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(54) Door for front-loading washing machine

Tür für von vorne beladene Waschmaschine

Porte pour le chargement frontal d'une machine à laver

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(56) References cited:
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Description

[0001] The present invention refers to a door for front-loading washing machine.

[0002] Front-loading washing machines comprise a unit having a tub comprising a drum, normally with horizontal axis; the drum has an opening for loading the laundry to be washed which is aligned with the opening of the unit. Said opening is closed by an openable door hinged to the unit.

[0003] The door is generally shaped like a porthole and comprises a transparent glass part with a plastic frame. The door has a ring-shaped seal which, once the door has been closed, presses up against the edge of the opening to prevent water and detergent coming out during washing.

[0004] Normally the glass part of washing machine doors is a recess shaped so as to keep the laundry inside the washing drum and prevent the laundry being damaged during washing or spin-drying operations.

[0005] In view of the described state of the art, the object of the present invention is to provide a door for front-loading washing machines that upgrades the washing action of the washing machine itself.

[0006] In agreement with the present invention, such object is achieved by means of a door for front-loading washing machines as defined in claim 1.

[0007] Thanks to the present invention, it is even possible to make a front-loading washing machine as defined in claim 6.

[0008] The characteristics and the advantages of the present invention will appear evident from the following detailed description of one of its practical embodiments, given by way of non-limiting example in the attached drawings in which:

the figure 1 is a front view of the door for front-loading washing machine in agreement with the present invention;
the figure 2 is a schematic view in vertical section according to the line II-II of the door of figure 1;
the figure 3 is a schematic view in horizontal section according to the line III-III of the door of figure 1;
the figure 4 is an enlarged view of a detail of the door of figure 3;
the figure 5 is a perspective view of the door of figure 1.

[0009] With reference to the figures 1-5 a door is shown for front-loading washing machine in agreement with the present invention. The washing machine, preferably a laundry washing machine, has in a known way a unit 1 comprising a front panel 9 having an opening 2 for loading the laundry to be washed, a washing tub fitted inside the unit and containing a drum fitted inside the tub in a revolving way and the drum and the tub (not visible in the illustrations) have respective openings aligned the one with the other and with the opening of the unit. The opening 2 of the unit 1 is closed by a door 3 hinged in 4 to the unit 1.

[0010] The door 3 is of the porthole type and comprises a circular frame 31 and an inner part 32, preferably in glass. The inner part 32 comprises a central part 33 with a convex part 33 adjacent to two concave parts 34. More precisely, the inner part 32 of the door 3 is shaped so that the horizontal section passing through the centre C of the door (figure 3) comprises the convex part 33 arranged at the centre of the inner part 32 and the concave parts 34 adjacent to the part 33; the concave parts 34 connect up on one side with the convex part 33 and on the other side with a circular peripheral part 35 of the door 3. Said shaping of the inner part 32 stretches vertically for at least half the height H of the door 3.

[0011] The convex part 33 has a lower horizontal extension than each concave part 34; the concave parts 34 preferably have the same horizontal extension.

[0012] The circular peripheral part 35 is adjacent to and integral with the frame 31. The circular peripheral part 35 has a shape identical to that of the known doors; this way it is not necessary to change the joint of the opening of the washing machine that presses up against the door 3 and more precisely with the circular peripheral part 35 of the door 3. This way, the door 3 can be used for any type of front-loading washing machine.

[0013] The inner part 32 of the door is shaped symmetrically with respect to the vertical axis A passing through the centre C of the door 3. The convex part 33 protrudes further from the inner profile P of the door than do the concave parts 34, i.e., it has a greater depth of the concave parts 34 with respect to the profile P on the side of the door which, with the door closed, is fitted inside the opening 2. The profile P is a vertical axis passing through the inner part of the frame 31 of the door P, i.e., the part of the frame 31 that presses up against the front panel of the unit 1 when the door 3 is closed.

[0014] As is better shown in the figure 5, the convex part 33 stretches along the vertical axis A passing through the centre C of the door 3 while the concave parts 34 connect up with said convex part 33 and with the circular peripheral part 35 of the door.

[0015] The door therefore has a double involute symmetric with respect to the central axis A.

[0016] Once arranged so as to close the opening 2 of the unit and therefore of the washing machine drum, the door 3 allows a greater revolution action of the laundry load acting on the involute surface of the porthole door. In fact, the result is a greater twisting of the laundry which wraps up in partial rotation and slips on the parts 34 of the door by means of a movement with direction shown by the arrows F in figure 5; the rotary movement of the laundry is substantially crossways to the typical rotary movement of the washing-machine drum. Said rotary movement of the laundry according to the arrows F combined with the typical rotary movement of the drum helps ensure more effective laundry washing.

