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(54) Top loading drum for laundry appliances

(57) A top loading drum (1) for laundry appliances having a substantially cylindrical lateral wall (2) that defines an internal volume (3) of said drum, an opening (4) positioned on said lateral wall (2) for accessing said internal volume (3), and a closing device (5) for closing said opening (4) and movable between a closed position and an open position; the closing device comprises a first, sliding, portion (6) which is slidingly coupled to said lateral wall (2) and is slidingly movable on said lateral wall between said closed position and said open position; the closing device further comprises a second, articulated, portion (7) which has a first end (71) with a first terminal hinged connection (81) on said lateral wall (2) and a second end (72) with a second terminal hinged connection (82) on said first, sliding, portion (6), said second, articulated, portion (7) having a plurality of segments (91, 92, 93) and being provided with at least one intermediate hinged connection (83, 84, 85) between two subsequent segments of said plurality of segments (91, 92, 93).

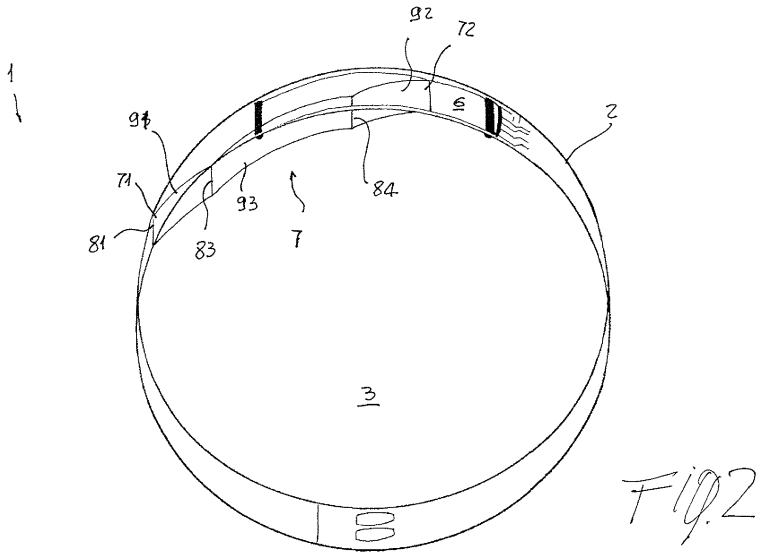


Fig.2

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Description

[0001] The present invention relates to a drum for laundry appliances, i.e. appliances for the washing and/or drying of laundry, of the top-loading type. In particular the present invention is related to a top-loading drum for laundry appliances which is provided with an increased opening window for accessing the internal volume of the drum and with a closing device for closing said opening window which is highly reliable, and quick and easy to actuate.

[0002] It is known that laundry appliances normally have a spin drum rotatably mounted inside the casing of the appliance, and have two main possible configurations: front loading, in which the drum is accessible through a porthole positioned on the front of the casing, and top loading, in which the drum is accessible through the top of the casing.

[0003] In the latter case, the drum has a substantially cylindrical lateral wall and rotates around an horizontal axis of rotation. Also, the drum is normally provided with an opening window located on the lateral wall thereof. A pair of lids are normally hinged on opposite sides of the window, said lids opening outwardly to allow the loading/unloading of clothes into/from the internal volume of the drum.

[0004] A first drawback of know-type solutions is the relatively limited opening space available for loading/unloading of clothes. Indeed, the opening window positioned on the lateral wall of the drum normally has relatively limited dimensions, due to the need of limiting the size and encumbrance of the door assembly (e.g. lids) which is used to close the window.

[0005] Moreover, the use two lids hinged on opposite sides of the opening window, requires the use of both hands of the user for opening/closing them, making uncomfortable for the user the overall operation of opening/closing the lids and loading/unloading clothes, as his/her hands are at least partially occupied by the clothes to be loaded/unloaded.

[0006] Based on these remarks, there is clearly the need of providing a top-loading drum for laundry appliances which is provided with an increased opening window for accessing the internal volume of the drum and with a closing device for closing said opening window that can be easily actuated by a user, even with a single hand.

