June 9, 1942. H. C. A. MEYER ET AL 2,285,935

CLOSURE FOR WASHING MACHINE CYLINDERS

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Fig. 1.

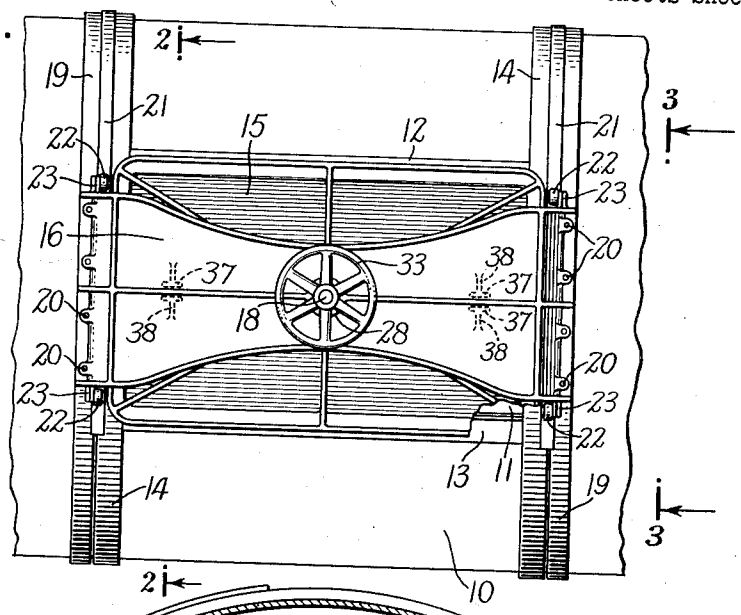
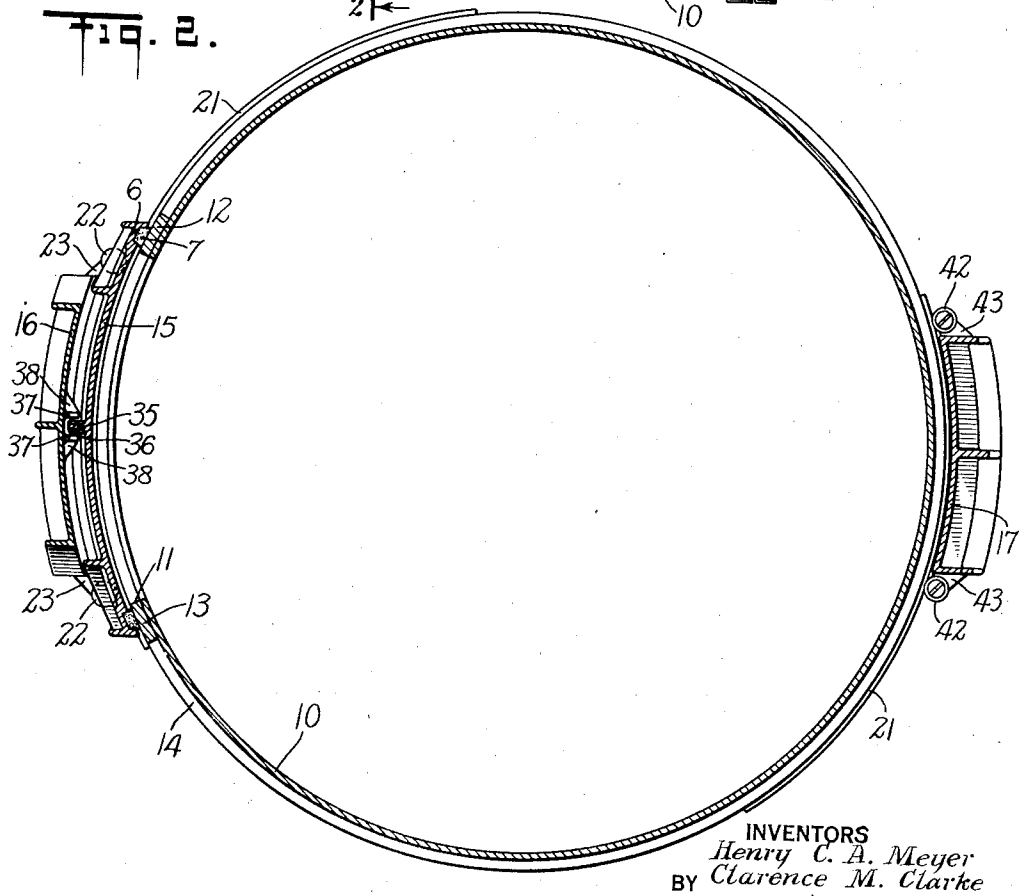


Fig. 2.



