April 20, 1943. W. F. OLIVER 2,317,213

CLEANING MACHINE

Filed June 30, 1939 2 Sheets-Sheet 1

Fig. 1

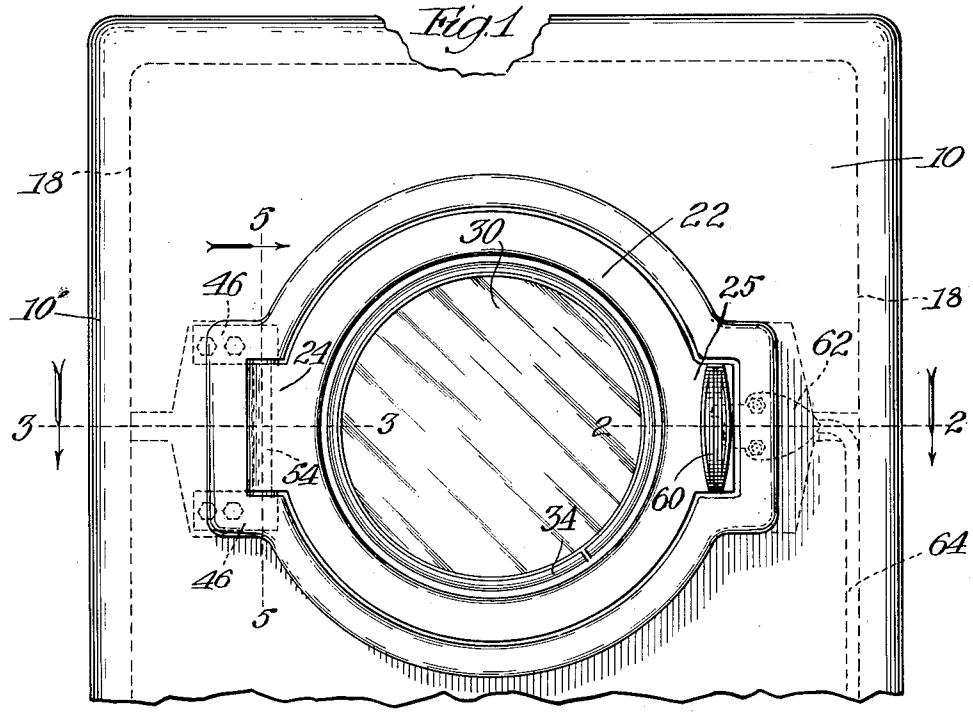


Fig. 2.

