Sept. 17, 1929. A. R. CURTIS 1,728,667

WASHER

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Fig. 4.

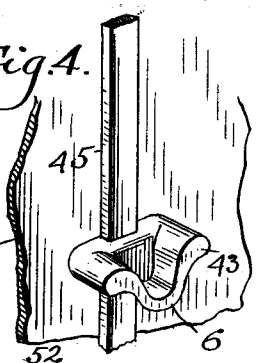



Fig. 5.

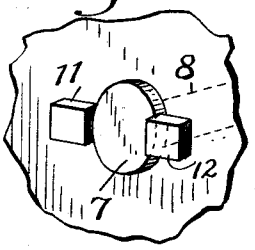
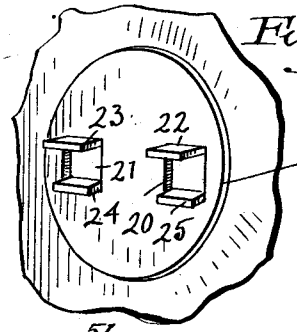



Fig. 6.



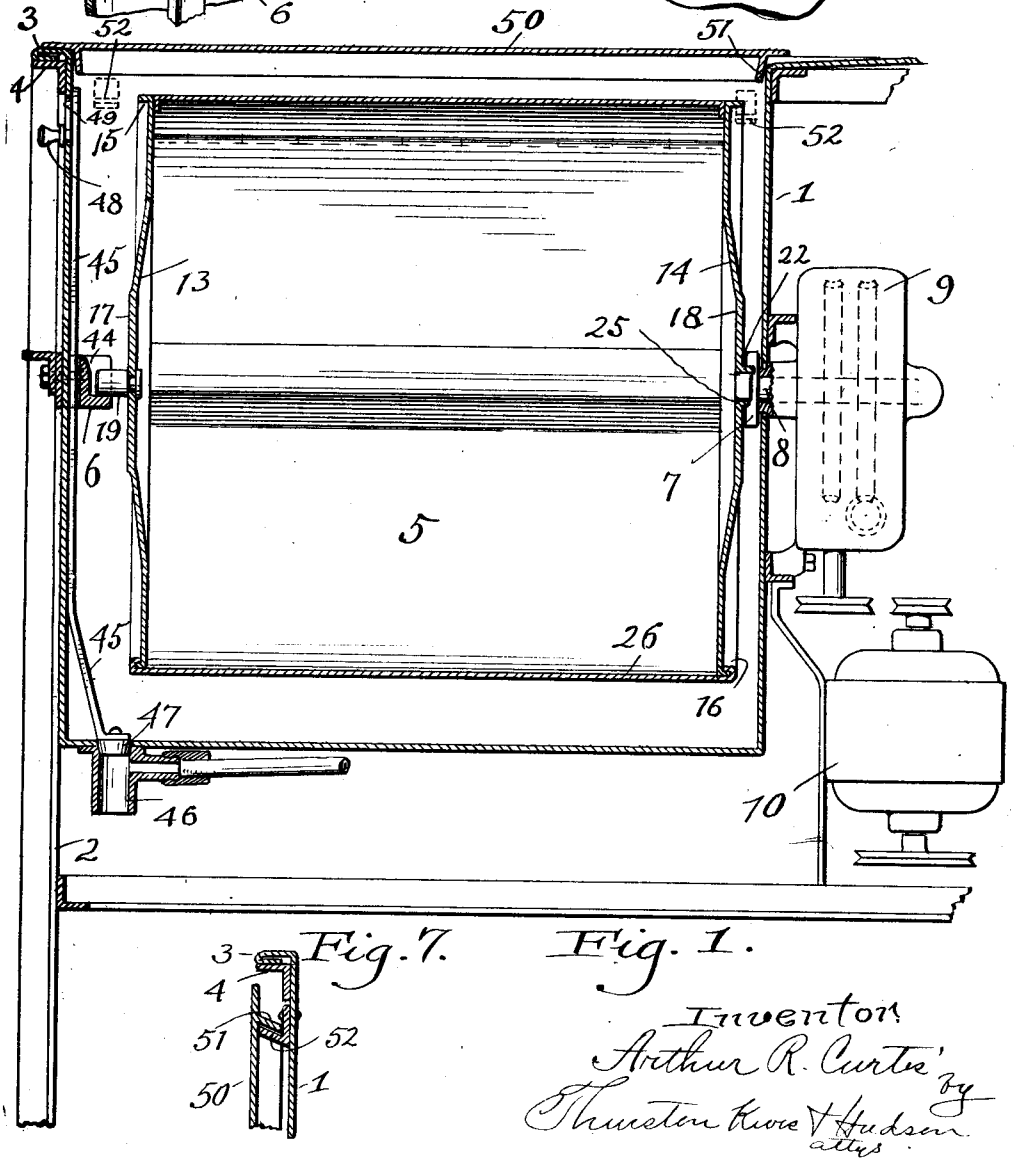




Fig. 7.




Fig. 1.

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Fig. 8.

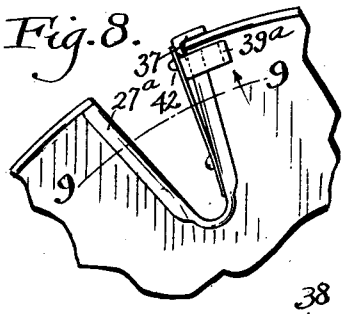


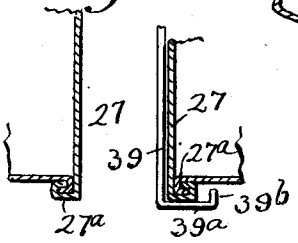

Fig. 2.




Fig. 3.




Fig. 9.




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# UNITED STATES PATENT OFFICE

ARTHUR R. CURTIS, OF CLEVELAND, OHIO

## WASHER

Application filed April 23, 1923. Serial No. 633,970.

This invention relates to washing machine, such as used for washing articles of clothing, fabrics and the like, and is particularly designed for household use.

It is the object of the present invention to provide a washing machine which is of simple and durable construction, which can be economically manufactured and in which the parts are conveniently accessible for cleaning or for repair.

More specifically, it is an object of the invention to provide a washer of the rotary cylinder type in which the cylinder is supported at one end upon a rotary driving member in such a manner that the removal of the cylinder from the tub and the insertion of the cylinder into the tub is greatly facilitated.

A further object is to provide means for effectually protecting the wall of the tub against denting and scratching by the trunnion of the cylinder as the cylinder is removed from or inserted into the tub.

A further object is to provide a closure member for the opening in the cylinder which is securely held in place and is effectively protected against distortion.

The above and other objects which are obtained by the present invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the following specification and set forth in the appended claims.

