Oct. 13, 1936. W. STROBRIDGE 2,057,070

LATCH FOR SLIDING DOORS

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Fig. 1.

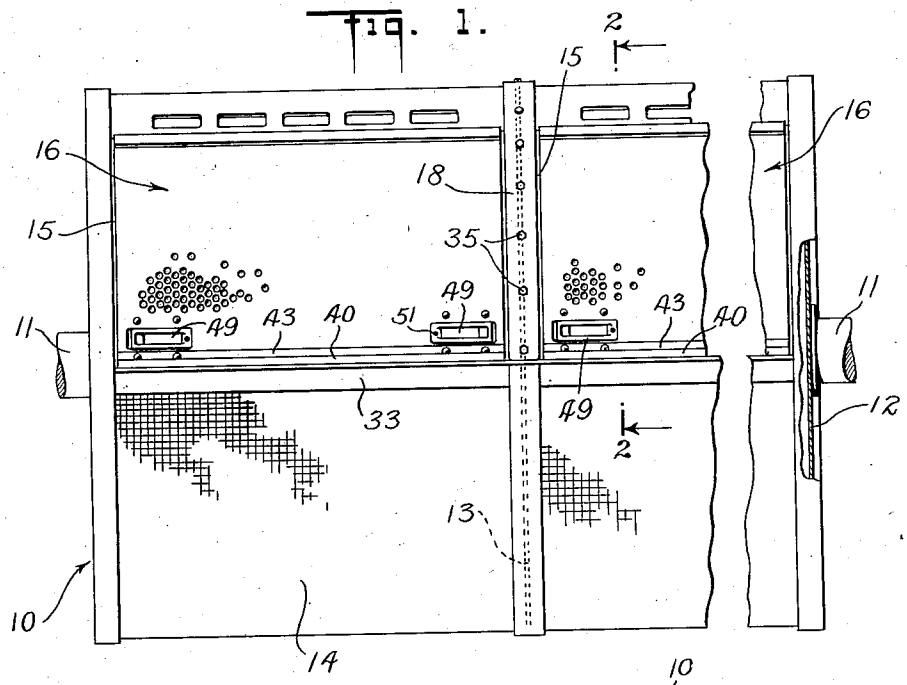


Fig. 2.

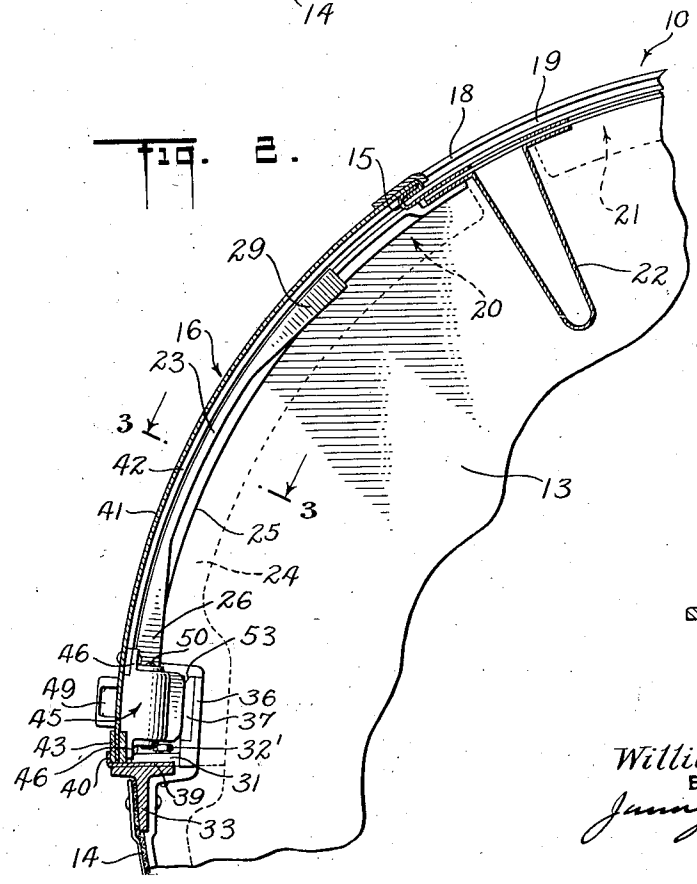
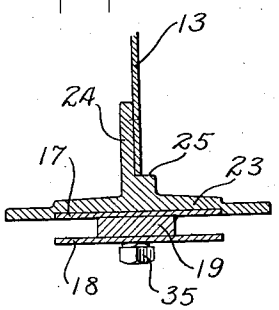


Fig. 3.



