Aug. 3, 1937. M. L. MANCHESTER 2,088,915

WASHING MACHINE

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Fig. 1.

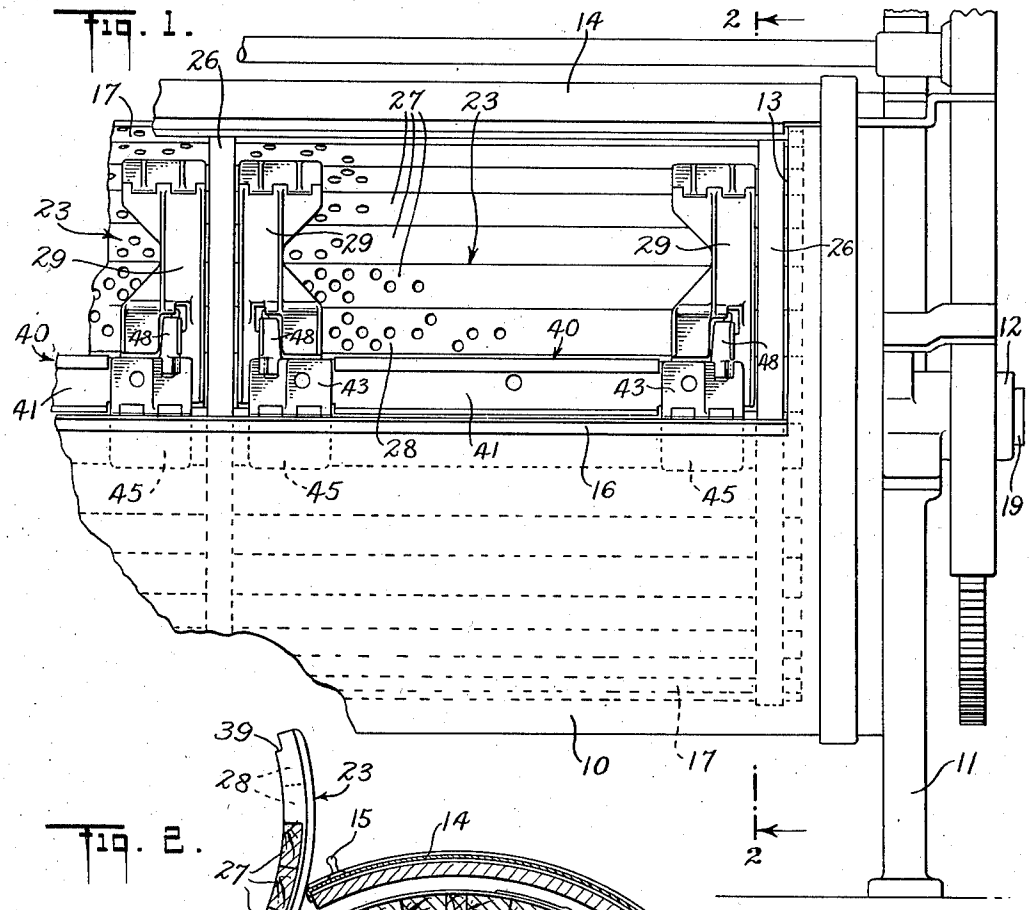
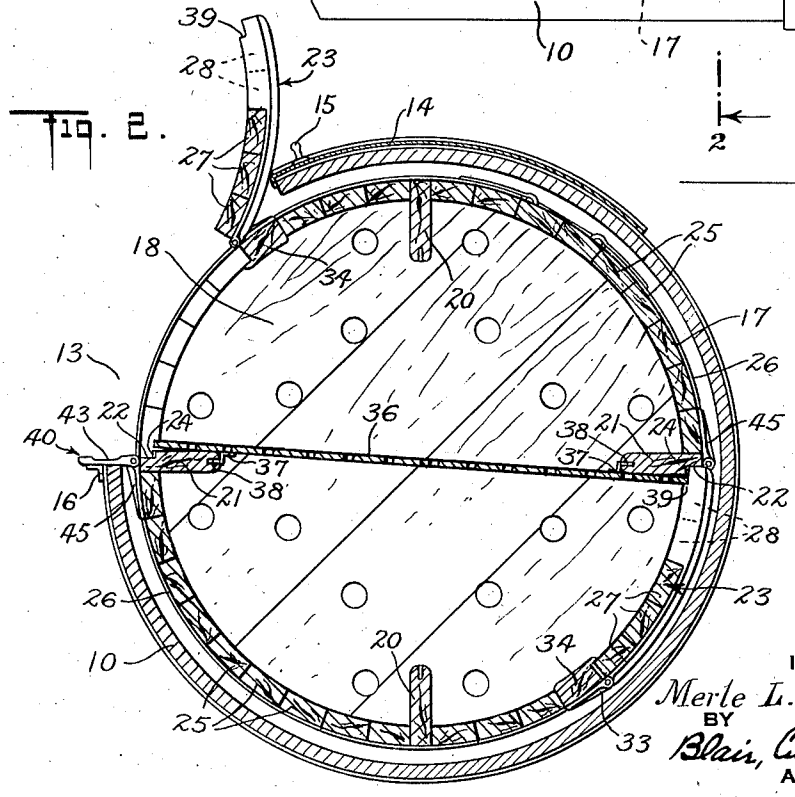