[0017] The inner part 32 of the door is furthermore

shaped asymmetrically with respect to the horizontal axis B passing through the centre C of the door 3 (figure 2). In fact, by dividing the door into a lower part 37 and an upper part 36, the upper part 36 has a different shape with respect to the lower part 37. The convex part 33, arranged centrally and adjacent to the two concave parts 34, connects up with the upper extremity 38 of the circular peripheral part 35 by means of a concave part 39. The particular shape of the upper part 36 helps increase the effectiveness of the rotary movement according to the arrows F of the laundry load in the drum.

Claims

1. Door for front-loading washing machine comprising a unit (1) with a front panel (9) having an opening (2) for loading the laundry to be washed with said door (3) suitable for closing said opening, said door (3) comprising a frame (31) and an inner part (32), said inner part comprising a circular peripheral part (35), **characterised in that** the inner part (32) of said door (3) is shaped so that the horizontal section passing through the centre (C) of the door comprises a central convex part (33) and two concave parts (34) which are adjacent and connect up with the convex part and with the circular peripheral part (35) of the door, wherein said convex part (33) protrudes more than the concave parts (34) with respect to the inner profile (P) of the door (3).

2. Door according to claim 1, **characterised in that** said shaping of the inner part (32) of the door (3) stretches vertically for at least half the height (H) of the door.

3. Door (3) according to claim 1 or 2, **characterised in that** said convex part (33) stretches along the vertical axis (A) passing through the centre of the door and said inner part is symmetrical with respect to said vertical axis passing through the centre of the door.

4. Door according to claim 1, **characterised in that** said inner part (32) of said door (3), is shaped so that the upper extremity (36) of said convex part (33) connects up with the circular peripheral part (35) by means of a concave part (39).

5. Front-loading washing machine comprising a unit (1) with a front panel (9) having an opening (2) for loading laundry to be washed and a door (3) suitable for closing said opening, a washing tub fitted inside the unit and containing a drum fitted inside the tub in a revolving way, the drum and the tub having respective openings aligned the one with the other and with the opening of the unit, **characterised in that** said door is defined as in any one of the preceding claims.

Patentansprüche

1. Tür für eine Frontlader-Waschmaschine, umfassend eine Einheit (1) mit einem Frontpaneel (9) mit einer Öffnung (2) zum Laden der zu waschenden Wäsche, wobei die Tür (3) mit der Öffnung (2) geschlossen werden kann und die Tür (3) einen Rahmen (31) und ein inneres Teil (32) umfasst und das innere Teil (32) ein kreisförmiges, umfängliches Teil (35) umfasst, **dadurch gekennzeichnet, dass** das innere Teil (32) der Tür (3) so geformt ist, dass der horizontale Abschnitt, der durch das Zentrum (C) der Tür (3) verläuft, ein zentrales konvexes Teil (33) und zwei konkave Teile (34) umfasst, die benachbart sind und sich dem konvexen Teil (33) und dem kreisförmigen, umfänglichen Teil (35) der Tür (3) anschließen, wobei das konvexe Teil (33) stärker als die konkaven Teile (34) in Bezug auf das innere Profil (P) der Tür (3) hervorsteht.

2. Tür nach Anspruch 1, **dadurch gekennzeichnet, dass** sich die Form des inneren Teils (32) der Tür (3) vertikal um mindestens die Hälfte der Höhe (H) der Tür (3) erstreckt.

3. Tür nach einem der Ansprüche 1 oder 2, **dadurch gekennzeichnet, dass** sich das konvexe Teil (33) entlang der vertikalen Achse (A) erstreckt, die durch das Zentrum der Tür (3) verläuft und das innere Teil (32) symmetrisch in Bezug auf die vertikale Achse (A) ist, die durch das Zentrum der Tür (3) verläuft.

4. Tür nach Anspruch 1, **dadurch gekennzeichnet, dass** das innere Teil (32) der Tür (3) so geformt ist, dass der obere Endpunkt (36) des konvexen Teils (33) mit dem kreisförmigen, umfänglichen Teil (35) mittels eines konkaven Teils (39) abschließt.

5. Frontlader-Waschmaschine umfassend eine Einheit (1) mit einem Frostpaneel (9) mit einer Öffnung (2) zum Laden der zu waschenden Wäsche, und einer Tür (3) zum Schließen der der Öffnung (2), einer in die Einheit eingepasste Waschkammer und einer Trommel, die drehbar in die Waschkammer eingepasst ist, wobei die Trommel und die Waschkammer entsprechende Öffnungen haben, die miteinander und mit der Öffnung (2) der Einheit (1) fluchten, **dadurch gekennzeichnet, dass** die Tür (3) nach einem der vorherigen Ansprüchen ausgebildet ist.

