June 26, 1934. F. A. GERLACH ET AL 1,964,114

DOORLATCH

Filed Dec. 12, 1931 2 Sheets-Sheet 1

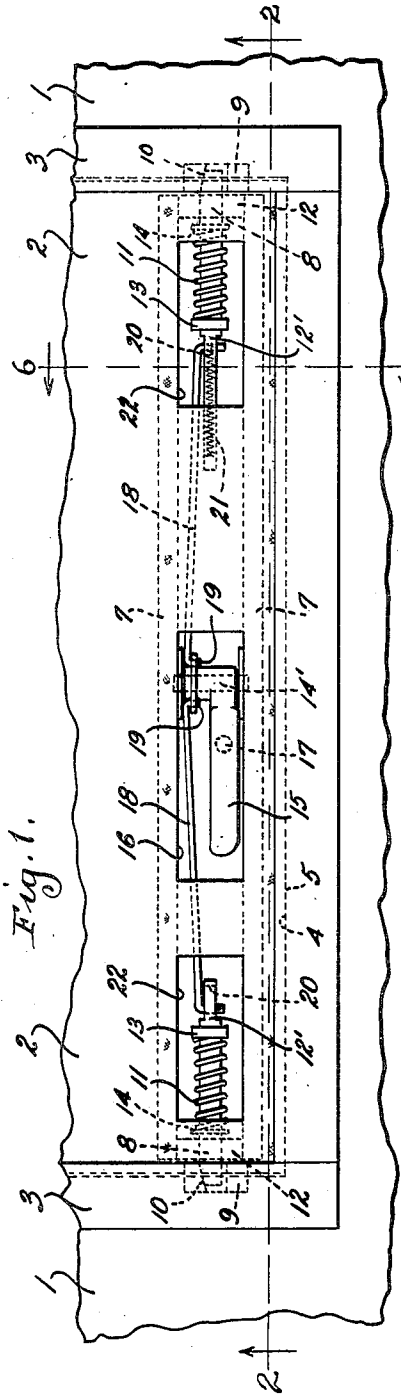

Fig. 1.

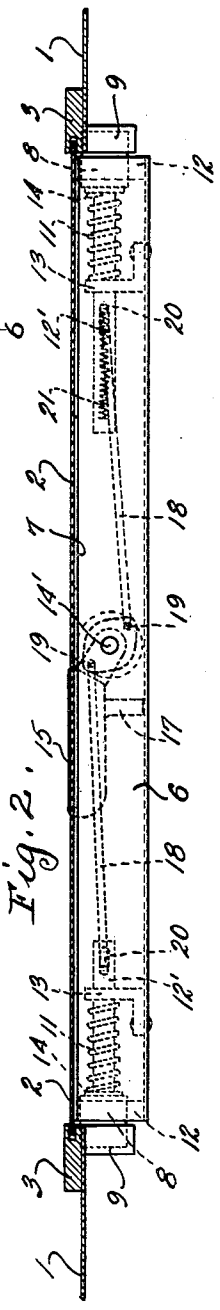

Fig. 2.

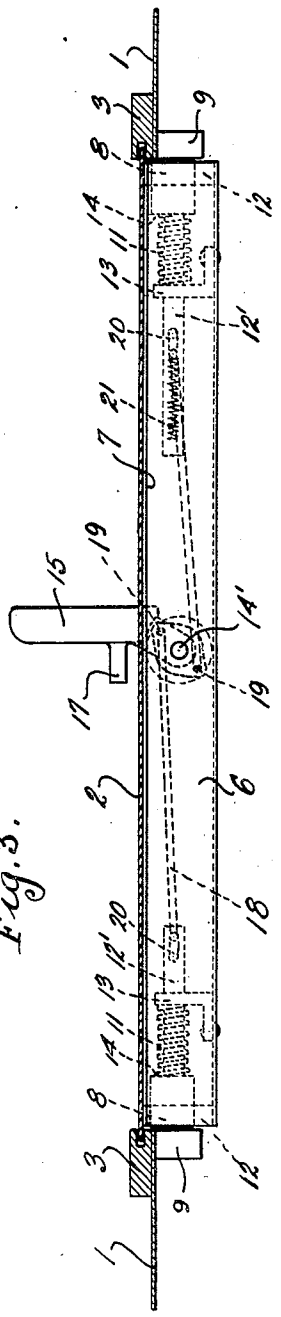

Fig. 3.