Reference should be had to the accompanying drawings forming a part of this specification in which Fig. 1 is a central vertical section lengthwise of the tub and cylinder, the section being slightly offset at one end of the cylinder to show the connection between the cylinder and driving head; Fig. 2 is a fragmentary transverse section through the cylinder; Fig. 3 is a top plan view of the cylinder with the hinged closure at the top; Fig. 4 is a fragmentary perspective view showing the trunnion receiving socket and valve operating strap guided thereby; Fig. 5 is a fragmentary perspective view of the driving head at the end of the cylinder drive shaft; Fig. 6 is a fragmentary perspective view of the end of the cylinder which engages the driving head on the drive shaft; Fig. 7 is a fragmentary vertical section showing the manner in which the tub cover may be hung upon the side of the tub; Fig. 8 is a fragmentary end elevation of the portion of the cylinder which carries the latch bar; Fig. 9 is a section on line 9—9 of Fig. 8.

Referring to the accompanying drawings, the tub 1 which is rectangular in horizontal cross-section is carried by a supporting frame 2 preferably formed of light angle iron. The upper edge of the tub is provided with outwardly extending flanges 3 which rest upon the horizontal flanges of top rails 4 of the supporting frame and are suitably secured thereto. Within the tub 1 is a rotary cylinder 5 which is detachably supported at one end upon an open top socket member 6 secured to one end of the tub and at its opposite end upon a driving head 7 which is fixed to the end of a horizontal drive shaft 8 which extends through the wall of the tub. The cylinder 5 is bodily removable from the tub and is preferably rotated alternately in opposite directions by means of an automatic reversing gear within the casing 9 at the end of the tub, the cylinder being driven through the reversing gear by means of a suitable motor 10 carried by the supporting frame.