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Fig. 4.

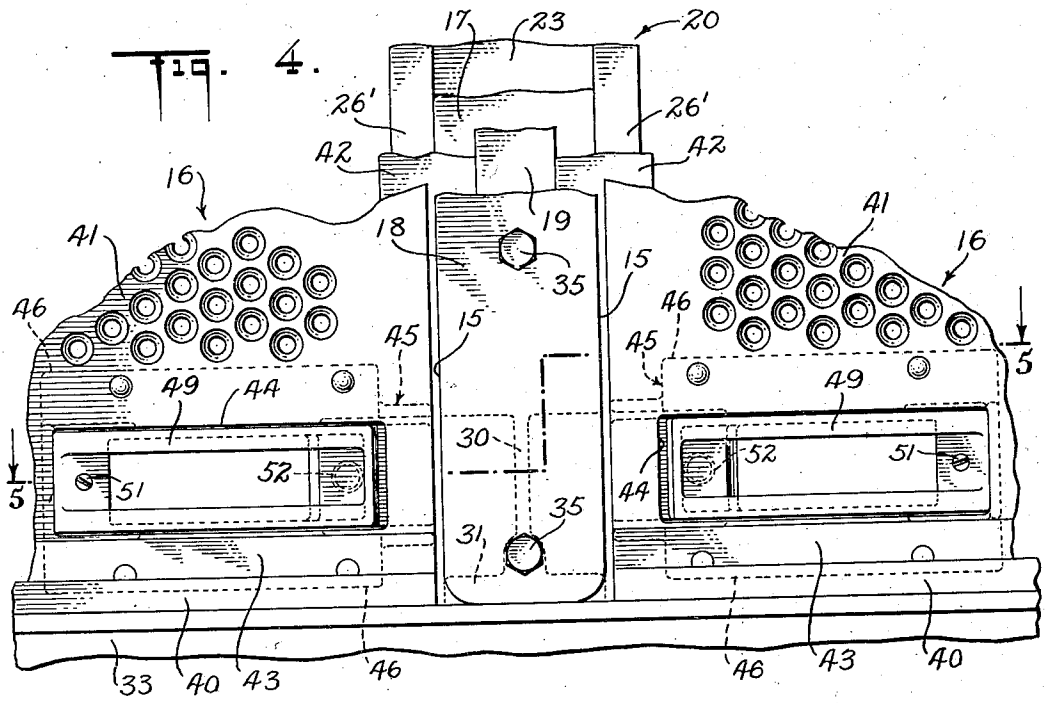
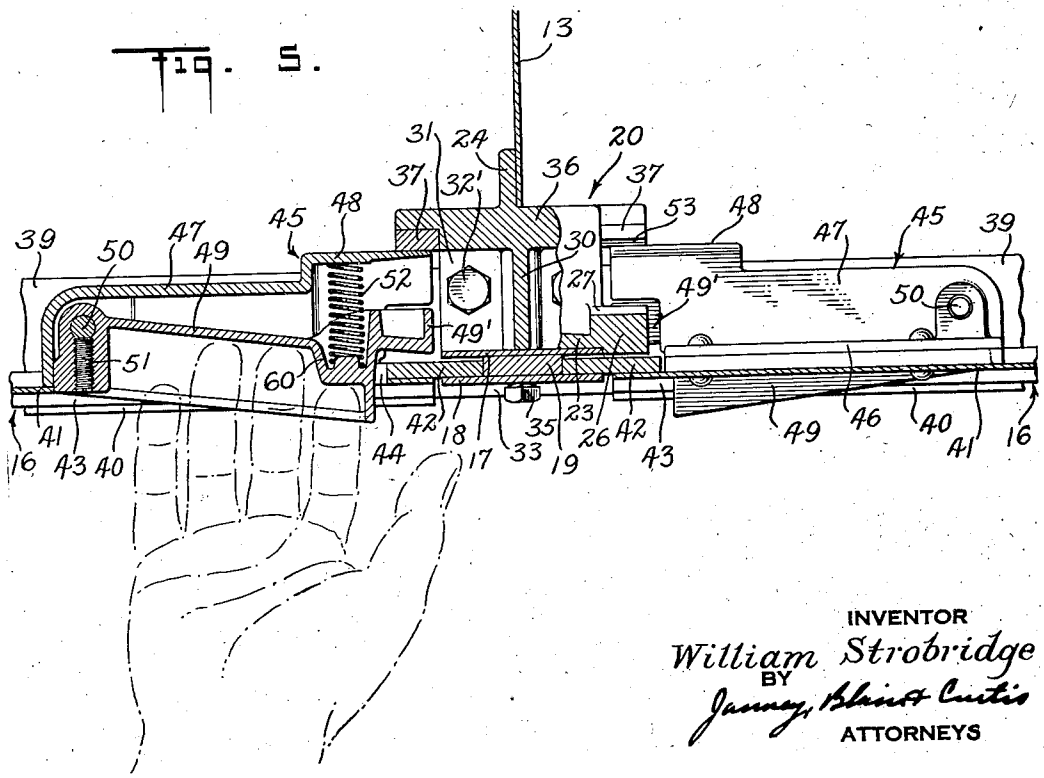