Fig. 2.



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Fig. 3.

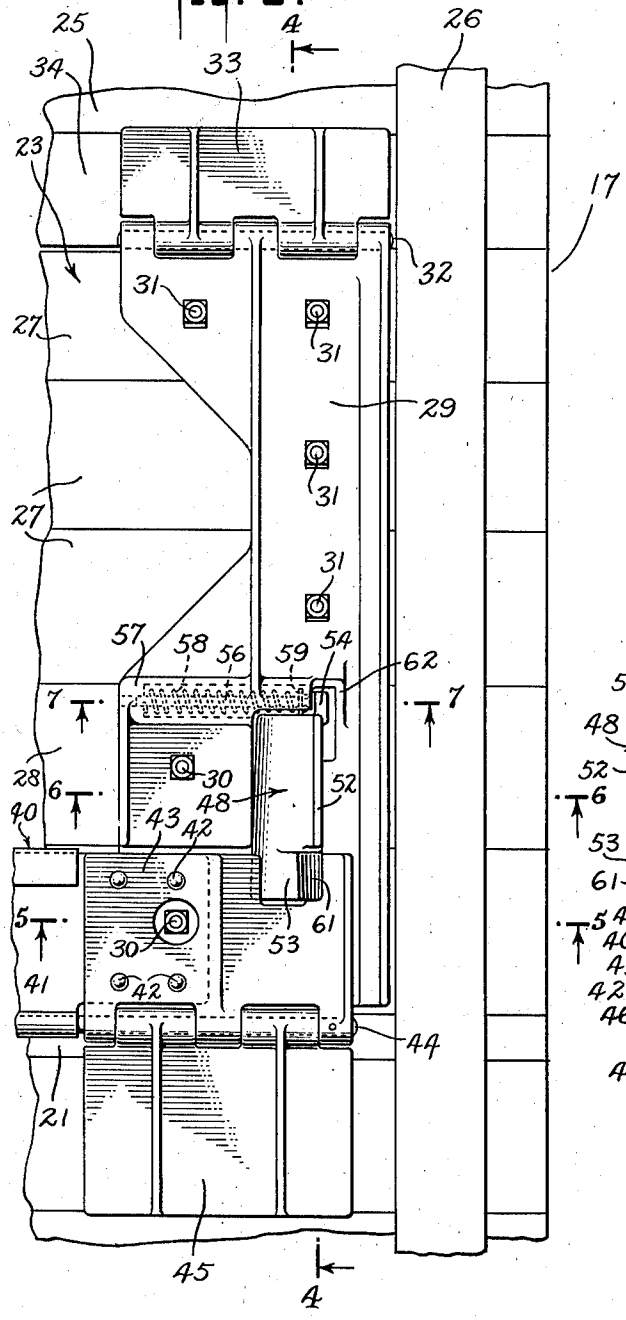
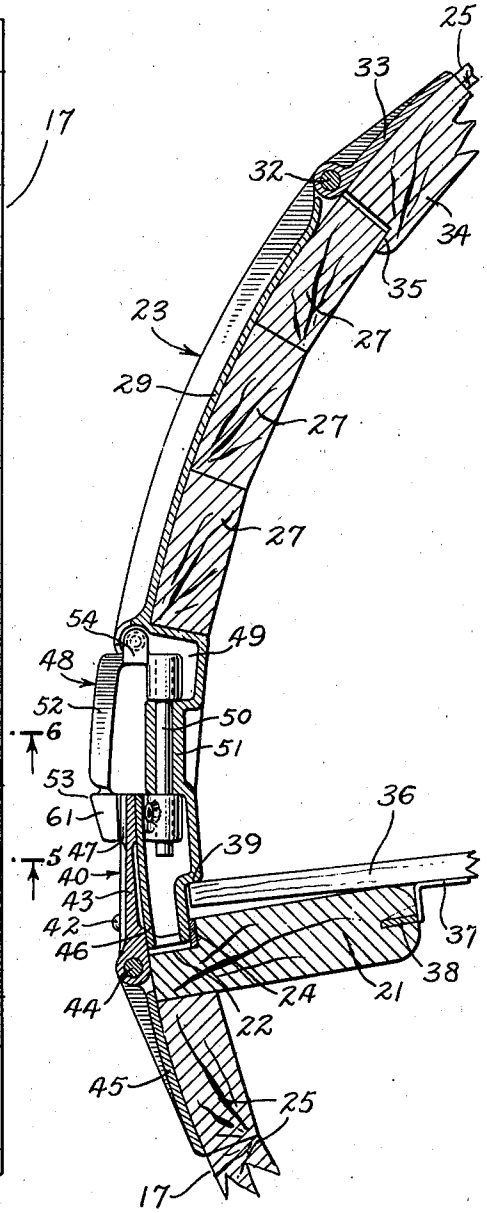