Revendications

1. Porte de lave-linge à chargement frontal comprenant une unité (1) pourvue d'un panneau avant (9) présentant une ouverture (2) pour le chargement du linge à laver, ladite porte (3) étant apte à fermer ladite ouverture, ladite porte (3) comprenant un châssis

(31) et une partie intérieure (32), ladite partie intérieure comprenant une partie périphérique circulaire (35), **caractérisée en ce que** la partie intérieure (32) de ladite porte (3) est conformée de telle sorte que la section horizontale passant par le centre (C) de la porte comprend une partie convexe centrale (33) et deux parties concaves (34) qui sont adjacentes et se relient à la partie convexe et à la partie périphérique circulaire (35) de la porte, ladite partie convexe (33) faisant davantage saillie que les parties concaves (34) relativement au profil interne (P) de la porte (3).

2. Porte selon la revendication 1, **caractérisée en ce que** ladite conformation de la partie intérieure (32) de la porte (3) s'étend verticalement sur au moins la moitié de la hauteur (H) de la porte (3).

3. Porte selon la revendication 1 ou 2, **caractérisée en ce que** ladite partie convexe (33) s'étend le long de l'axe vertical (A) passant par le centre de la porte (3) et ladite partie intérieure est symétrique relativement audit axe vertical passant par le centre de la porte.

4. Porte selon la revendication 1, **caractérisée en ce que** ladite partie intérieure (32) de ladite porte (3) est conformée de telle sorte que l'extrémité supérieure (36) de ladite partie convexe (33) se relie à la partie périphérique circulaire (35) au moyen d'une partie concave (39).

5. Lave-linge à chargement frontal comprenant une unité (1) pourvue d'un panneau avant (9) présentant une ouverture (2) pour le chargement du linge à laver et une porte (3) apte à fermer ladite ouverture, une cuve de lavage ajustée dans l'unité et contenant un tambour ajusté dans la cuve pour y tourner, le tambour et la cuve comportant des ouvertures respectives alignées l'une avec l'autre et avec l'ouverture de l'unité, **caractérisé en ce que** ladite porte est définie selon l'une quelconque des revendications précédentes.