As shown in Fig. 5 of the drawing, the driving head 7 has a pair of diametrically opposite driving lugs 11 and 12 extending therefrom and projecting beyond the inner face of the head 7. The lugs 11 and 12 engage with suitable sockets formed in the adjacent head of the cylinder as will be hereinafter explained.

The cylinder 5 has heads 13 and 14 at the ends thereof which are formed of sheet metal and have peripheral outwardly extending flanges 15 and 16. Reinforcing plates 17 and 18 are secured upon the outer faces of the heads 13 and 14 at the central portions thereof to stiffen the supporting portions of the heads. A trunnion 19 is rigidly secured to the center of the head 13 and serves to support this end of the cylinder in the socket member 6 carried by the end of the tub.

In the opposite head 14 apertures 20 and 21

are provided through the head 14 and reinforcing plate 18 to receive the driving lugs 11 and 12. Tongues 22 and 23 are provided upon one side of the apertures 20 and 21 and project outwardly from the head, said tongues being adapted to engage one face of the driving lugs 11 and 12. Tongues 24 and 25 which are shorter than the tongues 22 and 23 are provided upon the opposite sides of the apertures. As shown in the drawings, the long tongues 22 and 23 are upon the upper sides of the apertures on the side toward the hinged closure member of the cylinder, the driving mechanism being preferably so arranged that when the cylinder is stopped, the hinged closure member will always be at the top. The tongues 22, 23, 24 and 25 are preferably punched out of the body of the cylinder head 14 and project through the registering opening in the reinforcing plate 18.

The body of the cylinder has a fixed portion 26 of perforated sheet metal which is rigidly attached to the heads 13 and 14 and extends throughout the greater portion of the circumference of the cylinder but has its ends spaced apart to provide an opening which extends longitudinally of the cylinder from one head thereof to the other. The fixed portion 26 of the body has its opposite edges overlying the flanges 15 and 16 of the heads 13 and 14 and bent back over these flanges to secure the heads thereto. The fixed portion 26 of the cylinder body has regularly spaced reentrant portions 27 which form inwardly projecting ribs or baffles. The heads 13 and 14 have notches extending inwardly from the periphery thereof to receive the reentrant portions 27 of the cylinder body, the heads being flanged along the edges of the inwardly extending notches and the edges of the body in the reentrant portions thereof overlying these flanges and bent back to interlock therewith, the interlocking edge and flange being bent back against the head to form a double seam $27^a$ along a portion of the edge of the cylinder body. The double seam $27^a$ serves to lock the heads against inward movement with respect to the cylinder body so that the heads are rigidly locked to the body. The reentrant portions 27 of the cylinder body provide a rigid reenforcement for the sheet metal heads 13 and 14 and the double seams $27^a$ along the edges of the notches rigidly interlock the head to the reentrant portions of the body so that the head is held rigidly against both inward and outward movements with respect to the body. As clearly shown in Fig. 8 the outer ends of the double seams $27^a$ abut against the edge portions of the cylinder body which are turned back over the outwardly extending flanges 16 of the heads so that the peripheral standing seam connecting the cylindrical portions of the body to the peripheral edges of the heads is locked against spreading open at the ends of the seams terminating at the notches. The longitudinal opening of the cylinder is closed by a segmental sheet metal closure member 28 which is pivoted along one edge to an end of the fixed portion 26 of the cylinder body. The closure member 28 has integral inwardly extending side flanges 59 which lie closely adjacent the heads 13 and 14 and an inwardly extending flange 60 along its free edge which is formed by bending the edge of the closure member inwardly and back upon itself. The closure member 28 is connected along one longitudinal edge of the opening by means of hinge strips 29 and 30 secured to the fixed body portion 26 and to the edge of the closure member 28 respectively. The hinge strip 29 has a portion lying flat against the fixed portion 26 of the body at the end thereof and is formed with an outstanding rib or flange 31 which is preferably formed by bending the strip 29 outwardly and back upon itself. The edge of the cylinder opening to which the closure member 28 is hinged being at some distance from a reentrant portion, the hinge strip 29 is made in the form of an angle bar to reinforce and stiffen the edge to which the closure member is hinged. The edge of the strip 29 toward the opening is provided with hinge pin receiving knuckles 32 at the ends thereof directly over the opposite heads 13 and 14 and with intermediate spaced hinge pin receiving knuckles 33. The hinge strip 30 carried by the closure member 28 is provided along its outer edge with hinge pin receiving knuckles 34 which fit between the knuckles of the hinge strip 29 on the fixed portion of the body. A hinge pin 35 extending the full length of the cylinder passes through the interfitting knuckles of the hinge strips 29 and 30. The end of the fixed portion 26 at the edge of the opening with which the free edge of the closure member engages is provided with a reentrant portion 27 adjacent the opening, the edge portion of the fixed part of the cylinder between the reentrant portion 27 and the opening is bent back radially upon itself and the bent back portion is curved forwardly to provide a ledge 36 upon which the inner edge of the flange 60 of the closure member rests when the closure member is in closed position. The closure membr 28 has a curvature the same as other portions of the cylinder and when in closed position completes the cylindrical body of the cylinder. For securing the closure member 28 in closed position an angle latch bar 37 is provided which extends the full length of the cylinder and has a flange 38 adapted to overlie the free edge of the closure member 28 and an inwardly extending flange 39 which extends into the reentrant portion 27. The flange 39 has at each end an extension $39^a$ which is bent at right angles thereto and overlies the opposite heads of the cylinder.