Fig. 4.



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Fig. 5.

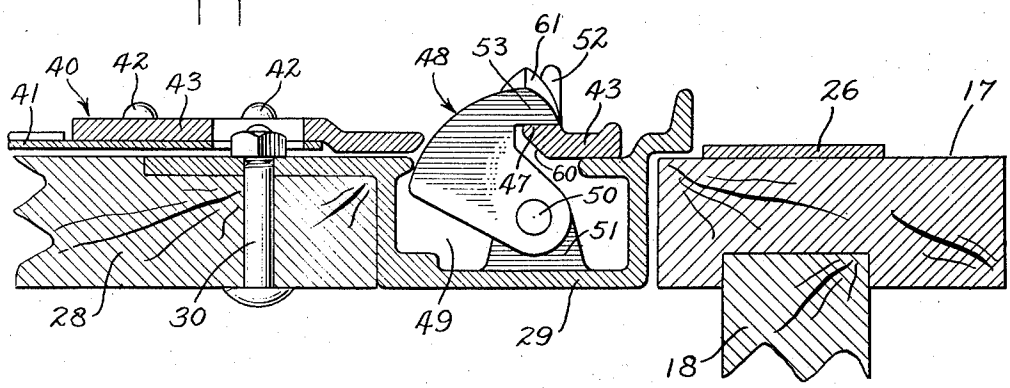


Fig. 6.

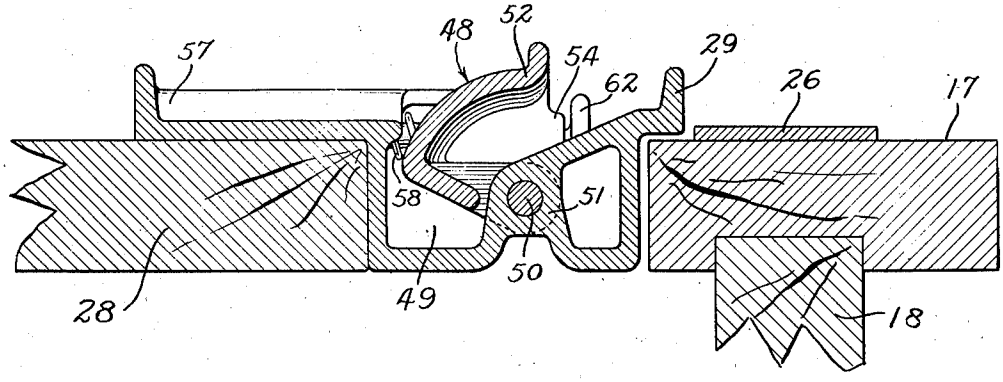
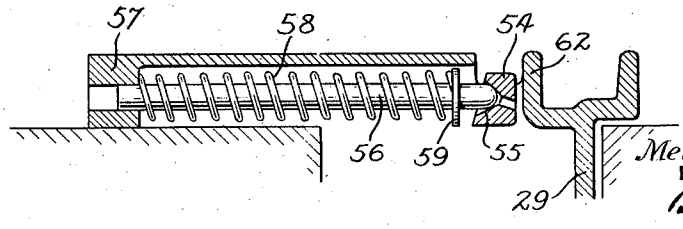