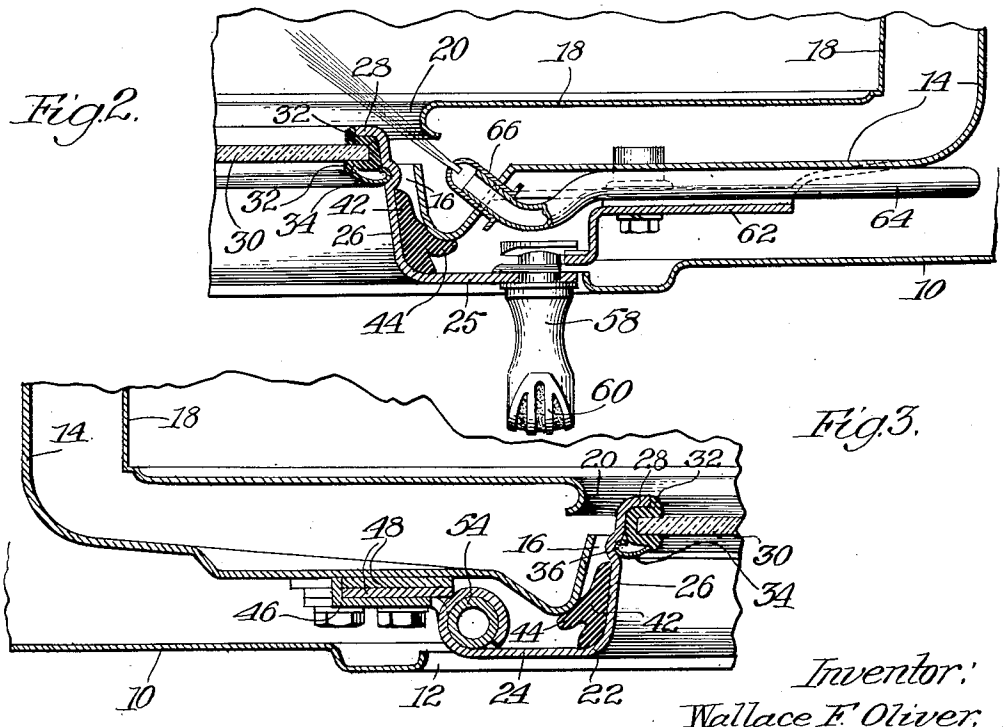


Fig. 3.

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Fig. 4.

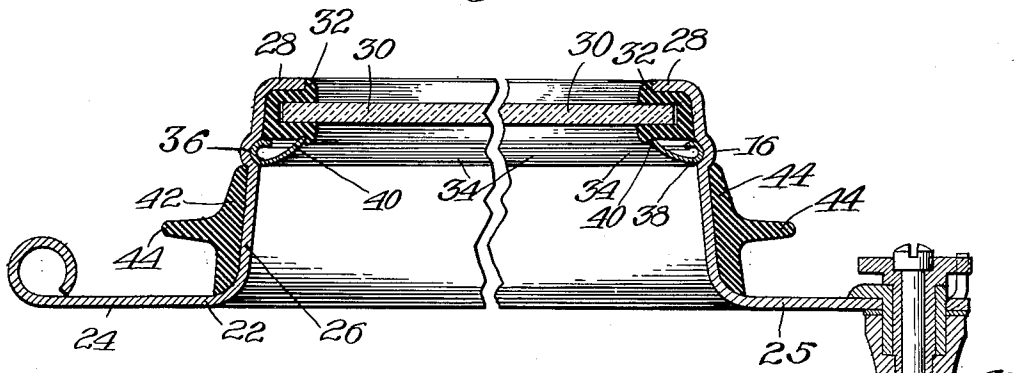


Fig. 6.

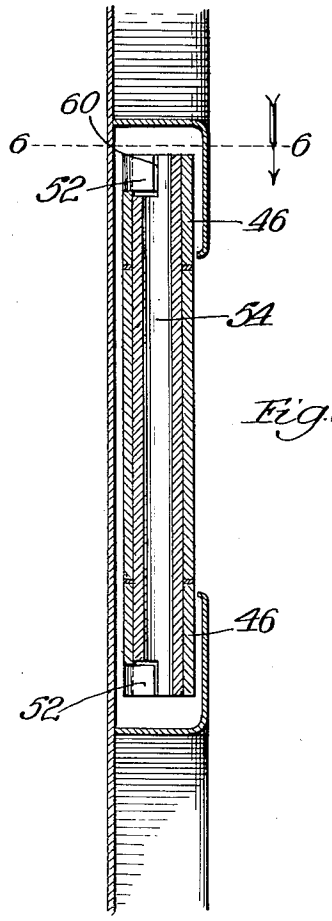
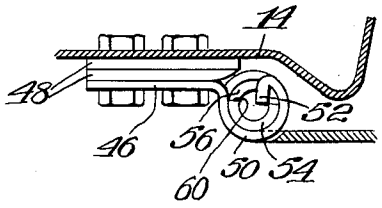


Fig. 5.



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UNITED STATES PATENT OFFICE

2,317,213

CLEANING MACHINE

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Application June 30, 1939, Serial No. 282,108

4 Claims. (Cl. 220—82)

This invention relates to cleaning machines and more particularly to the construction of a door through which material may be inserted into and removed from a washing machine.

One of the objects of the invention is to provide a cleaning machine having a glazed door in which a liquid tight seal is formed between the glazing and the door and between the door and the tub of the machine. According to one important feature both seals are resiliently formed so as to remain tight in spite of slight variations of size, wear and the like.

Another object of the invention is to provide a cleaning machine having a tub and a material container therein formed with registering openings in which cleaning liquid is injected directly into the container opening. Preferably the liquid supply pipe extends along the outside of the tub and is held in place by fastening means for a door closing the tub opening.