[0007] Thus, the present invention relates to a top loading drum for laundry appliances having a substantially cylindrical lateral wall that defines an internal volume of said drum, an opening positioned on said lateral wall for accessing said internal volume, and a closing device for closing said opening and movable between a closed position and an open position; the closing device comprises a first, sliding, portion which is slidingly coupled to said lateral wall and is slidingly movable on said lateral wall between said closed position and said open position; the closing device further comprises a second, articulated, portion which has a first end with a first terminal hinged connection on said lateral wall and a second end with a second terminal hinged connection on said first, sliding, portion, said second, articulated, portion having a plurality of segments and being provided with at least one intermediate hinged connection between two subsequent segments of said plurality of segments.

[0008] In practice, in the top loading drum according to the invention, the use of a closing device having a sliding portion and an articulated, foldable, portion, allows increasing the opening space for accessing the drum, maintaining at the same time a relatively simple and easy-to-operate structure.

[0009] As better explained in the following description, thanks to its structure, the closing device can be actuated (i.e. open/closed) even with one hand by the user. At the same time, the construction of the closing device with a sliding portion and a hinged, articulated, portion, is optimal for load distribution to the drum body. In other words, in the drum according to the invention, the load distribution from the door assembly (i.e. the closing device) to the drum body is more or less uniform and spread out on the drum surface.

[0010] Advantageously, the second, articulated, portion of the closing device follows the profile of the lateral wall of the drum when the closing device is in the closed position and is folded in the internal volume of the drum when the closing device is in the open position. The objective of maximum opening dimension is therefore achieved with comparatively minimum penetration of the door assembly into the drum. Indeed, when the closing device is in the closed position, the articulated portion is closely adjacent to the lateral wall of the drum, while when the closing device is in the open position the articulated portion is confined in a limited portion on the upper side of the drum interior, with negligible loss of available internal volume for clothes.

[0011] To this purpose, the segments of the articulated portion of the closing device are preferably curved segments which have substantially the same curvature radius of the cylindrical lateral wall of drum.

[0012] The number of segments forming the articulated portion of the closing device can be chosen according to the design needs. A minimum of two segments is normally required, with a first segment hinged on the lateral wall of the drum, a second segment hinged on the sliding portion and an intermediate hinged connection positioned between said first segment and said second segment. In this way, the closing device comprises a sliding element and two foldable, hinged elements. A higher number of segments forming the articulated portion of the closing device is normally preferred.

[0013] In particular, the articulated portion of the closing device preferably comprises a first segment hinged on the lateral wall of the drum, a second segment hinged on the sliding portion and a third segment positioned between said first and second segment and hinged on said first and second segment. In this way, the closing device

comprises a sliding element and three foldable, hinged elements.

[0014] Preferably, when the said closing device is in the open position, the angle between two subsequent segments of the second articulated portion as measured form the interior of said drum is greater than 180°, and more preferably said angle is greater than 270 °.

[0015] Also, in the open position, the angles between the first end of the articulated, portion and the lateral wall of the drum and between the second end of the articulated portion and the sliding portion as measured form the interior of said drum are lower than 180 °, and preferably lower than 90 °.

[0016] When the above angles are formed, the articulated portion is folded as much as possible inside the drum, thereby minimizing the occupied volume inside the drum. For the purposes of the present invention, the above angles are measured with reference to the tangents to the segments in correspondence of the connection points.

[0017] Advantageously, the closing device comprises elastic means, e.g. torsion springs, which are positioned in correspondence of one or more of said terminal hinged connections and/or intermediate hinged connections. The presence of such elastic means allows achieving an automatic opening of the closing mechanism.

[0018] In practice, when unlocking the closing device, the elastic means positioned at appropriate hinged connections of the closing device actuate an automatic opening action of the door assembly, with an automatic collapsing movement of the articulated portion inside the drum and an automatic sliding movement of the sliding portion on the wall of the drum. It is worth noting that such operation can be carried out with one hand only and with little or no effort by the user.

[0019] Further features and advantages of the present invention will be more clear from the description of preferred but not exclusive embodiments of top loading drum for laundry appliances according to the invention, shown by way of examples in the accompanying drawings, wherein:

- Figure 1 is a perspective view of the lateral wall and closing device in a first embodiment of a top loading drum according to the invention, shown in the closed position;
- Figure 2 is a perspective view of the embodiment of Figure 1, shown in a first intermediate open position;
- Figure 3 is a perspective view of the embodiment of Figure 1, shown in a second intermediate open position;
- Figure 4 is a perspective view of the embodiment of Figure 1, shown in a third intermediate open position;
- Figure 5 is a perspective view of the embodiment of Figure 1, shown in the fully open position;
- Figure 6 is a perspective view of the lateral wall and closing device in a second embodiment of a top loading drum according to the invention, shown in the open position.