Fig. 5.



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Fig. 6.

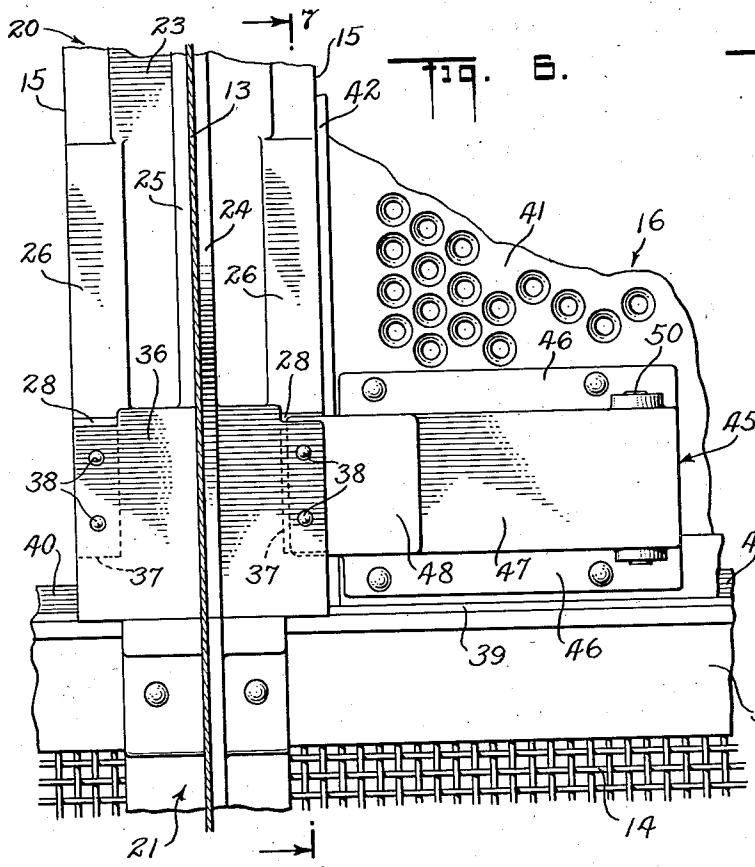


Fig. 7.

