a clockwise direction, referring to Fig. 1, the garments will be engaged principally by the left hand sides of the ribs. Due to the spiral angle from front to rear, the ribs will gradually cause movement of the garments toward the inner end of the cylinder.

When it is desired to unload the garments after a washing operation and after the liquid has been removed from the cylinder, then the door 31 is unlatched and is swung to the dotted-dash line position of Fig. 1. Then by rotating the cylinder in a counterclockwise direction, referring to Fig. 1, the garments will be engaged by the right hand sides of the ribs and will gradually be fed toward and out of the discharge opening 30. As the garments approach the opening the actual removal may be speeded up by manual help. It is apparent, however, that is unnecessary for the operator to reach any distance inwardly into the cylinder to unload garments therefrom.

As a modification of the above idea, in lieu of the spirally arranged ribs 53, ribs 56, of the type illustrated in Fig. 4, may be employed. These ribs are of gradually decreasing cross section from the rear toward the front but may extend straight from the front toward the rear rather than at a spiral angle. The ribs may taper both in width and height, as is illustrated in Fig. 5. As a result of this tapering cross section, when the garment cylinder is rotated in either direction, the ribs will tend to feed the garments gradually toward the front end of the cylinder. Thus, if the door 31 is open, automatic discharge of the garments can be effected through an opening of the same relative size as the opening 30 of Fig. 2.

In addition to performing the unloading function, the ribs 53 of the main form of the invention and the ribs 56 of the modification carry out the usual function of longitudinal ribs in a garment cylinder. When used in a washing machine the ribs tend to lift the garments upwardly as the cylinder rotates and then drop the garments after the latter have been raised to such height that the garments fall by gravity back to the bottom of the cylinder. This produces effective tumbling of the clothes during the washing operation.

Various other changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated as may come within the scope of the claims.

What I claim is:

1. In a garment handling apparatus, a cylinder disposed for rotation on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, ribs within the cylinder extending from the loading end toward the opposite end, said ribs being of progressively less height so that any water within the cylinder will cause progressive movement of the garments toward the opening when the cylinder is rotated,
and a door for closing said end opening, said end opening being of such size with respect to the diameter of the cylinder that garments may readily fall therethrough when the door is open.

2. In a garment handling apparatus, a supporting frame, a cylinder disposed for rotation on said supporting frame on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, the opposite end of the cylinder being closed, ribs within the cylinder, having at least one side angled so that said side extends obliquely from the loading end toward the opposite end with the angled side so arranged with respect to the location of the said opening as to cause progressive movement of the garments toward said end opening when the cylinder is rotated in a predetermined direction, a door for closing said end opening, and means movably connected to said supporting frame supporting said door for rotation with the cylinder and for movement to an open position completely disengaged from the cylinder where the door does not interfere with the automatic unloading of garments while the cylinder is being rotated, said end opening overlapping the ends of said ribs so that garments moved toward the opening by the sides of the ribs may readily fall through said opening when the door is open.

3. In a garment handling apparatus, a supporting frame, a cylinder disposed for rotation on said supporting frame on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, the opposite end of the cylinder being closed, ribs within the cylinder having at least one side angled so that said side extends obliquely from the loading end toward the opposite end with the angled side so arranged with respect to the location of the end opening as to cause progressive movement of the garments toward said end opening when the cylinder is rotated in a predetermined direction, a door for closing said end opening, and means movably connected to said supporting frame supporting said door for rotation with the cylinder and for movement to an open position completely disengaged from the cylinder where the door does not interfere with the automatic unloading of garments while the cylinder is being rotated, said end opening having a radius greater than the radial distance between the center of the opening and the top of a rib at said end opening so that garments moved toward the opening by the sides of said ribs will fall through the opening when the door is open.

4. In a garment handling apparatus, a cylinder disposed for rotation on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, the opposite end of the cylinder being closed, ribs within the cylinder extending from the loading end toward the opposite end, said ribs being of progressively less width toward said end opening to cause progressive movement of the garments toward the opening which is provided on a door for closing the margin of said end opening, said end opening overlapping the ends of said ribs so that garments moved toward the opening by the sides of the ribs may readily fall therethrough when the door is open.

5. In a garment handling apparatus, a cylinder disposed for rotation on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, a plurality of circumferentially spaced ribs within the cylinder extending from the loading end toward the opposite end, said ribs each being of progressively less height toward said end opening to cause progressive movement of the garments toward the opening when the cylinder is rotated, and a door for closing said end opening, said end opening being of such size that portions of the ribs project radially inwardly beyond the margin of the opening whereby garments may fall through the opening when the door is open and after the garments have been moved to the opening by any of said ribs.

6. In a garment handling apparatus, a cylinder disposed for rotation on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, a plurality of circumferentially spaced ribs within the cylinder extending from the loading end toward the opposite end, said ribs each being of progressively less height toward said end opening to cause progressive movement of the garments toward the opening when the cylinder is rotated, and a door for closing said end opening, said end opening being nearly as large as the diameter of the cylinder so that garments moved by any of said ribs may readily fall through said opening when the door is open.

7. In a garment handling apparatus, a supporting frame, a cylinder disposed for rotation on said supporting frame on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, the opposite end of the cylinder being closed, ribs within the cylinder extending in a generally longitudinal direction from the loading end toward the opposite end, said ribs having angled surface portions which are so disposed with respect to the location of the end opening as to cause progressive movement of the garments toward said end opening when the cylinder is rotated, a door for closing said end opening, and means movably connected to said supporting frame supporting said door for rotation with the cylinder and for movement to an open position completely disengaged from the cylinder where it does not interfere with the automatic unloading of garments, said end opening and door being of a diameter to overlap the ends of the ribs so that garments moved toward the opening by said ribs may readily fall through said opening when the door is open.

8. In a garment handling apparatus, a supporting frame, a cylinder disposed for rotation on said supporting frame on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, the opposite end of the cylinder being closed, ribs within the cylinder extending in a generally longitudinal direction from the loading end toward the opposite end, said ribs having angled surface portions which are so disposed with respect to the location of the end opening as to cause progressive movement of the garments toward said end opening when the cylinder is rotated, a door for closing said end opening, and means movably connected to said supporting frame supporting said door for rotation with the cylinder and for swinging movement to an open position at one side of and completely disengaged from the exterior of the cylinder, said end opening and door being of a diameter to overlap the ends of the ribs so that garments moved toward
the opening by said ribs may readily fall through said opening when the door is open.

9. In a garment handling apparatus, a cylinder disposed for rotation on an axis which extends in a generally horizontal direction and having an end opening for the loading and unloading of garments, ribs within the cylinder extending from the loading end toward the opposite end, said ribs being of progressively less height toward said end opening to cause progressive movement of the garments toward the opening when the cylinder is rotated, and a door for closing said end opening, said end opening and door being of such size with respect to the diameter of the cylinder and with respect to the size and position of said ribs that garments moved toward the opening by said ribs may readily fall therethrough when the door is open.

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