Fig. 7.



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Patented Aug. 3, 1937

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UNITED STATES PATENT OFFICE

2,088,915

WASHING MACHINE

Merle L. Manchester, Syracuse, N. Y., assignor, by mesne assignments, to United States Hoffman Machinery Corporation, New York, N. Y., a corporation of Delaware

Application December 2, 1933, Serial No. 700,639

3 Claims. (Cl. 220—32)

This invention relates to washing machines wherein a cylinder is mounted for rotation within an outer casing. More specifically this invention provides a cylinder door closure in which the undesirable effects of unavoidable wear of the locking parts is minimized. Further, it provides for an automatic bridge for the gap between cylinder and outside casing of the washer.

Washing machine cylinders rotate in casings of appreciably larger diameter, the casing and cylinder being provided with door openings which may be brought into registry. While articles are being placed in or removed from a cylinder through the said registering openings, it often happens that some of the smaller pieces drop down into the space between the cylinder and the surrounding casing. To prevent this resort has been had to various expedients. For instance, an apron was provided which, when the doors were open, could be brought into a position to lie across the respective door sills, bridging the gap between casing and cylinder. In other constructions the door of the cylinder was made in two parts, a longer upper door hinged to the upper edge of the door opening and a shorter lower door hinged to the lower edge of the door opening. When the cylinder doors were opened the lower door portion swung downwardly to extend across the gap between the cylinder and casing, in which position it was supported by the door sill of the casing.

Aprons according to the first expedient were found to be awkward to handle and necessitated very careful spotting of the inner cylinder to bring the respective openings into close alignment. Where the second expedient was employed, namely, the double doors, the operator was forced to use two separate and distinct motions when opening the cylinder doors. It was first necessary to unlatch the lower door allowing it to fall in place and then to raise the longer door to give access to the inside of the cylinder.

One of the objects of this invention is to provide a cylinder door closure which embodies a simple, practicable and automatically operable means for bridging the gap between the door sills of the cylinder and outer casing. It is further an object of this invention to simplify the operation of the cylinder closure by making it possible to open the said door and bridge the gap between cylinder and casing by a single motion or act of the operator.

Another difficulty found in machines of this kind has to do with the means for locking the cylinder doors so that they will not yield to the pounding of the load within the cylinder nor suffer relative movement between latching surfaces to cause wear of those surfaces and eventually looseness of the door members. Loosening at the latching surfaces not only produces door rattling but permits opening of the doors to such an extent while the machine is in operation that fabrics may be caught therein and badly damaged. Furthermore, it is desirable that when the doors are moved to closed position the latches should operate automatically to locked position in order to reduce as far as possible the danger of the operator's closing a door without first assuring himself that the latches have caught before setting the machine in operation. It is therefore an object of this invention to provide simple and efficient door latches subject to a minimum of wear which will automatically lock themselves when the doors are closed by the operator.

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 indicated in the following claims.

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

Fig. 1 is a front elevation of a portion of a washing machine embodying the several features of the present invention;

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

Fig. 3 is an enlarged elevation of a portion of the washer cylinder showing certain of the specific features of the invention;

Fig. 4 is a partial section taken on line 4—4 of Fig. 3;

Fig. 5 is an enlarged partial section taken on line 5—5 of Fig. 3;

Fig. 6 is a similar section taken on line 6—6 of Fig. 3; and

Fig. 7 is a section taken on line 7—7 of Fig. 3.

