Sept. 1, 1953 P. P. GLASSEY 2,650,490

DOOR CONSTRUCTION FOR TUMBLER TYPE WASHING MACHINES

Filed March 11, 1948

FIG. 1.

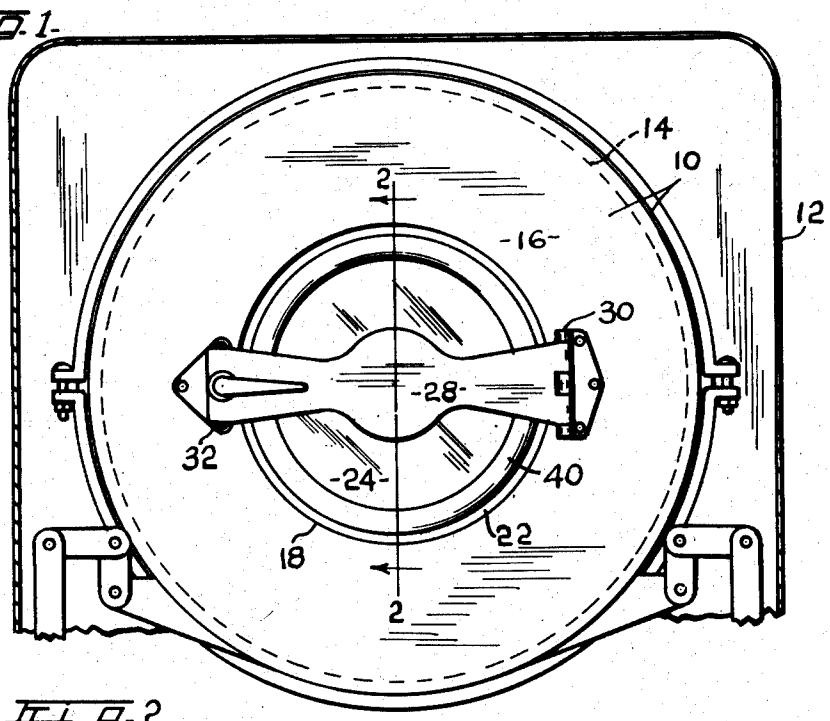


FIG. 2.

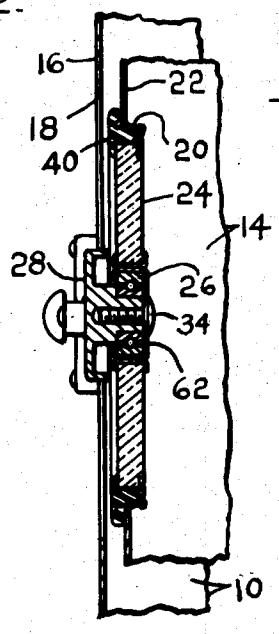
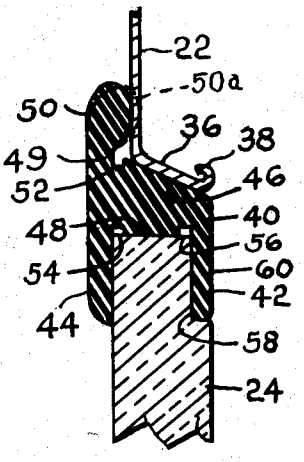


FIG. 3.



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DOOR CONSTRUCTION FOR TUMBLER TYPE WASHING MACHINES

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2 Claims. (Cl. 68—139)

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This invention relates to washing machines, and more particularly to a door sealing construction adapted for cylinder type washing machines and the like.

The invention has particular reference to a circular door seal in which the door opening and door are both free to rotate, and in which upon closing the door, both rotate in unison. In such constructions, the door does not seat in the door opening in the same angular relation each time, and difficulty is at times encountered in providing a good seal due to constructional tolerances and misalignment.

An object of the invention is to provide a seal for such a door in which the sealing element has a primary and secondary yielding sealing effect.

Another objeact of the invention is to provide a seal for a circular door closing a conically flanged circular recess formed in a flat end surface member, in which the sealing member is an annulus of yielding rubber-like material having a conical seat as well as a surface engaging secondary seat, the annulus being adapted to be tensioned about and held in place upon the rim of a circular door.

A further object of the invention is to provide a self-aligning seal.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings, wherein like reference characters indicate like parts:

Figure 1 is a fragmentary elevation of a cylinder type washing machine having a circular door coaxially arranged with respect to the cylinder thereof;

Figure 2 is a transverse section taken substantially on the line 2—2 of Figure 1; and

Figure 3 is an enlarged view of a portion of Figure 2, showing the sectional detail of the sealing ring and its engagement with the cylinder end wall.

In Figure 1, there is shown a cylinder type washing machine employing an outer tub or splash guard 10 resiliently or otherwise supported upon a stationary framework, for example, in the manner shown in a copending application of Douglas Serial No. 775,237, filed September 20, 1947. The tub 10 may be enclosed within an

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outer stationary casing 12, and contains therein a washing cylinder 14 rotatably supported and driven by a suitable source of power, as will be readily understood by those skilled in the art. The tub 10 has a forward wall 16 having an enlarged access aperture 18 arranged substantially in alignment with a circular aperture 20 located in the forward wall 22 of the cylinder 14.

A revolvable door 24 composed of a disk of transparent material such as plastic or glass, if desired, is rotatably supported by means of a bearing 26 upon a transversely extending bar 28 hinged at one end as at 30 to the forward wall 16 of the tub 10 and secured at the other end as at 32 by a latch plate affixed to the forward wall 16. The bearing 26 is supported on a trunnion 34 rigidly secured to the bar 28 and the bearing 26 is centered by the bar 28 so as to be in alignment with the axis of rotation of the cylinder 14. The aperture 20 of the cylinder 14 is provided with an inwardly extending tapered flange 36 having a rolled bead 38. The flange 36 is as nearly circular and concentric with the axis of rotation of the cylinder as stamping practice permits. The transverse bar 28 and bearing 26 are so arranged with respect to the disk 24 as to position the disk immediately beneath or within the flange 36.