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Fig. 3.

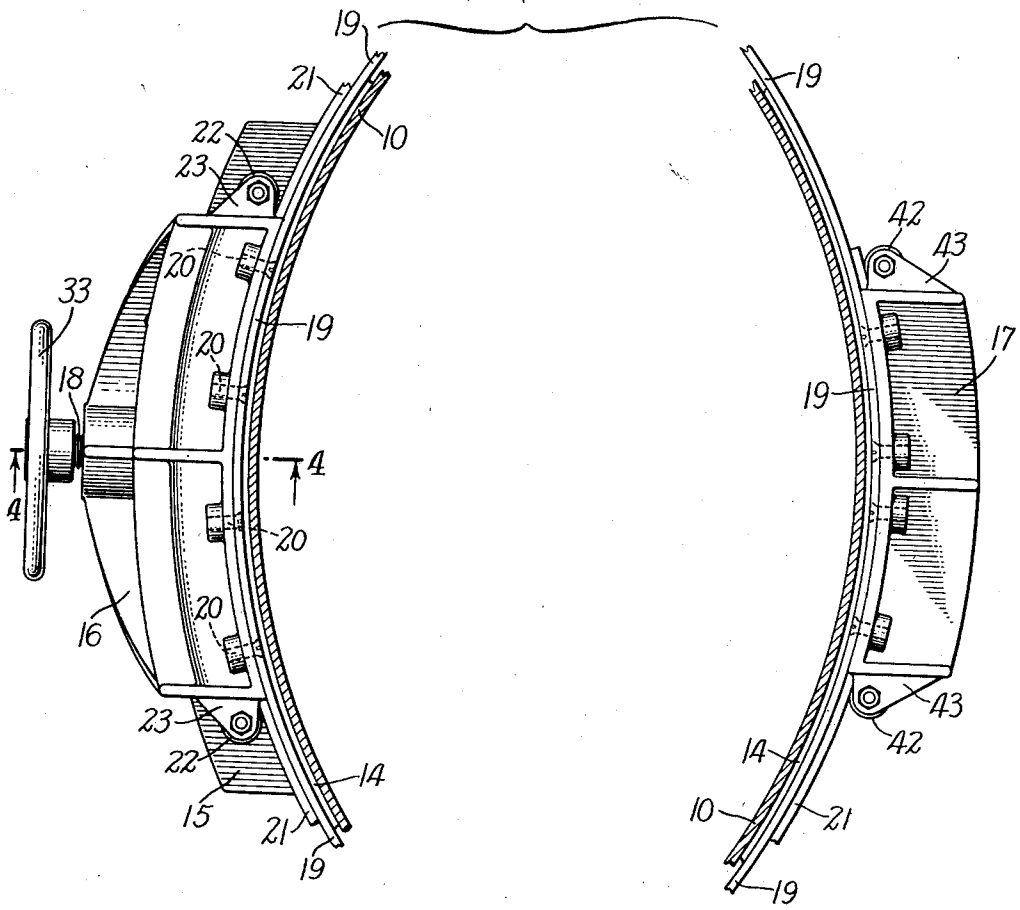
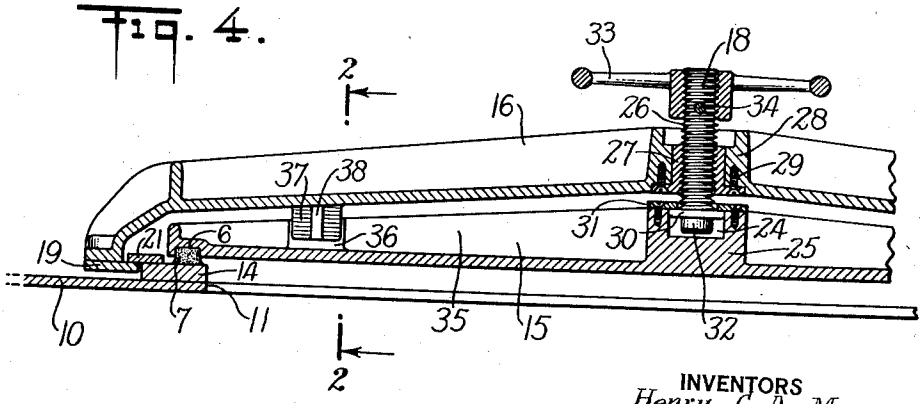


Fig. 4.