The portions 39[a] extend over the double seams 27[a] connecting the reentrant portion 27 to the cylinder heads and has an inturned end portion 39[b] which is engageable with the seam 27[a] to limit the outward movement of the latch bar. The latch bar 37 is resiliently supported by means of a pair of spring straps 40 which are secured to the flange 39 of the latch bar and to the cylinder body adjacent the inner end of the reentrant portion 27. The closure member 28 is provided adjacent its free edge and centrally thereof with a handle 41 by means of which it may be opened or closed. The latch bar 37 has a handle 42 attached to the central portion of the flange 38 by means of which the latch bar may be swung away from the closure member to release the same. The stop flanges 39[b] at the ends of the latch bar 37 limit the outward movement of the latch bar and prevent excessive movement thereof which might cause the supporting straps 40 to become distorted. During the closing movement of the closure member 28 the face of the inwardly extending flange 60 at the free edge thereof engages the inner edge of the flange 38 of the latch bar and forces the latch bar clear of the opening to permit the closure member to pass into closed position whereupon the latch bar will spring back into locking position. To remove the cylinder from the tub the end of the cylinder carrying the trunnion 19 is tilted upwardly to a slight extent, causing the lower tongues 24 and 25 to be swung clear of the driving lugs 11 and 12 so that the cylinder may be lifted bodily in a vertical direction. When the cylinder is inserted into the tub, the closure member 28 is preferably opened so that the operator can look through the openings 20 and 21 in the head 14 and see when these openings are properly positioned with respect to the driving lugs 11 and 12. The cylinder is lowered with the end which engages the driving head 7 slightly lower than the other end so that the short tongues 24 and 25 will readily pass the lugs 11 and 12 while the long tongues 22 and 23 will drop upon the top surfaces of the lugs and prevent further movement of the cylinder. The open socket member 6 is provided with inclined sides 43 which serve to guide the trunnion 19 to the central seat portion of the socket. The upper edge 44 of the back portion of the socket member 6 is beveled so that if the trunnion engages the back portion of the socket, it will be guided forwardly into the central pocket.

In removing the cylinder from the tub and inserting the cylinder into the tub, the cylinder trunnion is likely to strike against the end wall of the tub and dent or scratch the same. To protect the end wall of the tub, I have provided a vertically sliding bar or strap 45 which lies flat against the end wall and is guided between the end wall and the central portion of the socket member 6. The vertically movable strap 45 extends vertically across the axis of the cylinder and will be engaged by the trunnion 19 in case the cylinder is moved toward the end wall as it is moved to or from its supports. The strap 45 also serves to control the drain outlet 46 in the bottom of the tub which is located adjacent the end of the tub upon which the strap 45 is mounted. The outlet 46 is adapted to be closed by a valve in the form of a plug 47 attached to the lower end of the strap 45. The strap 45 extends to adjacent the top of the tub and is provided with a handle 48 which extends through a slot 49 in the end wall of the tub adjacent the top thereof. The tub is provided with a cover 50 in the form of a flat plate which is provided with flanges 51 on its underside which extend along the edges and are spaced inwardly from the edges of the plate. The flanges 51 are slightly tapered inwardly and fit within the upper edges of the open top of the tub, the inward inclination of the flanges permitting the cover to readily slip into place. Attached to one side of the tub adjacent the ends thereof and immediately below the top rails 4 of the frame are supporting lugs 52 which project outwardly from the tub and are inclined upwardly. When the cover is removed from the top of the tub, one of the edge flanges 51 may be slipped over the supporting lugs 52 suspending the cover 50 in vertical position on the side of the tub.