Still another object of the invention is to provide a glazed door construction particularly adapted for use in cleaning machines in which a glazed sheet is resiliently held in place in the door frame to provide a liquid tight seal therewith. One particular feature relates to a resilient clamping ring formed yieldingly to hold the sheet in the frame.

Yet another object is to provide a door construction having a combined sealing and drip ring adapted to form a resilient seal around a tub opening when the door is closed and to act as a drip ring when the door is open.

Other objects, advantages, and novel features of the invention will be apparent from the following description of the embodiment shown in the accompanying drawings, in which:

Figure 1 is a partial front elevation of a washing machine embodying the invention;

Figures 2 and 3 are enlarged sections on the lines 2—2 and 3—3 of Figure 1;

Figure 4 is an enlarged section through the door;

Figure 5 is a partial section on the line 5—5 of Figure 1; and

Figure 6 is a section on the line 6—6 of Figure 5.

The machine illustrated is an automatic washing machine of the type more particularly described and claimed in Bassett and Chamberlin United States Patent No. 2,165,884, dated July 11, 1939. It will be understood, however, that various features of the invention are applicable to machines of other types either separately or in combination.

The illustrated machine comprises an outer casing or cabinet 10 formed with a substantially circular opening 12 in its front wall and having mounted therein a stationary tub 14 formed with a central opening 16 registering with the opening 12. A perforated container or drum 18 is rotatably mounted in the tub and has an opening 20 registering with but spaced slightly from the opening 16. The tub is rotatably supported at its rear end and is driven through a motor and transmission under the control of suitable automatic control devices not shown herein but which may be of the type disclosed in said Patent No. 2,165,884.

The opening 16 in the tub is adapted to be closed by a door formed by an annular sheet metal frame 22 having a flat projection 24 at one side and a similar projection 25 at its diametrically opposite side. The frame 22 includes a substantially axially extending flanged portion 26 of slightly smaller diameter than the opening 16 terminating in an inturned flange 28. The central portion of the door is closed by a sheet of glass or the like 30 through which an operator may observe the interior of the machine during operation.

In order to seal the sheet 30 into the door frame a sealing ring 32 of rubber or other yielding material is arranged around the periphery of the sheet and is formed with a groove to receive the edge thereof. The sheet and sealing ring are such a size as to fit within axially extending portion 26 of the door frame adjacent the inturned flange 28 and are secured in place by a split ring 34 fitting within an annular groove 36 in the portion 26.

The ring 34 is formed of sheet metal of arcuate cross section with a rolled bead 38 at its outer edge to fit within the groove 36 and with its mid portion curved arcuately so that its inner edge 40 lies substantially in the plane of one side of the bead 38 and engages the sealing ring 32 adjacent its inner edge. Normally the ring is slightly larger in diameter than the groove 36 and when compressed radially to force it into the groove, it is distorted slightly so that its inner edge 40 tends to move axially. Due to this feature and to the resilient construction of the ring the edge 40 presses against the inner edge of the sealing ring 32 with a resilient force which holds the sealing ring tightly in engagement with the glass sheet 30 regardless of slight variations in size of the parts or of any tendency of the sealing ring to take a permanent set. Due to this arrangement, as best seen in Figure

4, the sealing ring is compressed between the split ring **34** and the flange **28** so that it is sealed tightly against both the door frame and the glass sheet.

On the outer periphery of the portion **26** there is arranged a second sealing ring **42** of rubber or the like having a relatively wide base portion fitting against the portion **26** and with an integral radial rib **44** extending outwardly therefrom. When the door is closed as seen in Figures 2 and 3, the rib **44** engages the tub **14** around the opening therein and is distorted by the tub so as to form a resilient seal therewith. Due to resiliency of this rib, the seal will be maintained regardless of slight variations in size or of wear of parts.

According to another feature of the invention the rib **44** also acts as a drip ring when the door is open to prevent liquid from running down onto the outer parts of the door frame. Since the inner surface of the door is exposed to liquid during operation, this liquid tends to run down the door when it is open and will drip from the outer edge of the rib **44** instead of following the door to the outer portion thereof. This assists in keeping the machine clean and prevents accumulation of cleaning liquids such as soap suds on the outer portions of the door.