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Fig. 5.

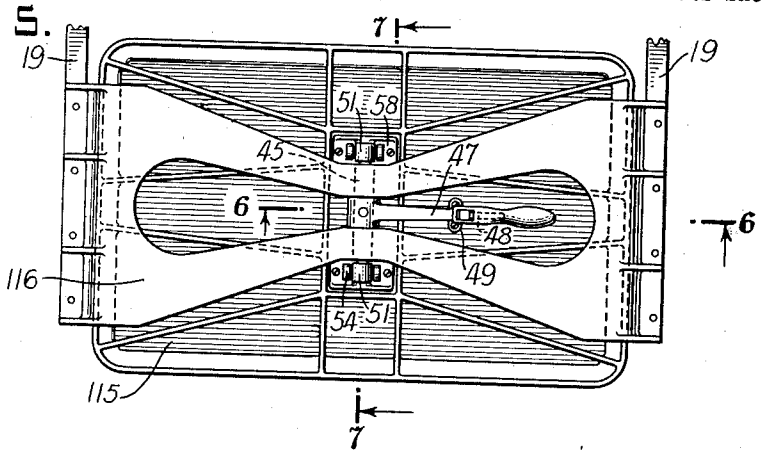


Fig. 6.

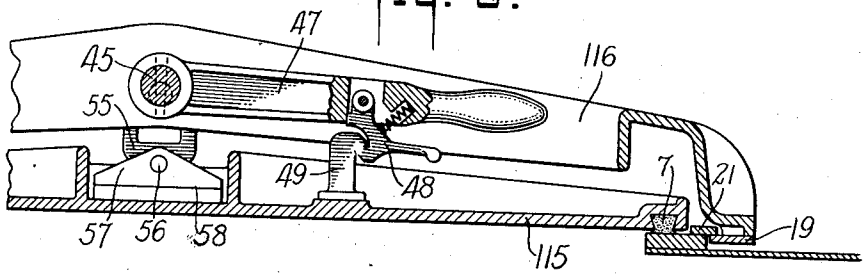
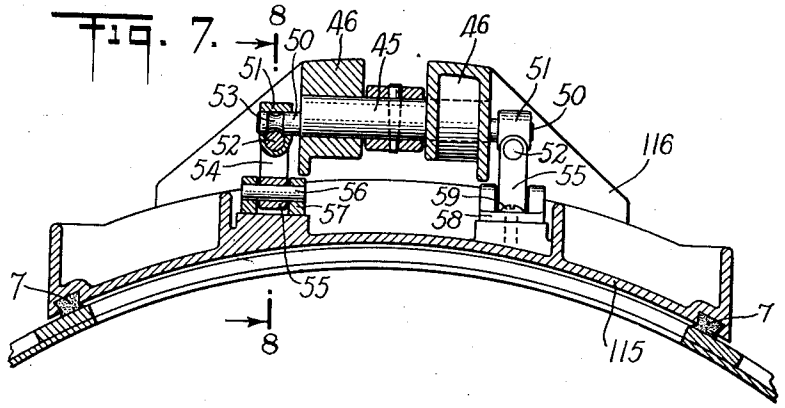


Fig. 7.



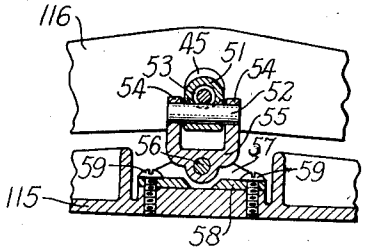


Fig. 8.