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

Referring to the drawings, it will be seen that a cylindrical casing 10 is mounted upon standards 11 and provided with bearing members 12 supported by said standards. This construction as applied to one end of the washer is shown in Fig. 1. The casing is provided with a door opening 13 and a door closure comprising a

door 14 slidable over the periphery of the casing to the open position shown in Fig. 2 and guided at its lateral edges in a known manner. This sliding door is provided with any suitable handle as indicated at 15 to facilitate raising the door or pulling it down to closed position. At the lower edge of the door opening 13 there is provided an angular abutment member 16 serving as a sill against which the lower edge of the door 14 rests when the door is in closed position.

A cylinder 17 is rotatably mounted upon a horizontal axis within the casing 10. It is provided with end heads and, if desired, with intermediate heads of similar construction. Such a head is indicated at 18 in Fig. 2. The end heads are provided with any suitable trunnion assembly providing shaft members 19 rotatably mounted in bearings 12. Secured to the heads are rib members 20 and 21 which serve as tumblers for agitating the clothes when the machine is in operation. The ribs 21 are notched as at 22 to provide seats for the free edges of cylinder doors 23. Each notch 22 provides a shoulder against which are secured slam or wearing plates 24, best shown in Fig. 4, disposed adjacent the lateral edges of the door opening and adapted to cooperate with hinge members of the doors, as will be more fully described hereinafter.

The peripheral space between the ribs 20 and 21 is occupied by a plurality of wooden staves 25 which are secured to the head members hereinbefore mentioned by means of continuous metal bands 26. These staves run the length of the cylinder except at the door openings, in line with which short stub staves are employed. Each door 23 comprises a plurality of similar wooden staves 27 and 28, which constitute the body of the door and which are secured at their ends each to a cast hinge-strap 29. The staves 27 extend the full width of the door opening terminating at their ends in close-fitting relation to the lateral edges of said opening. The staves 28, two of which are employed for each door, are shorter than the staves 27 and are secured to the hinge-strap castings by bolts 30. The longer staves are secured to the hinge-strap castings by bolts 31.

Each hinge-strap is pivoted at its upper end by means of a pin 32 to a hinge-butt 33, the latter being rigidly mounted upon a hinge-butt-stave 34 which is notched, as at 35, so as to overlap the upper edge of the upper stave of the door when the door is in closed position, best shown in Fig. 4. The portion of the lower door-stave 28 which lies between the hinge-straps will be similarly overlapped by the shoulder 22 of the tumbler rib 21. When the door is in closed position contact takes place between the hinge-straps and the wear plates 24. Thus there is no wear-producing contact between the stave itself and the rib. It should be noted that a single full width door closes the opening between the hinge-butt-stave 34 and the rib 21.

Dry cleaning cylinders are usually provided with door openings disposed at 180° from one another which are brought successively into registry with the opening in the casing when it is desired to unload the cylinder. Since dry cleaning fluids are not drained from the casing after each operation it is necessary before removal of the load to lift it out of the fluid standing in the cylinder. To facilitate this operation a drainboard is employed in the following manner. After the machine has been stopped and one of the cylinder doors brought into registry with the casing opening, a removable drainboard is thrust through the door openings and disposed within the cylinder in substantially a diametrical position. Means are provided for supporting the edges of the drainboard in a position substantially flush with the sills of the respective cylinder door openings, and other means are provided for holding the drainboard in such a position when the cylinder door is closed. After insertion of the drainboard the cylinder is rotated 180° to bring the opposite door opening into registry with the casing opening. This brings the load to the upper side of the drainboard and permits surplus fluid to drain through the board into the lower half of the cylinder and casing. Then, when the cylinder and casing have been opened the operator may reach inside and slide the load along the drainboard and over the unloading apron (when one is available), discharging the same into a laundry basket or other receptacle.

Such a drainboard 36 is shown in operative position in Figs. 2 and 4. This drainboard rests against the relatively upper and lower surfaces of the opposing ribs 21 adjacent their outer ends, the drainboard being provided with metal angles 37 adapted to engage copper ground-strips 38 set into the inner ends of the ribs. The ribs prevent shifting of the drainboard in a radial direction and, when the doors are closed as shown in Fig. 4 and in the lower half of Fig. 2, the longitudinal edges of the drainboard are engaged by shoulders, as at 39, formed upon the hinge casting and the lower door stave. Thus the drainboard is clamped along either longitudinal edge thereof between the shoulders 39 and the points of contact of the drainboard with the tumbler ribs 21. It will be understood that the cylinder staves, the door staves, the cylinder heads, and the drainboard are all suitably perforated to permit free circulation of the treating fluid during draining thereof from the clothes at the end of a washing operation.