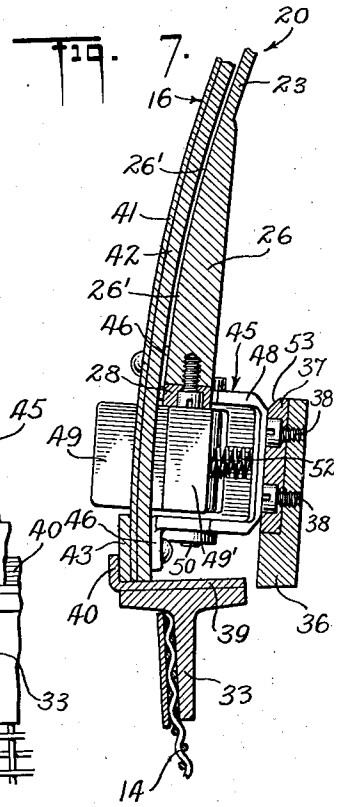
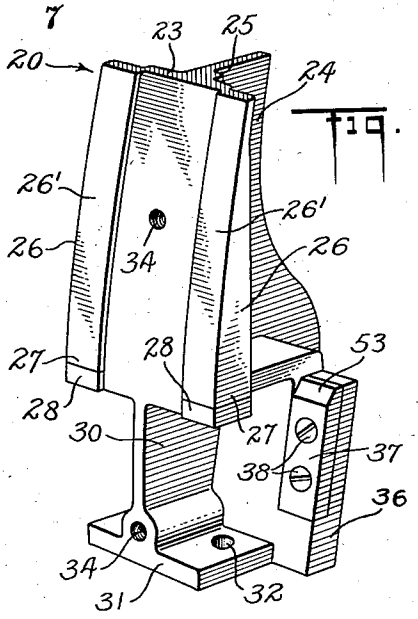


Fig. 8.



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UNITED STATES PATENT OFFICE

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LATCH FOR SLIDING DOORS

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Application February 4, 1933, Serial No. 655,166

11 Claims. (Cl. 220—55)

This invention relates to latching and clamping means for sliding doors of cylindrical vessels, and more especially to such means as applied to drying tumblers for laundries and dry cleaning plants.

One of the objects thereof is to provide simple, efficient and inexpensive latching means of the character described which will positively hold the door locked in open or closed position and be easily and safely operable to release the door. A further object is to provide a rugged and durable latching mechanism that will be reliably self-locking in both open and closed positions of the door. A further object is to provide a simple and efficient means for clamping the door tightly in closed position to prevent chattering or "chucking" movements of the door during operation of the apparatus. A further object is to provide mechanism of the character described wherein parts subject to wear are readily accessible for making adjustments or for replacement.

Other objects will be in part obvious and in part pointed out hereinafter.

This 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 indicated in the following claims.

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

Fig. 1 is a front elevation with parts broken away of a drying tumbler embodying my invention;

Fig. 2 is a partial cross-section on line 2—2 of Fig. 1;

Fig. 3 is a cross-section taken on line 3—3 of Fig. 2;

Fig. 4 is an enlarged detailed view of a portion of the tumbler seen in elevation similar to Fig. 1;

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 4;

Fig. 6 is a rear elevation of the portion of the cylinder and latch mechanism that is shown in front elevation in Fig. 4;

Fig. 7 is a cross-section taken on line 7—7 of Fig. 6; and

Fig. 8 is a perspective view of the lower end of a cylinder frame member that cooperates with the latch mechanism.

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

Cylindrical treating vessels may be said to fall into two general classes, namely, those which rotate at a relatively slow speed and in which the articles being treated are alternately immersed in and lifted out of a bath of treating fluid, as in a washer or dry cleaner; and those, such as drying tumblers, which rotate at a higher rate of speed for removing the fluid from a batch of treated articles or material by evaporation. The peripheral velocity of the latter type of machine is often as high as or higher than 300 feet per minute. As these tumblers are frequently reversed as to direction of rotation, it will be readily understood how essential it is, not only that the doors be dependably held in locked closed position during the drying operation, but also that means be provided to reduce to a minimum the tendency of having occur a "chucking" action, that is, a limited relative motion, between the cooperating parts of the doors and their frames and, as well, between latches and their keepers. And since these machines are often operated by women, it is important that door latching and operating mechanisms be easily operable with the expenditure of slight manual effort and that they be characterized by a high degree of safety.