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Patented June 9, 1942 2,285,935

UNITED STATES PATENT OFFICE

2,285,935

CLOSURE FOR WASHING MACHINE CYLINDERS

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Application May 5, 1939, Serial No. 271,858

7 Claims. (Cl. 220—41)

This invention relates to closure devices for the doorways through which materials to be cleansed are charged into and discharged from cylindrical containers, and more particularly to circumferentially slidable closures for washing machine cylinders.

There is a certain type of washing machine now being manufactured which comprises a single rotatable water-tight cylinder within which the materials to be cleansed are actively agitated in the presence of wash water and suitable laundering agents. Since no outer drum or tub is employed, the necessity of maintaining the doorways in a sealed water-tight condition during operation of the machine is obvious. Circumferentially operable closures for the charging openings have been found most advantageous for use with this type of washing cylinder. To be practically satisfactory, however, they must be capable of quick manipulation by the laundry operative with a minimum of labor. They must stand in open position without danger of falling and must also be capable of being locked rigidly in closed position with sufficient force to insure against accidental movement during laundering operations; and when locked they must be water-tight.

It is an object of the present invention to provide a closure of the character described having to a notable extent all of the characteristics and capabilities above set forth. A further object is to provide a doorway closure of simple and rugged construction. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be set forth in the following claims.

In the accompanying drawings, in which is shown one of the various possible embodiments of the invention,

Fig. 1 is a front elevation of a portion of a washing machine cylinder showing a closure device embodying the principles of the present invention, broken away at one corner to reveal the doorway frame members;

Fig. 2 is a cross-section on line 2—2 of Figs. 1 and 4, showing certain details of the closure and its counterweight;

Fig. 3 is a discontinuous section through the cylinder on line 3—3 of Fig. 1 showing the closure device and its counterweight in enlarged elevation;

Fig. 4 is a cross-section broken away at one end, taken on line 4—4 of Fig. 3;

Fig. 5 is a front elevation, similar to Fig. 1, of a modified closure structure in which is used a locking mechanism adapted especially for rapid operation;

Fig. 6 is a sectional view taken through the closure structure substantially on line 6—6 of Fig. 5;

Fig. 7 is a cross-section taken substantially on line 7—7 of Fig. 5; and

Fig. 8 is a cross-section taken on line 8—8 of Fig. 7.

Similar reference characters refer to similar parts throughout the various views of the drawings.

The accompanying drawings show a section of a washing machine cylinder 10, preferably of the shell-less type characterized above, although it will be understood that the present invention applies equally well to closures for cylinders of washing machines of ordinary construction. The figures show a doorway 11 formed in the front side of the cylinder as viewed in Fig. 1, the door opening being reinforced by upper and lower frame members 12 and 13 interposed between a pair of spaced cylinder bands 14 which pass around the cylinder as reinforcing members and which also serve as the end members of the door frame. The closure device comprises a door 15, a clamping door carriage 16 and a counterweight 17.

The door is of rectangular form to correspond with the doorway frame, and its dimensions permit of its overlapping the frame members on all sides of the door opening. A groove or channel 6 is formed in the lower face of the door member, running completely around close to the edge of said member, to form a seat for a continuous gasket 7 composed of any suitable material, which gasket in the closed position of the door is adapted to be pressed tightly against the outer surface of the door frame, thus effectually sealing the door opening and preventing the escape of liquid from the interior of the washing cylinder during operation of the machine. This gasket is compressed to any desired extent to render the seal tight and to hold the door immovably in its closed position, by means of the clamping carriage 16 and clamping screw 18.

The clamping carriage overlies the door and extends beyond the same at its two ends where retaining plates 19 are secured to the under surface of the carriage by means of countersunk

screws 20. Each of these plates extends inwardly toward the center of the door far enough to underlie a track band 21 secured upon the periphery of the respective cylinder band 14 and extending about the upper side of the cylinder from a point approximately level with the bottom of the lower door frame member to a point near the bottom of the cylinder upon the opposite side thereof. These track bands serve as tracks adapted to cooperate with rollers 22, pivotally mounted in webs 23, laterally extending from the upper and lower corners of the clamping carriage at both ends thereof, so that each end of the carriage may have rolling contact with the respective track band and thus facilitate manipulation of the door from and to its closed position.