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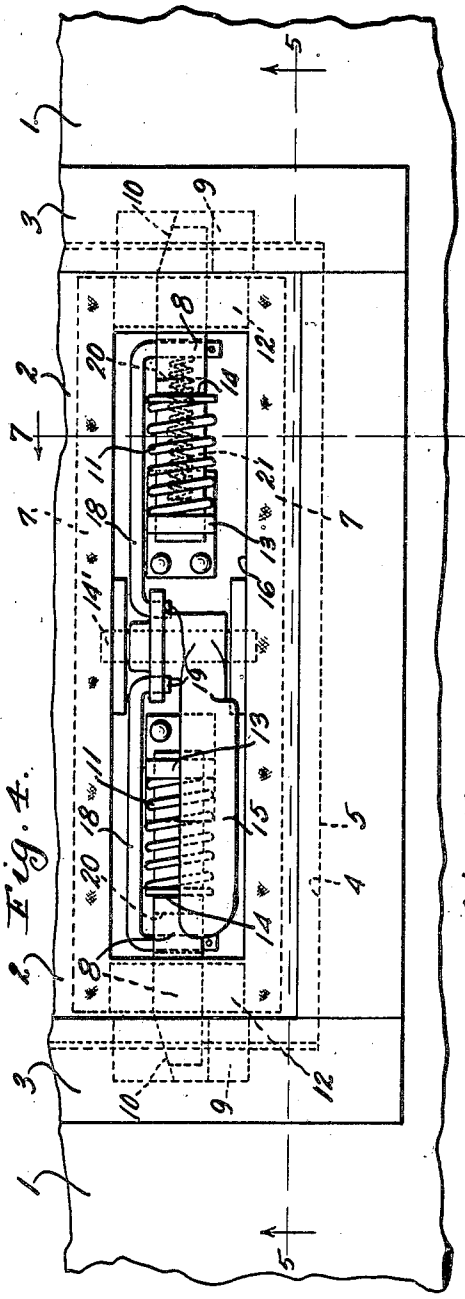

Fig. 4.

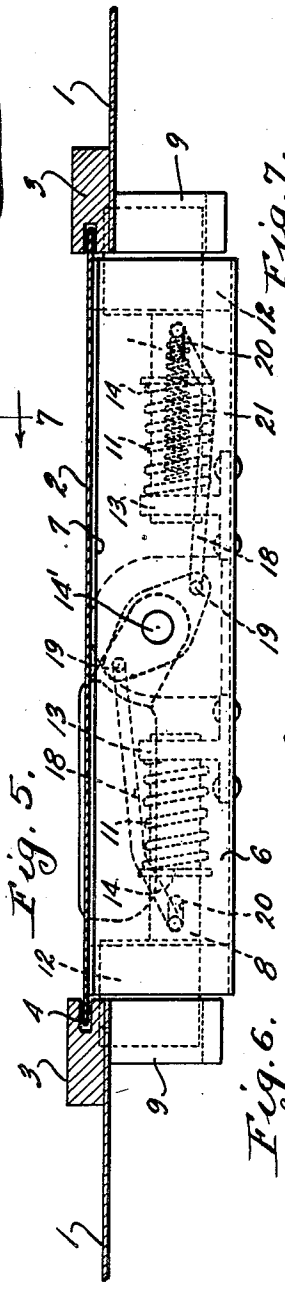

Fig. 5.