Referring to the drawings, I have shown my invention as embodied in the door structure of a cylinder 10 adapted to be rotatably mounted by means of trunnions 11 which are secured to the ends or heads 12 of the cylinder, as shown, in Fig. 1. These cylinders are relatively light compared with the ordinary type of washing cylinder and comprise a pair of head members 12, one of which is shown in Fig. 1, and, if of any great length, one or more transverse partitions 13. Where such partitions are used it will be understood that the cylinder is divided longitudinally thereby into a plurality of compartments in each of which a batch of material may be whirled for the removal of cleaning or washing fluid.

The cylindrical wall of the cylinder consists preferably of a covering of a rustproof woven wire mesh material 14 which is secured to the periphery of the heads of the cylinder and to the partitions 13 where such partitions are employed. In Fig. 1, one such intermediate partition is shown dividing the tumbler into two compartments. Each compartment is furnished with a door opening 15 over which is provided and adapted to slide in a peripheral direction a door 16 guided in ways disposed at its lateral edges, which ways comprise an inner member as 17, which may be secured in any suitable manner

to the cylinder head or intermediate partition, and an outer member 18 spaced from the said inner member 17 by a filler 19.

As shown herein, suitable frame members as 20 and 21 are employed to form an outer flange at the periphery of the various heads and partitions, to which flange or flanges the guide plates or ways for the doors and the metal screening may be secured. The frame member 20 which parallels the edges of the door opening is of special construction and may be made single, where it is employed in connection with an end head, or double, as shown in the drawings, where it is used in connection with an intermediate partition, and also may be made in rights and lefts where the single type is required for use with a right or left end head.

In the drawings a double member is shown providing means cooperating with the door locking mechanisms of two doors, which doors are arranged one upon either side of an intermediate partition. The structure of member 20 will be best understood by reference to the perspective view in Fig. 8 in connection with the other disclosures thereof. As will be seen, this member 20 is a long curved bar extending substantially from the lower edge of the door opening 15 to a point above the upper edge thereof adjacent the tumbler rib 22. The outer curved portion 23 of the bar constitutes a flange to support the parts of the cylinder exterior thereto. Back of the flange 23 is a web 24 to which the partition 13 is secured by welding or in any other suitable manner. Near the base of the web is a shoulder 25 which rests against the periphery of the partition.

Extending laterally from a point slightly above the lower end of the bar upon either side of the flange, are a pair of tapered latch keepers 26, the outer surface 26' of each of which is stepped above and curved in correspondence with the flange 23 and the rear or inward surface of which tapers from a relatively thick abutment 27 at the lower end to a thin edge at the upper end. Bolted to this abutment 27 is a wear plate 28 against which the upper surface of a latch engages when the door is in closed position. Near the upper end of the bar 20 is a second latch keeper 29 of exactly similar form but disposed to face in the opposite direction, thus providing an upturned abutment for supporting the latch of the door when the door is in opened position. One or two of these members 29 will be employed according as the bar member is single or double.

Below the abutment 27 the flange of the bar is discontinued but a central web 30 extends down to a horizontally disposed flange 31 provided with bolt holes 32 by means of which and bolts 32' the said bar is fastened down to a T member 33 which extends longitudinally of the compartments to support the lower frame member for the door opening. Threaded bolt holes 34 are distributed lengthwise of the bar to receive the bolts 35 which fasten the door guide plates and filler plate to the bar member. The spaces between the abutments 27, the flange 31, and the central web 30 constitute pockets in which latch devices operate, as will be described hereinafter.