The clamping screw 18 passes through the center boss 28 of the clamping carriage into registry with a socket or seat 24 formed in a centrally located hub 25 of the door member 15. The screw 18 has a thread 26 which engages the threaded bore of a bushing 27, centered in the boss 28 of the carriage and secured thereto by means of countersunk screws 29. This sleeve or bushing is preferably made of a suitable alloy adapted to withstand wear. Screw 18 is likewise made of similar material, and near its lower end is provided with an integral collar 30 adapted, in the raised position of the screw 18, to engage the under side of a retaining ring 31, secured to the upper surface of the door hub 25. In the raised or upturned position of the screw its lower end, indicated by the reference 32, does not engage the bottom of the socket 24 but is slightly spaced therefrom.

When the clamping screw is turned down into contact with the door, the engagement of the retaining plates 19 with the track bands 21 limits the upward movement of the clamping carriage 16, wherefore the door may be pressed against the door frame with any desired degree of force. When the clamping screw is turned up, the clamping carriage moves downwardly until there is no longer contact between the retaining plates 19 and the track bands 21 and the rollers 22 rest upon the track band. During this movement of the different members of the closure, the collar 30 of the clamping screw engages the retaining ring 31 and positively lifts the door away from the door frame. The entire closure construction may now be rolled along the track bands to its open position, the end flanges of the carriage with their retaining plates cooperating with the enveloped edges of the track bands to guide this movement. The clearance for endwise movement of the screw within the door socket 24 is, of course, proportioned to the clearance between the rollers 22 and the track band 21 when the retaining plate 19 is in contact with the underside of said band so as to permit proper functioning of the different parts of the closure structure in the manner described.

A hand wheel 33, fixed upon the upper end of the screw 18 by means of a pin 34, serves as a means for manipulating the clamping screw. In order that in their movement relatively to one another the door and its clamping carriage may be maintained in proper alignment, a longitudinal web 35 extending upwardly from the upper surface of the door is provided adjacent the two ends of the door with thickened bosses 36 adapted to be received between a pair of flanges 37 which extend downwardly from the under surface of the carriage. These flanges are reinforced by web members 38 and effectively prevent a relative rotative movement of the door and its carriage during operation of the clamping screw.

Referring to Fig. 3, it will be noted that the two retaining plates 19 of the door clamping carriage 16 constitute portions of straps which pass around the cylinder and connect the carriage with the counterweight 17. The latter, like the former, has surfaces curved to correspond to the curvature of the track bands 21, to which the retaining plates or straps 19 are secured by countersunk screws. The counterweight has also four rollers 42, pivotally mounted in webs 43 extending laterally from the upper and lower corners of the counterweight at both ends. These rollers rest on the track bands 21 and permit the counterweight to slide freely over the surface of the cylinder responsive to movement of the closure in either opening or closing direction. The drawings show the cylinder in its loading and unloading position, with the doorway at the front. It will be clear that as the closure is raised to its upper or open position, less and less of its weight will be borne by the straps 19 since more and more of the weight will be directly supported by the track bands 21. This loss of suspended weight will be compensated by the simultaneous movement of the counterweight whose weight will be gradually shifted to the track bands through the retaining plates 19. This suspended weight compensation permits the closure to remain at rest in any position between the limits of its path of travel.

In Figures 5 to 8 inclusive, a modified form of closure structure is shown wherein the locking and unlocking of the door in respect to the doorway by the clamping carriage is accomplished through the oscillation of a shaft 45 pivotally mounted in bearings 46 which extend upwardly from the upper surface of the clamping carriage. The axis of this shaft lies perpendicular to the lengthwise axes of the door 115 and clamping carriage 116. A hand lever 47 is pinned to the shaft 45 between the bearings 46, and serves to oscillate the shaft between locking and unlocking positions. In the figures, the lever and shaft are shown in their locked position in which they are retained by the engagement of a spring-pressed latch member 48, carried by the lever, with a latch member 49 carried by the door. The shaft 45 has eccentric extensions 50 at both ends which are rotatable within blocks 51. Each of these blocks supports a pin 52 disposed at right angles to the eccentric 50 and cooperatively disposed in respect to a grooved portion 53 of the eccentric. This pin is extended beyond the walls of the block 51 into pivotal relation with the side members 54 of a shackle 55 pinned as at 56 to a lug 57 of a member 58 rigidly attached to the upper side of the door 115 as by the screws 59.