The door is secured to the tub through a novel hinge construction formed by hinge plates **46** bolted to the tub adjacent one side of the opening **16** and provided with shims **48** spacing the plates the desired distance from the door. The plates are rolled over at their inner ends as best seen in Figure 6 at **50** to provide substantially circular journals for rotatably receiving a hinge pin. At the extreme outer portion each plate is cut away to provide a bent-in tab **52** forming a stop to limit opening of the door as will appear hereinafter.

The extending portion **24** of the door is secured to a tubular hinge pin **54** whose ends are journalled in the rolled over portions **50** of the hinge plates **46**. The extreme outer ends of the tubular pin **54** are cut away at **56** and the tabs **52** extend into the cut-away portions. When the door is closed the parts occupy the relationship shown in Figure 6, but as the door is opened one edge of the pin **54** adjacent the cut-away portion will engage the tab to limit opening movement of the door.

The door is held closed by a rotatable latch **58** carried by the extending portion **25** of the door frame and having an operating handle **60**. The latch is engageable with the end of a latch plate **62** bolted to the tub **14** and projecting into the back of the latch when the door is closed.

Cleaning liquid is introduced into the machine through a pipe **64** from any desired liquid source. As seen in Figure 2 the pipe extends along the front face of the tub **14**, preferably lying in a groove therein and passes under the latch plate **62**. The latch plate thus serves to hold the pipe **64** rigidly in place on the tub. The end of the pipe **64** extends to a nozzle member **66** which projects through the wall of the tub **14** and is arranged to discharge liquid directly into the opening **20** in the container or drum **18**. In this way the cleaning liquid is discharged directly onto the material in the drum and this feature is particularly important in connection with rinsing of clothes following the washing operation.

While one embodiment of the invention has been shown and described in detail, it will be understood that it is illustrative only and is not intended as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. In a cleaning machine having a tub formed with an opening therein, the combination of a door pivoted adjacent said opening to close the same, said door comprising an annular ring having a flanged portion at its inner edge, a circular sheet of transparent material fitting in said flanged portion, an annular sealing ring having a groove therein receiving the edge of said sheet and engaging said flanged portion, and a sheet metal ring of curved cross-section engaging the annular ring and the sealing ring at spaced points and resiliently pressing the sealing ring against said sheet.

2. A door construction for cleaning machines or the like comprising an annular sheet metal ring formed with a substantially axially extending portion terminating in an inturned flange, a sheet of transparent material fitting within said axially extending portion, a sealing ring having a groove receiving the edge of said sheet and engaging the inturned flange, said axially extending portion being formed with an annular groove spaced from said flange, and a split ring of sheet metal substantially arcuate in cross section having its outer edge fitting in said latter groove and its inner edge engaging the sealing ring adjacent the inner edge thereof, said split ring being resilient and resiliently urging the sealing ring against the sheet and the flange.

3. A door construction for cleaning machines or the like comprising an annular sheet metal ring formed with a substantially axially extending portion terminating in an inturned flange, a sheet of transparent material fitting within said axially extending portion, a sealing ring lying between said sheet of transparent material and the inturned flange, said axially extending portion being provided with an internal abutment spaced from said flange, and a resilient split ring of relatively wide and thin cross section spring dished with its outer edge engaging behind said abutment and its inner edge pressing the sheet of transparent material against the sealing ring, whereby the torsion imparted to the metal of the split ring by confining its external circumference yieldingly compresses said sealing ring and holds said transparent material in place.

4. Holding means for a glazed door or the like comprising an annular split ring of resilient sheet metal of curved section formed with a rolled bead at its outer edge and with its inner edge portion curved around from the plane of the other side of the bead and in spaced relation thereto, the length of the inner edge being greater than the circumference of a circle having a radius equal to the radius of the outer portion of the bead less the distance from the outer to the inner edges of the split ring, whereby the ring tends to distort when compressed radially to move the inner edge axially toward the member to be held, and abutment against which the outer circumference of the split ring reacts.

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