Rearwardly of these pockets and forming a fourth side thereof is a back flange 36 which extends laterally to either side of the center line of the bar a distance substantially equal to the distance of the lateral edge of the latch keeper 26 from the center line of the bar. As will more clearly appear by reference to Fig. 7 the left-hand surface of this back flange is not parallel to a plane tangent to the outer surface of the bar at its lower end but is inclined downwardly toward that plane so as to provide a wedging surface adapted to cooperate with a portion of the door latching mechanism to force the door outwardly against the outer members of the door guides when the door is in closed position. This back flange is provided with a wear plate 37 secured to the flange by means of bolts 38. Shims (not shown) may be inserted behind plates 28 and 37 to provide for adjustment, and to take up wear. Along the upper surface of the T beam 33 is secured a sill plate 39 having an upturned flange 40 disposed exteriorly of the periphery of the cylinder and of the door so as to prevent the bowing or springing of the door outwardly under the action of a pounding load.

The door 16 is composed of a perforated sheet 41 having secured thereto along its vertical edges members 42 extending beyond the edges of the sheet between the guide members 17 and 18. These members are not so thick as the space between the guide members. Thus the door has slight freedom of motion in the guides except when in its jammed lower position. Along the lower edge of the door there is a stiffening plate 43 which is jammed against the upturned flange 40 of the sill 39 when the door is in closed position.

Near the lower edge of the door adjacent each vertical edge thereof the door plate is cut away, as at 44, to give access to pockets formed within latch housing members 45 which are bolted to the inner surface of the door back of each of the said openings therein. Each housing comprises flanges 46 and a substantially rectangular box-like portion 47 which is increased in depth as at 48 to provide space in which the bolt end 49' of a latch member 49 operates. The back of the housing portion 48 is disposed in such relation to the wear plate 37 on the back flange 36 as to slide thereon when the door approaches its closed position and to coact therewith for jamming the door against the outer margins of the door opening frame.

The latch 49 is pivoted in the housing by a pin 50 which extends through the housing from side to side and is held in place by means of a set screw 51. Thus it will be seen that the latch member may be swung about the pin 50 in a substantially horizontal plane from an outer position, in which it underlies the abutment plate 28 on the bar 20 to hold the door in its lower position, to an inward position where it is clear of the abutment. In the latter position of the latch the door is free to be raised. The latch is normally held in its outer or abutment-engaging position by means of a spring 52 extending between the inner wall of the housing and a socket 60 formed in the rear wall of the latch. As will be seen by reference to Fig. 5 the latch member is made hollow and open to the open side of the housing so that its interior is accessible from the outer side of the door. It is operated to release the lock by pressure of the fingertips of the operator exerted in a direction toward the interior of the cylinder, and it will be noted that the rear wall of the latch including the socket portion 60 is so shaped as to facilitate bringing the fingertips into contact therewith and to equalize the pressure exerted by the different fingers.

In Fig. 5 the left-hand side of the figure is in cross-section through the latch while the right-

hand side of the figure shows the latch housing in plan view. In both instances the latch is in its outer or locked position and it will be seen by reference to the right-hand side of the figure that the bolt portion 49' underlies the abutment 27. Both sides of this figure show the rear of the latch housing engaging the inclined jamb surface of the flange 36.

The operation of the mechanism will be largely obvious. When it is desired to open the door, which we will suppose is in closed locked position, the operator thrusts his two hands within the hollow latch members at the sides of the door and pressing with slight force moves each latch member to its inward position where it will be clear of the abutment member 27. Now, without changing the position of the hand and with a substantially continuous movement, pressure may be exerted by the operator against the upper wall of the latch to open the door. As the door rises the bolt portion of the latch will engage the tapered side of the upper latch keeper 29 and when it has reached the desired height will be forced by the spring 52 over the abutment end of said latch keeper. The door will thus be positively held in open position.