Since in all other respects the door structure now being described is like that of the form first shown, its operation by means of the present locking structure will be readily understood.

As said above, the figures disclosed the locking mechanism in its locked position with the retaining plate 19 tight against the under surface of the track band 21 and the door held with its gasket 7 pressed tightly against the doorway frame. The door may be quickly and easily unlocked by first releasing the latch 48 and then turning the operating lever 47 through an angle of 180 degrees. This action, through rotation of the eccentric shaft 45, will lift the door away

from the door frame, at the same time relieving the pressure between the retaining plate 19 and the track band 21, thus permitting the clamping carriage rollers to rest upon the track bands as hereinbefore described.

From the foregoing, it will be seen that a doorway closure made in accordance with the present invention is well adapted to attain the ends and objects hereinbefore set forth, and to be economically manufactured since the entire mechanism consists of three simple castings, a pair of straps made from standard rolled material, and a few inexpensive machine elements.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim:

1. In a closure for openings in washing machine cylinders and the like, in combination, a door supporting carriage movable circumferentially to and from a position overlying such a cylinder opening, a door for said opening movable radially into and out of contact with the border of said door opening, door supporting means on said carriage manually operable in one manner to lift said door free of the cylinder surface and manually operable in another manner in cooperation with reaction limiting means on said cylinder and carriage to force said door tightly against the border of said opening.

2. In a closure for openings in washing machine cylinders and the like, in combination, a rigid door supporting carriage movable on tracks on the cylinder to and from a position overlying such a cylinder opening, a door for said opening, manually operative means on said carriage movably secured to said door for supporting and moving said door into and out of contact with a portion of the cylinder surface bordering said opening, and retaining means on said carriage adapted to coact with said tracks to limit the reactive movement of said carriage upon operation of said manually operative means.

3. In a closure for openings in washing machine cylinders and the like, in combination, a rigid door supporting carriage movable on tracks on the cylinder to and from a positiion overlying such a cylinder opening, a door for said opening, manually operative means on said carriage movably secured to said door for supporting and moving said door into and out of contact with a portion of the cylinder surface bordering said opening, retaining means on said carriage adapted to coact with said tracks to limit the reactive movement of said carriage upon operation of said manually operative means, and a resilient gasket interposed between the cooperative surfaces of said door and said cylinder.

4. In a closure for openings in washing machine cylinders and the like, in combination, a rigid door supporting carriage movable on tracks on the cylinder to and from a position overlying such a cylinder opening, a door for said opening, a manually operative screw mounted in a threaded opening in said carriage and movably secured to said door for supporting and moving said door into and out of contact with a portion of the cylinder surface bordering said opening, and cooperative means on said carriage and said tracks for limiting the reactive movement of said carriage away from said cylinder surface upon operation of said manually operative screw.

5. In a closure for openings in washing machine cylinders and the like, in combination, a door supporting carriage mounted to move on tracks on the cylinder circumferentially of the cylinder to and from a position overlying such a cylinder opening, a member serving as a counterbalance for said carriage and door movable on said tracks on the side of said cylinder opposite said opening, and means for mutually supporting said carriage and counterbalancing member and for retaining both in operative relation to said tracks comprising straps passing over said cylinder beneath said tracks and connected at their opposite ends to said carriage and said member.

6. In a closure for openings in washing machine cylinders and the like, in combination, a rigid door supporting carriage movable on tracks on the cylinder to and from a position overlying such a cylinder opening, a door for said opening, means for supporting and moving said door into and out of contact with a portion of the cylinder surface bordering said opening, comprising a manually operable eccentric means rotatably mounted on said carriage and in operative relation to coacting members carried by the door, and means limiting the reactive movement of said carriage away from said cylinder surface upon operation of said manually operative eccentric means.

7. In a closure for openings in washing machine cylinders and the like, in combination, a door supporting carriage mounted to move on the cylinder circumferentially of the cylinder to and from a position overlying such a cylinder opening, a member serving as a counterbalance for said carriage and door movable circumferentially on the side of said cylinder opposite said opening, and means for mutually supporting said carriage and counterbalancing member comprising straps passing over said cylinder and connected at their opposite ends to said carriage and said member.

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