To provide a seal between the disk 24 and flange 36, an annular ring 40 of rubber-like material is positioned around the periphery of the disk 24. The cross section of the ring is substantially uniform throughout, and has inwardly extending spaced flanges 42 and 44 adapted to embrace the opposite marginal faces of the disk 24. The outer surface of the ring 40 has a tapered or conical annular surface 46 adapted to mate with the conical flange 36. The radial thickness between the portion 48 of the ring which seats upon the rim of the disk 24 and the seat 46 is such as to provide sufficient yielding of the resilient material to permit the material to normally seat perfectly around its entire periphery with the flange 36 upon a small degree of axial pressure upon the disk 24 as is exerted by the transverse bar through the bearing 26. It will of course be understood that the bearings upon which the cylinder 14 rotate are such as to withstand such axial thrust.

To safeguard the seal against possible leakage and to prevent axial splash in the event of such leakage, the forward wall of the sealing member is extended radially as at 49 and has formed peripherally thereon an annular bead 50 overhanging the conical surface 46. Such bead, due

to elasticity of the radial extension 49 is adapted to yieldingly engage the forward wall 22 of the cylinder 14 to provide a secondary seal. It will be observed that the bead, while positively engaging the wall 22, engages the wall lightly and in a manner such as not to interfere with or resist the necessary thrust for the seating of the tapered portion 46 with the flange 36. Yet the pressure exerted by the bending of the bead from the normal unstressed overhanging position shown in dotted lines to the position shown in solid lines at 50a (see Figure 3) is sufficient to provide a highly satisfactory secondary seal.

Suitable reliefs in the form of annular grooves 52, 54, and 56 are provided in the internal annular corners in order to assure a proper fit and to guard against stress concentration at such points as might lead to premature rupture of the sealing ring material. If desired, the thickness of the door 24 may be reduced as at 58, so as to accommodate a seal ring whose inner surface 60 is flush with the inner surface of the door. Any suitable gasket or packing 62 may be employed to prevent wash water within the cylinder from escaping through the bearing 26.

In closing the door and bringing the seal into engagement with the door opening, the annular bead may lightly engage the end face 32 of the cylinder just prior to seating the conical seal face against the conical door opening flange. The action is such as to tend to axially align the door axis with that of the cylinder, through slight universal action of the single bearing 26. Thus the conical seal is brought into substantial alignment with the conical door opening flange, and assumes a proper aligned seating engagement. Thereafter, the bead yields to a substantial extent as the seal is axially pressed into engagement with the opening flange, to provide a secondary seal.

From the foregoing, it will appear that a seal is provided having excellent sealing characteristics primarily where the seal engages the tapered opening flange. In the event of slight leakage, a secondary seal is provided which offers substantially more resiliency to adapt itself to unevenness in the forward surface of the forward cylinder wall. Such a seal may be made of rubber or rubber-like material having a resiliency such as to permit stretching of the ring about the door periphery. With such resiliency, sufficient cushioning is provided for effective sealing. The taper may be varied as requirements dictate, and the degree of pressure applied to the face of the cylinder wall may be varied by the depth and form of the annular groove 52 and thickness of the radial extension 49. However, it is desirable to produce a seal having a minimum thrust requirement with effective sealing.

Although a single embodiment of the invention has been illustrated and described, it is to be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A laundry appliance door seal construction comprising a stationary support, a container having an end wall, means for mounting said container on said support for rotation about an axis normal to said end wall, a circular door-receiving aperture in said end wall arranged substantially coaxial with the axis of rotation of said container, said aperture being bounded by a circular tapered flange formed in said end wall, a circular door, hinged supporting means for said door mounted on said support, bearing means on said hinged means for rotatably supporting said door for rotation coaxial with said container when said door is in closed position, said bearing means having a universal movement whereby said door may align itself axially with the container axis as the hinged supporting means is moved into door closed position, a resilient continuous annular plastic gasket stretched about the rim of said door, having an inwardly directed channel for embracing the rim and marginal faces of said door, and an outwardly tapered seat for engaging said tapered flange, said gasket having a radially outwardly extending annular sealing bead projecting from the edge adjacent the higher diametered portion of said tapered seat, said bead overhanging said outwardly tapered seat, and means for exerting axial thrust upon said door to engage said bead by contact with the surface of said wall and align said door axially with the container, and thereafter seat the tapered seat within the tapered flange.

2. A laundry appliance door seal construction comprising a stationary support, a container having an end wall, means for mounting said container on said support for rotation about an axis normal to said end wall, a circular door-receiving aperture in said end wall arranged substantially coaxial with the axis of rotation of said container, said aperture being bounded by a circular flange formed in said end wall, a circular door, hinged supporting means for said door mounted on said support, bearing means on said hinged means for rotatably supporting said door for rotation coaxial with said container when said door is in closed position, said bearing means having a universal movement whereby said door may align itself axially with the container axis, as the hinged supporting means is moved into door closed position, a resilient annular continuous plastic gasket stretched about the rim of said door, and having together with the rim of said door a tongue and channel engaging means for positioning said gasket upon the door rim, and an outwardly tapered seat for engaging said circular flange, said gasket having a radially outwardly extending annular sealing bead projecting from the outer edge of said tapered seat, said bead overhanging said tapered seat, and means for exerting axial thrust upon said door to engage said bead by contact with the surface of said wall adjacent said flange, and align said door axially with the container, and thereafter seat the tapered seat within the circular flange.

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