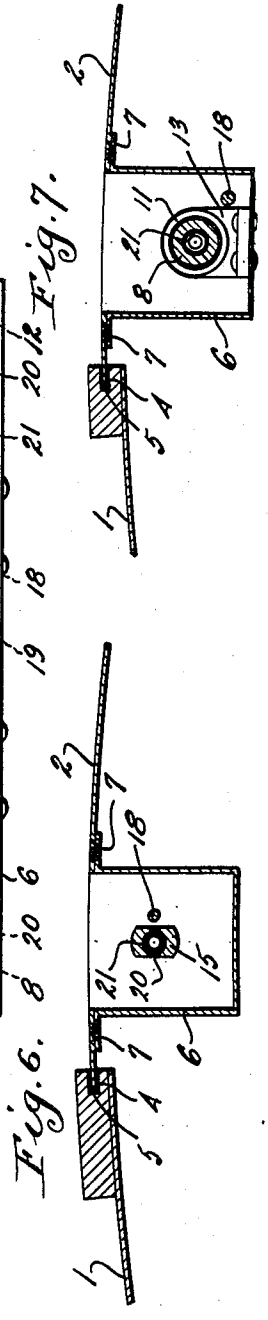

Fig. 7.

Fig. 6.

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DOORLATCH

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2 Claims. (Cl. 292—36)

Our invention relates to a latch mechanism for the cylinder doors of washing machines, cylinder doors of drying tumblers or like devices although it is not limited thereto.

The doors of a washing machine cylinder are usually sheet metal and mounted to slide in grooved guides provided at each side of the door and are arranged to be locked against movement in both their closed and open positions. It has been found desirable to provide a latch operating means midway the sides of the door in order to manipulate the door with the greatest ease and, since the door is in closed position during operation of the cylinder, it is desirable to have the door securely locked against any opening movement as well as to provide for an automatic take-up for latch wear so that the door will be securely locked even after long usage.

Heretofore, the housing for the cylinder door locks has been made of a different metal than that of the door which necessitated securing the door and lock housing together by means of rivets, screws, or bolts. Such construction prevented the latch mechanism housing from being attached to the door by the more desirable method of spot welding, but our invention contemplates constructing both the door and the latch mechanism housing of the same metal, preferably Monel metal, whereby they may be spot welded together which has the advantages of decreasing the weight, decreasing the cost of manufacture, and requiring less labor in assembly. Likewise, the latch mechanism housing is of a nature to provide a bracing means for the cylinder door to thus give the door greater strength and rigidity.

Various objects and advantageous features of our invention may be seen in the following description and one embodiment thereof may be seen in the accompanying drawings wherein similar characters of reference designate corresponding parts, and wherein:

Fig. 1 is a fragmentary face view of a washing machine cylinder and door showing the door in closed position and provided with a latch mechanism and latch mechanism housing constructed in accordance with our invention, the latch mechanism being in operative position; Fig. 2 is a longitudinal sectional view of the lock mechanism taken on the line 2—2 of Fig. 1; Fig. 3 is a view similar to Fig. 2 and showing the latch mechanism in inoperative position; Fig. 4 is a fragmentary face view of a washing machine cylinder and door showing a door of the short type in closed position with the door being provided with a latch mechanism embodying our invention and the latch mechanism being in operative position; Fig. 5 is a sectional view of the latch mechanism shown in Fig. 4 and taken on the line 5—5 thereof; Fig. 6 is an enlarged sectional view taken on the line 6—6 of Fig. 1 with the door edge in position in the lower jamb; and Fig. 7 is a sectional view taken on the line 7—7 of Fig. 4 with the door likewise in position in the lower jamb.

Referring to the drawings, we have shown a portion of a cylinder 1 that may be of the usual perforated type as found in washing machine or drying tumbler cylinders, the cylinder being provided with a door 2 mounted to slide in suitable grooved guides 3 with its lowermost edge 4 abutting against a jamb 5 when in closed position and the edge 4 being remote from said jamb when the door is in open position. Referring to Figs. 1, 2, 3, and 6, wherein a door of the long type is shown, a one-piece cover 6 for a suitable latch mechanism hereinafter described is provided, the casing or housing being preferably of the same material as the door so as to lend itself readily to attachment thereto by spot welding, being of a length to extend substantially entirely across the width of the door, and being substantially U-shaped in cross section with outwardly extending flanges 7 at the ends corresponding to the upper edges of the U. These flanges form a place for attaching the housing 6 to the door 2 by spot welding in proper position to have the ends of locking bolts 8 at each end of the door enter bolt notches or keepers 9 provided on the cylinder 1 when the door is in closed or open position.