When it is desired to close the door the action of pressing in the latch member is repeated, whereupon the door descends of its own weight. As it approaches its closed position, the latch moving therewith slides along the tapered side of the lower keeper 26 and is forced out of its spring-biased position. When the closed position of the door is reached the latch springs outwardly automatically to stand beneath the abutment 27 and lock the door. Also, as the door descends and just before the latch member clears the abutment, the back of the housing engages the upper end of the wear plate 37 which is beveled as shown at 53. Then as the door continues to descend and because of the inclination of the back flange to the plane of tangency of the lower edge of the door, the door is crowded over and jammed tightly against the outer guide flanges 18.

From the foregoing it will be seen that I have provided a construction of an essentially practical nature in which the several objects of the invention are attained.

As many possible embodiments may be made of the above invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination with a fixed abutment within said container of a latch on said door pivoted to swing inwardly with respect to the plane of said opening to a position clear of said abutment.

2. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination with a fixed abutment within said container of a latch on said door pivoted to swing inwardly with respect to the plane of said opening to a position clear of said abutment, and means on said latch serving as a handhold to raise said door.

3. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination with a fixed abutment within said cylinder of a latch on said door adapted to be moved by hand pressure toward the interior of said container to a position clear of said abutment, in which position the said latch is adapted to serve as a handhold for raising said door to open position.

4. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of means on said container overlapping exteriorly a portion of the margin of said door, means providing a camming surface on said container interiorly of said door, and a latch housing on said door adapted in the closed position of said door to coact with said camming surface to force said door tightly against said overlapping means.

5. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of a frame disposed on the outside of said container for overlapping a portion of said door opening, and a latch housing on the door adapted to coact with means within the container to force a portion of the edges of said door tightly against said frame.

6. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of a frame disposed on the outside of said container for overlapping a portion of said door opening, a latch housing on the door adapted to coact with means within the container to force a portion of the edges of said door tightly against said frame, and a latch mounted in said housing adapted to coact with other means on said container to lock the door in closed position.

7. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of a member secured within said container substantially parallel to a lateral edge of said door opening and comprising a tapered latch keeper terminating in a downturned abutment and an inclined shoulder spaced inwardly from said abutment, means supported by said member forming inner and outer guides for said door, a latch on said door adapted to slide over said tapered keeper and lock beneath said abutment, and a housing for said latch adapted to slide along said inclined shoulder to force the edge of said door against said outer guide.

8. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of a member secured within said container substantially parallel to a lateral edge of said door opening and comprising a tapered latch keeper terminating in a downturned abutment and an inclined shoulder spaced inwardly from said abutment, means supported by said member forming inner and outer guides for said door, a latch on said door adapted to slide over said tapered keeper and lock beneath

said abutment, a housing for said latch adapted to slide along said inclined shoulder to force the edge of said door against said outer guide, and wear plates removably secured to said abutment and said inclined shoulder.

9. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of a member secured within said container substantially parallel to a lateral edge of said door opening and comprising a tapered latch keeper terminating adjacent the lower edge of said door opening in a downturned abutment and an oppositely disposed tapered latch keeper terminating in an upturned abutment adjacent the upper edge of said door opening, and a spring latch on said door adapted to slide along the tapered side of one or the other of said keepers and lock against the abutment thereof to hold the door in open or closed position.

10. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of a member secured within said container substantially parallel to a lateral edge of said door opening and comprising a tapered latch keeper terminating adjacent the lower edge of said door opening in a downturned abutment and an oppositely disposed tapered latch keeper terminating in an upturned abutment adjacent the upper edge of said door opening, a spring latch on said door adapted to slide along the tapered side of one or the other of said keepers and lock against the abutment thereof to hold the door in open or closed position, said latch being pivoted to swing inwardly out of abutment-engaging position upon an inwardly directed pressure being applied thereto.

11. In treating apparatus of the type comprising a rotatable container having a cylindrical wall with an opening therein and a door adapted to slide over said wall and to be lowered to close said opening, the combination of means framing exteriorly the outer edges of said opening, a latch housing on said door adapted to coact with means on said container to jam said door against said framing means, and a latch within said housing adapted to coact alternatively with spaced means within said container to lock the door in open or closed position.

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