Having described my invention, I claim—

1. In a washer of the character described, a washer cylinder having ends and a cylindrical wall between the same, said cylindrical wall having an opening extending from one end to the other, said cylinder having a door in its cylindrical wall adapted to be seated in the opening in said wall, and means for fastening said door in place comprising a bar attached to the cylindrical wall intermediate the ends thereof and adapted to be shifted circumferentially to overlap one longitudinal edge portion of the door throughout the length thereof.

2. In a washer, a cylinder having heads, a substantially cylindrical sheet metal body, said body having a fixed portion with its edges overlying and secured to said heads, said fixed portion of the body extending throughout the greater portion of the cylinder, said body having a closure forming portion completing the cylindrical wall and connected to one end of said fixed portion by means of a hinge, said closure portion having inwardly extending end flanges closely adjacent the inner faces of the heads and an inwardly extending flange on the side thereof opposite the hinge, the opposite end of the fixed portion of the cylinder body having an inwardly offset ledge adapted to receive the last mentioned flange, and means for secur-

ing the closure member in closed position.

3. In a washer, a cylinder having heads and a substantially cylindrical body, said body having a portion fixed to the heads, said fixed portion extending throughout the greater portion of the circumference and forming between the ends thereof a longitudinally extending opening in the periphery of the cylinder, a closure member hinged along one longitudinal edge of the opening, and a spring pressed latch bar extending the full length of the closure member for securing the closure member in closed position.

4. In a washer, a cylinder having heads and a cylindrical sheet metal body having a portion fixed to the heads, said fixed portion extending throughout the greater portion of the circumference and forming between the ends thereof a longitudinally extending opening extending from one head to the other, a reinforcing member secured to the fixed portion and having an outwardly projecting rib extending the full length of the cylinder, and a closure member hinged to said reinforcing member.

5. In a washer, a cylinder having heads and a substantially cylindrical body provided with an opening extending longitudinally of the cylinder from one head to the other, a closure member hinged along one of the longitudinal edges of the opening, said closure member having an inwardly extending flange along the edge thereof opposite the hinge, means for limiting the inward movement of the closure member, and a spring pressed latch bar carried by the fixed part of the body and engageable with the free edge of the closure member throughout the length thereof to hold the closure member in closed position, the flange of the closure member being adapted to engage the latch bar to force the same clear of the opening in the closing movement of the closure member.

6. In a washer, a cylinder having heads and a cylindrical body, said cylinder having an opening in the cylindrical body extending longitudinally of the cylinder, a closure member hinged to one longitudinally extending edge of the opening, a spring pressed latch bar secured to the cylinder body along the opposite edge of the opening and extending the full length thereof, said latch bar being normally held by spring pressure in locking position in which it overlaps the free edge of the closure member when the closure member is in closed position, said bar being shiftable circumferentially out of the path of movement of the closure member, and interengaging means on the cylinder and latch bar to limit the movement of the latch bar.

7. In a washer, a cylinder having heads, and a cylindrical body, said cylindrical body having an opening extending longitudinally from one head to the other, said body having a reentrant portion adjacent one longitudinal edge of the opening, said heads having notches extending inwardly from the periphery to receive said reentrant portion of the body, said heads having outstanding projections along the edges of the notches, a closure member hinged to the edge of the opening opposite the edge adjacent the reentrant portion, an angle latch bar movably mounted on the body and having a flange overlying the free edge of the closure member and a flange extending into the reentrant portion of the body, said last mentioned flange having integral extensions at the ends thereof bent to overlie the heads at the ends of the reentrant portion, said extensions having portions engageable with the outstanding projections on the heads to limit the movement of the latch bar.