A flap or apron 40 is hinged to swing about an axis 44 disposed parallel to door axis 32 and at the periphery of the cylinder exteriorly of the door 23. This flap comprises a metal plate 41 secured at its ends by means of rivets 42 to a pair of hinge members 43. These hinge members are rotatably secured by means of pins 44 to hinge butts 45 rigidly mounted upon the outer surface of the cylinder. The flap overlaps the door 23 covering substantially the whole of the lower stave thereof and an equal amount of the lower ends of the hinge-straps 29. Each flap-hinge 43 is provided with a pad 46 disposed upon its inner surface in close adjacency to the hinge axis 44, which pad is adapted firmly to engage the outer surface of the hinge-strap 29 adjacent its extreme lower or free edge. Thus the closing of the flap over the lower edge of the closed cylinder door forces the lower ends of the respective hinge-straps into close contact with wear plates 24. A similar pad 47 is provided on the outer surface of each hinge member 43 adjacent the upper edge thereof, which pad is engageable by a latch member generally designated by the numeral 48, which is rotatably mounted in a recess 49 formed in each hinge casting 29, as best shown in Fig. 5.

By reference to Figs. 3, 4, 5, 6 and 7 it will be seen that this latch member 48 is in cross-section of a general sector-like formation and is pivoted

substantially at the apex of the sector by means of a pin 50 upon a boss 51 formed within the hinge casting. Each latch comprises a finger-grip portion 52 (best seen in Figs. 3, 4 and 6), a latch-hook portion 53 (best shown in Figs. 3, 4 and 5), and a projecting portion 54 providing a socket 55 in which is seated the end of a spring-urged thrust rod 56 which is guided in a boss 57 formed upon the hinge-strap casting. The thrust rod is urged to the right, as seen in Figs. 3 and 7, by means of a compression spring 58 interposed between a wall of the boss 57 and a collar 59 secured to or formed upon the thrust rod 56. This spring and thrust rod, as shown in Fig. 3, tend to rotate the latch member about its axis to the right and toward the right lateral edge of the door.

It will be understood, of course, that a similar latch mounted upon the hinge-strap secured to the opposite end of the door operates in the reverse direction and is forced by its spring toward the left. Thus the two latches normally press outwardly toward the lateral edges of the door. In the position shown the hook member 53 overlies the before-mentioned pad 47 formed upon the hinge member 43 of the flap 40 and holds the upper end of the flap-hinge in close engagement with the outer surface of the hinge-strap 29. Each flap-hinge 43 is provided with a beveled surface 60, see Fig. 5, adapted to engage a camming surface 61 formed upon the outer surface of the hook member 53 to force the latch member inwardly toward the center of the door and downwardly in the recess 49 when the flap is moved from the position shown in Fig. 2 to its closed position as shown in Figs. 3 and 4.

A stop member 62 extends outwardly from the surface of the hinge-strap 29 in a position to be engaged by the projection 54 of the latch member to limit movement of the latch member under the reaction of the spring 58, so that the latch member will normally be held in a position to be engaged by the flap-hinge when the said flap is brought to its closed position.

From the foregoing description, the cooperation existing between the door hinges, the flap member, and the latch member will be largely obvious. With the door in closed position, as shown in Figs. 3 and 4, when it is desired to open the door the operator grasps the two latch members disposed at opposite edges of the door and with a natural pulling motion swings them about their axes toward one another to release the latch-hooks from engagement with the flap-hinge surface 47. Continuing the pull upon the latch members raises the door which now may be swung to a position slightly beyond the vertical where it will stand in engagement with the lower edge of the open casing door 14, as shown in Fig. 2. This movement of the cylinder door automatically displaces the unloading flap 40 from its closed position to the open position shown in Fig. 2, thus closing the gap between cylinder and casing. With the cylinder door and flap in this position the drainboard 36 may be inserted in its proper position within the cylinder or removed therefrom. Supposing that it has been inserted in the position shown in Fig. 2, the door 23 is pulled down to its closed position to hold the drainboard securely in place. Then the flap is raised to its closed position and automatically displaces the latch-hooks 53 from the position shown in Fig. 5, so that their springs may force them into engagement with the flap-hinge pads 47.