As clearly shown in Fig. 1, the end of each bolt 8 has its side remote from the lowermost edge 4 of the door 2 formed at an angle to take against and coincide with the angular form of one side of the keeper 9 as indicated at 10. This angular form on one side of the end of each latch bolt 8 together with the angular surface of the latch keeper 9 serves to cam the door 2 down tightly against the jamb 5 when the bolts 8 are forced into the keepers 9 by springs 11 provided for that purpose. Thus, the door 2, when in closed position, is positively held against any movement whatever by the action of the bolts 8. That is, the jamb 5 prevents any downward movement of the door 2 and the beveled or angular portions on the bolts and latch keepers prevent any upward movement of the door. It will be noted that the notch or bolt opening in each latch keeper is considerably larger than the ends of the bolts

8 so that the end of each bolt is free to move further into the notch or bolt hole of its keeper and hold the door securely against movement in either direction although the parts are considerably worn from using. Some wear will take place on the contacting surfaces of the lowermost edge 4 of the door 2 and the jamb 5 and also on the contacting surfaces of the coacting angular portion of the bolts 8 and keepers 9. However, since the ends of the bolts 8 are free to move further into the keepers 9 due to a lost motion connection between the bolts and the operating means therefor as hereinafter described, the door will always be held securely in a closed position due to the yielding pressure of the coiled expanding springs 11 against the coacting angular surfaces of the latch bolts and latch keepers.

Each latch bolt 8, there being one at each side of the door 2, is guided in its longitudinal movement by having one rectangular shaped end slide in a guide formed in a block 12 that is secured in the proper position in the channel shaped end of the U-shaped housing 6, and its intermediate round portion 12' slide in a perforation formed in a bracket 13 secured to the bottom of the channel of the housing 6. The coiled expanding springs 11 which yieldingly press the latch keeper engaging ends of the bolts 8 outwardly away from the ends of the housing 6 are interposed between the bracket 13 and a shoulder 14 formed on the bolt 8 at the junction of the rectangular bolt heads and the round portion 12' of the bolts. To form perfect seats for the springs 11, washers may be placed between the ends of the springs and the shoulders 14. A second pair of notches or keepers, not shown, may be provided in the opposing guides 3 at the edges of the door opening in the cylinder 1 with which the bolts 8 register when the door 2 is in full open position. From the description above, it will be understood that, when the door is moved to its full open position, the bolts 8 will be spring pressed into one set of notches or keepers to hold the door against movement and when the door is moved to its closed position with its lowermost edge 4 against the jamb 5, the bolts 8 will be spring pressed into the notches or bolt openings provided in the keepers 9 to positively lock the door against any movement.

To economize in space in order that the outer tub of a washing machine in which the cylinder is employed may be made as small as possible, the space between the outer surface of the cylinder 1 and the inner surface of the tub is made as small as safe operation of the machine will permit. Therefore, any handles provided on the door 2 for its manipulation should not extend out radially beyond the outer surface of the cylinder. A most convenient location for a handle on the door has been found to be adjacent the lowermost edge 4 thereof and centrally between its ends. Therefore, a handle 15 is provided at this point, the handle being mounted to swing freely in a plane parallel to the longitudinal axis of the cylinder on a pivot 14' which is so located that in the position shown in Figs. 1 and 2 the handle may be swung to be substantially entirely beneath the plane of the outer surface of the door 2 in nested position and as shown in Fig. 3 may be moved to extend outwardly at right angles to the surface of the door. The handle is so swung for latch bolt moving purposes and when in its extended position is immovable relative to the door in the plane of door movement whereby it may serve as a handle for moving the door in either direction.