8. In a washer, a cylinder having heads and a cylindrical body, said body having a fixed portion extending throughout the greater portion of the circumference and fixed to said heads and a closure portion completing the cylindrical body, a reinforcing angle strip secured to one end of the fixed portion of the body and extending the full length of the cylinder, said angle strip having a base portion secured to the cylinder and an outwardly extending flange, said base portion having spaced hinge pin receiving knuckles along the edge thereof, a hinge strip secured to the adjacent edge of the closure member and having knuckles fitting between the knuckles of the angle strip, and a hinge pin passing through the interfitting knuckles and extending from one end of the cylinder to the other.

9. In a washer, a cylinder having heads and a cylindrical body formed with spaced reentrant portions extending lengthwise of the cylinder, said body having a fixed portion comprising the greater portion of the cylindrical wall and a segmental hinged member completing said cylindrical wall, one of said reentrant portions being adjacent an end of the fixed portion of the cylinder body, said hinged member being hinged to the opposite end of the fixed portion, means for limiting the inward movement of the hinged member, an angle locking strip having a flange extending into the reentrant portion adjacent the free end of the hinged portion and a flange adapted to overlie the free end of the hinged member, and means engaging the flange within the reentrant portion for yieldingly holding the locking strip in engagement with the hinged member.

10. In a washer, a cylinder having a longitudinally extending opening, a closure member for said opening forming a segment of the cylinder and hinged along one longitudinal edge of the opening, the opposite edge of the closure member having an inwardly extending flange, an inwardly offset ledge formed along the opposite longitudinal

edge of the opening to receive said flange, said cylinder having a reentrant portion parallel with the offset ledge and adjacent thereto, an angle locking strip having a flange adapted to overlie the edge of the closure member and a flange extending inwardly into said reentrant portion, resilient strips secured to said inwardly extending flange of the locking strip and to the cylinder adjacent the bottom of said reentrant portion.

11. In a washer, a cylinder having a cylindrical sheet metal body formed with spaced reentrant portions extending longitudinally of the cylinder and sheet metal heads adapted to fit within the edge portions of the body and having notches to receive the reentrant portions of the cylinder, said heads having outturned edge flanges extending substantially throughout the peripheries thereof, the edges of said body being turned back over the flanges of the heads, the outstanding seams along the reentrant portions of the cylinder being bent back against the head to form double seams.

12. A washer cylinder comprising a sheet metal body formed with spaced reentrant portions extending longitudinally throughout the length thereof and cylindrical portions between the reentrant portions, and sheet metal heads adapted to fit within the body at the ends thereof and having notches to receive the reentrant portions of the body, the cylindrical portions of the body being secured to the edge portions of the heads by seams which lock the heads against outward movement with respect to the body and the reentrant portions of the body being secured to the heads along the edges of the notches by seams which lock the head against both inward and outward movement.

13. A washer cylinder comprising a sheet metal body formed with spaced reentrant baffle forming portions with substantially straight side walls extending longitudinally throughout the length thereof, and cylindrical portions between the reentrant portions and integral therewith, and sheet metal heads formed to fit within the ends of the body and having notches with straight side edges adapted to receive the reentrant portions of the body, the peripheral portions of the head between the notches and the straight side edges of the notches being flanged outwardly and the edge portions of the body being bent over the flanges to form with the flanges interlocking seams, the seams along the edges of the notches being bent back against the head to form double seams.

14. A washer cylinder comprising a sheet metal body of cylindrical form having integral reentrant baffle forming portions extending longitudinally thereof throughout its length, and sheet metal heads adapted to fit within the edge portions of the body and having notches to receive the reentrant portions of the cylinder, said heads having outturned peripheral edge flanges and outturned flanges along the edges of the notches, the edges of the body being turned back over the flanges of the heads, the outstanding seams along the reentrant portions of the cylinder being bent back against the head to form double seams, said double seams abutting at their outer ends against the inturned edges of the body to prevent opening of the standing peripheral seam at the edges of the notches.

In testimony whereof, I hereunto affix my signature.

ARTHUR R. CURTIS.