Where hinged doors have been used to close openings in a washer cylinder, it has been customary to use sliding bolts mounted in housings furnished by the door hinge straps, which bolts are spring-pressed outwardly beneath a cylinder band or other latch keeper mounted upon the cylinder to lock the door in closed position. As in use these doors are frequently permitted to slam shut the latch members are subjected to great shock and frequently get out of order. Also with such constructions the wear is excessive and the latches soon become inoperative or at least ineffective to maintain a tight closure of the door opening. This disadvantage is not present in applicant's construction for the latches mounted upon the door hinges are subjected merely to the pressure resulting from the force employed by the operator in raising the flap to its closed position. As the shock is slight there is little chance of damaging the mechanism of the latch or causing undue wear thereof. Furthermore, it is to be noted that since the latch operates through the long lever arm provided between the pad 47 and the hinge axis 44, as compared with the short lever arm between the pad 46 and the axis of the flap hinge, there is a leverage gain of about five to one, so that even should there be some looseness at 47 only one-fifth of the amount of such looseness would be apparent at 46. Also, this leverage gain makes it possible for a light latching member to support a very heavy load impressed upon the inner surface of the door.

From the foregoing disclosure it will be seen that this construction presents the following advantages: a firm and reliable cylinder door closure during operation of the machine; an unavoidable bridging of the clearance gap between the cylinder and the casing when the door stands open, thus insuring against forgetfulness on the part of the operator and assuring that articles will not drop down between the cylinder and casing; automatic operation of the door latch when the flap is raised to its closed position, accompanied by both audible and visible evidence that the parts are ready for operation, (in this connection it should be noted that quite audible clicks are heard when the latches snap into place); very effective control of forces operating upon the latch, flap and door members and, consequently, minimum wear of these parts; and little need for accuracy in spotting the cylinder to bring the cylinder door opening into alignment with the casing opening since the flap will function efficiently even though displaced angularly a considerable amount from the position shown in Fig. 2. Also it is to be noted that the single door is overlapped interiorly at both its upper and lower edges so that no gap is left for the entanglement of articles being treated, and since the flap lies entirely upon the outer surface of the door, it is impossible for articles to be caught between the flap and the door.

Thus it will be seen that this invention as embodied herein is well adapted to carry out the objects hereinbefore set forth in a thoroughly efficient and workmanlike manner; that the construction is sturdy, durable, and so simple that the assembling of the parts or replacement thereof may be easily accomplished.

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:

1. In a washing machine cylinder, in combination, door-latching mechanism comprising a door-hinge pivoted at one side of the door opening in said cylinder and extending across said opening, means at the opposite edge of said opening for rigidly supporting the free end of said door-hinge, a member pivotally mounted at said opposite edge and closable over the said free end of said hinge, and a latch pivotally mounted within a recess in said door-hinge, rotatable about an axis substantially normal to said opposite edge of said opening, said latch being adapted to be brought into locking engagement with said member.

2. In a washing machine cylinder, in combination, door-latching mechanism comprising a door-hinge pivoted at one side of the door opening in said cylinder and extending across said opening, means at the opposite edge of said opening for rigidly supporting the free end of said door-hinge, a member pivotally mounted on said opposite edge and closable over said free end of said hinge, a self-locking latch pivotally mounted on said door-hinge, rotatable about an axis substantially normal to said opposite edge of said opening and adapted to be brought into locking engagement with said member when the latter is moved to closed position, and means on said latch providing a hand grip for first turning said latch about its said axis and then swinging said door-hinge about its pivot.

3. In apparatus of the character described, in combination, a cylinder having a door opening, a door adapted to form a complete closure for said opening and pivotally supported at one edge of said opening, means at the opposite edge of said opening for rigidly supporting said door in closed position, a flap closable over the rigidly supported edge of said door, and a pair of hinged latches on said door rotatable about axes angularly disposed relatively to the rigidly supported edge of said door, adapted automatically to be brought into locking engagement with said flap when the latter is moved to closed position and movable about their respective axes toward a medium line normal to said rigidly supported edge to release said flap.

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