The pivot 14' is conveniently located in the housing 6 in such position that the handle 15 in its nested position occupies a space in the channel of the housing 6, the door 2 being provided with a rectangular shaped opening 16 through which the handle 15 passes in its movement from one position to the other. Such handle is provided with a stop lug 17 which engages the bottom of the channel of the housing 6 when the handle is in its nested position and prevents the handle from entering the housing 6 too far. Also, the stop lug is positioned adjacent the pivoted end of the handle to act as a guard against pinching the operator's hand between the housing 6 and the inner portion of the handle while the handle is being moved into the housing.

Suitable rods 18 are operatively connected eccentrically to the handle 15 near its pivot 14' and to the bolts 8 in such manner that the two bolts 8 will be moved longitudinally towards the handle pivot against the resistance of the springs 11 when the handle 15 is swung about its pivot from its nested position to its extended position, movement of the bolts 8 being in the reverse direction when the handle is swung from its extended position to its nested position. As shown in Figs. 1, 2 and 3, one end of each rod 18 is pivotally connected to the handle 15 at 19 and the other end of each rod is pivotally and slidably connected to the ends of the bolts 8 adjacent the brackets 13, the bolts 8 being provided at such points with short slots 20 through which the bent end of each rod 18 extends. Cotter pins or other means may be provided to retain the bent ends of the rods 18 in the slots 20.

The purpose of the slots 20 is to permit movement of the handle 15 about its pivot 14' part way from its nested position to part way toward its outwardly extended position without moving the bolts 8. That is, a lost motion connection is provided between the rods 18 and the latch bolts 8, this connection being provided to permit the springs 11 to move the latch bolts 8 into the latch keepers 9 without resistance to take up wear and also to permit the handle 15 to be slightly raised out of the housing 6 before it becomes effective to compress the springs 11 and withdraw the latch bolts from the latch keepers whereby greater leverage may be had on the handle 15 which is conducive to easier manipulation.

However, when the door is in a closed position and the latch keeper engaging ends of the bolts are in coacting position with the latch keepers, some provision is necessarily made to yieldingly hold handle 15 in its full nested position with the stop lug 17 against the bottom of the channel of the housing 6 so that no portion of the handle projects outside of the plane of the outer surface of the cylinder 1. Therefore, a light expanding spring 21 is provided that is disposed between the bent end of one of the rods 18 and the bottom of an opening in the round portion 12' of one of the bolts 8 to yieldingly press the rod 18 outwardly and thereby hold the handle 15 in its full nested position. The door 2 is provided with cut-out portions 22 for permitting access to the latch mechanism for purposes of removal or repair.

With the above construction, we have provided a cylinder door latching mechanism and a housing therefor embodying numerous advantageous features. For example, we have pro-

vided a latch mechanism housing that lends itself readily to spot welding to the cylinder door and thus permits a cylinder door that is lighter in weight in its complete form to be furnished. The fact that the housing is of one-piece construction is also advantageous both in manufacture of the housing and in assembly thereof with the cylinder doors. Further, the latch mechanism housing extends substantially entirely across the width of the cylinder door and acts as a bracing means to provide a stronger and a more rigid cylinder door construction. In addition to the above advantageous features, we have provided a latch mechanism that automatically takes up any wear in the latching bolts and latching bolt keepers whereby the cylinder door will be securely held in its desired position at all times regardless of wear on the parts. Various other advantageous features will be readily apparent.

What we claim is:

1. In a cylinder door latch mechanism, a door having an opening, a casing mounted on said door beneath said opening to form a recess accessible through the opening, latch mechanism in said recess and a handle for actuating said mechnism by swinging motion between a position within the recess and one outstanding through said opening, and a lug on said handle arranged adjacent the pivoted end thereof to limit the closing motion of the handle into the recess.

2. In a cylinder door having a rectangular opening extending parallel to the axis of the cylinder and a casing mounted on said door beneath said opening to form a recess accessible through the opening, the combination which comprises a latch mechanism in said recess, a handle for actuating said mechanism mounted to swing in a plane adjacent one longitudinal edge of said opening between a position within the recess and one in which the handle stands out through the opening, and a lug on said handle arranged adjacent the pivoted end thereof to limit the closing motion of the handle into the recess and to act as a guard against pinching the hand of the operator between the handle and the door while said handle is being moved into said recess.

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