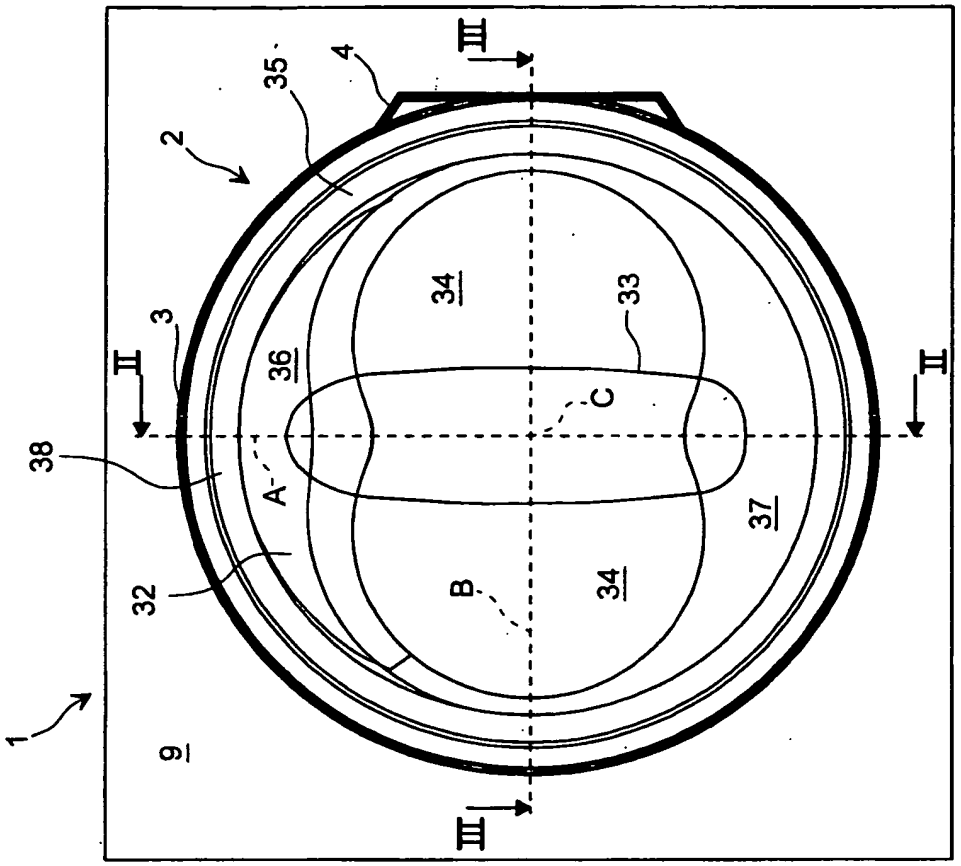

III
35
4
2
34
33
3
36
II
II
C
38
A
37
32
B
34
1
9
III

Fig.1

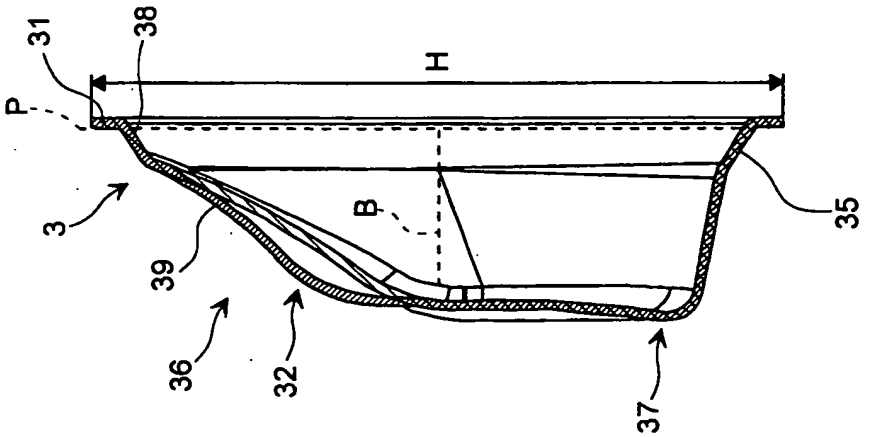

31
38
H
P
35
3
B
39
36
32
37

Fig.2

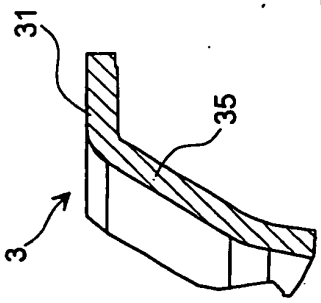


Fig.4

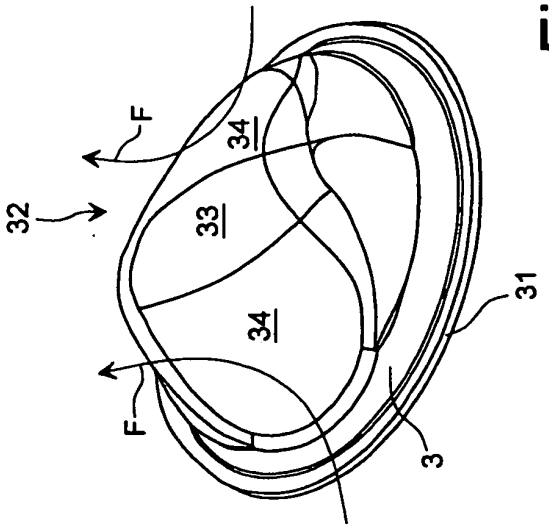


Fig.5

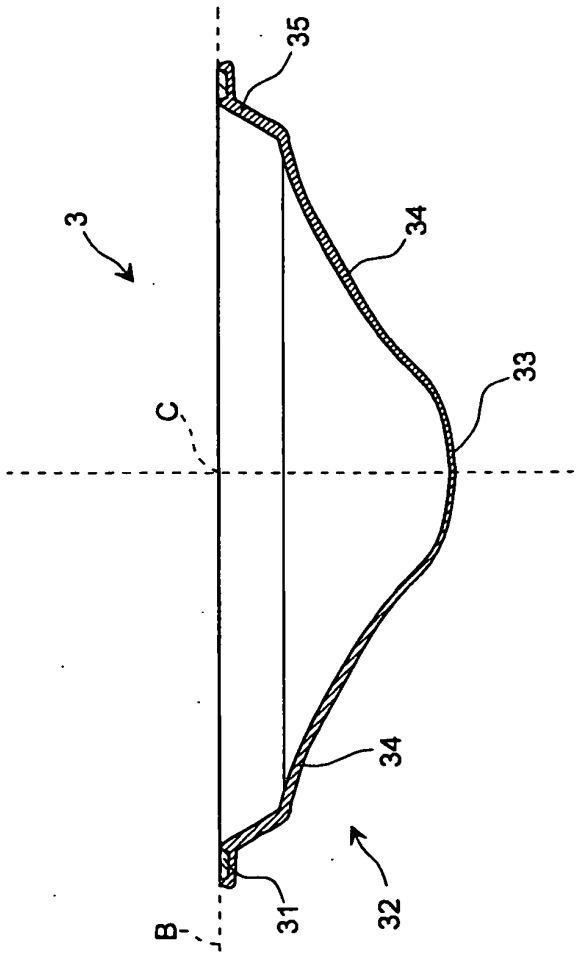


Fig.3