[0020] With reference to the attached figures, a top loading drum for laundry appliances according to the present invention, generally designated with the reference numeral 1, has a substantially cylindrical lateral wall 2 that defines an internal volume 3 of the drum 1 into which clothes are loaded for washing and/or drying purposes. Mounting of the drum 1 into the casing of the appliance, as well as its movement and functioning, can be made according to conventional practice and will not be described in details.

[0021] The drum 1 is provided with an opening 4 which is positioned on said lateral wall 2 for accessing the internal volume 3 and for loading/unloading clothes into/from it. A closing device 5 for closing the opening 4 is also provided, said closing device 5 being movable between a closed position and an open position. In the following description the term "door assembly" will also be used as an alternative to the term "closing device".

[0022] In the top loading drum according to the invention, the closing device 5 comprises a first, sliding, portion 6 which is slidingly coupled to the lateral wall 2 of the drum 1. The sliding portion 6 is slidingly movable on said lateral wall 2 between the closed position and the open position. In the attached figure, the sliding portion 6 slides counterclockwise during opening and clockwise when closing.

[0023] The closing device 5 further comprises a second articulated portion 7 which has a first end 71 with a first terminal hinged connection 81 on the lateral wall 2 of the drum 1, and a second end 72 with a second terminal hinged connection 82 on the first sliding portion 6.

[0024] In the most general embodiment the second, articulated, portion 7 has a plurality of segments and is provided with at least one intermediate hinged connection between two subsequent segments of said plurality of segments.

[0025] In the embodiment of figures 1-5, the second articulated portion 7 comprises three segments 91, 92, 93. The first segment 91 has a first end 71 with a first terminal hinged connection 81 on the lateral wall 2 of the drum 1; the second segment 92 has a second end 72 with a second terminal hinged connection 82 on the first, sliding, portion 6; the third segment 93 is positioned between said first 91 and second 92 segment, and is connected to said first 91 and second 92 segment through, respectively, a first intermediate hinged connection 83 and a second intermediate hinged connection 84.

[0026] In an alternative embodiment, illustrated in figure 6, the second articulated portion 7 comprises only two segments 91 and 92. The first segment 91 has a first end 71 with a first terminal hinged connection 81 on the lateral wall 2 of the drum 1; the second segment 92 has a second end 72 with a second terminal hinged connection 82 on the first, sliding, portion 6; an intermediate hinged connection 85 is positioned between a second end 73 of said first segment 91 and a first end 74 of said

second segment 92.

[0027] The closing device according to the solution of figures 6 is more simple and easier to manufacture with respect to the previously described one; however the volume taken by the articulated portion 7 inside the drum 1 when the device is in the open position is larger than in the previous case.

[0028] In general, in all cases, the second articulated portion 7 follows the profile of the lateral wall 2 when the door assembly 5 is in the closed position (see figure 1), i.e. the segments 91, 92 and 93 are closely adjacent and parallel to the lateral wall 2 of the drum 1. Although not shown, the situation is the same for the embodiment of figures 6 in which, when in the closed position, the segments 91 and 92 are closely adjacent and parallel to the lateral wall 2 of the drum 1.

[0029] Therefore, the various segments 91-93 forming the second articulated portion 7 are preferably curved segments having substantially the same curvature radius of the cylindrical lateral wall 2 of the drum 1, so that no internal space of the drum 1 is occupied by them when the door assembly 5 is in the closed position.

[0030] With reference to figure 2, the opening action of the door assembly 5 can be conveniently started by a "reverse" movement of the sliding portion 6 in the closing direction, i.e. clockwise in the attached figures. In this way, the segments 91, 92 and 93 of the second articulated portion 7 are moved away from the lateral wall 2 and are projected inside the internal volume 3 of the drum 1.

[0031] Then, referring to figures 3 and 4, the opening action of the door assembly 5 is continued by moving the sliding portion 6 in the opening direction, i.e. counterclockwise in the attached figures. During such movement, the second articulated portion 7 progressively "collapses", while the segments 91, 92 and 93 are folding on each other.

[0032] At the end of the movement (figure 5) the door assembly 5 is completely open, i.e. the first sliding portion 6 is completely moved away from the opening 4 of the lateral wall 2 and the second articulated portion 7 is folded inside the internal volume 3 of the drum 1.

[0033] Although not illustrated, the same situation during the opening operation occurs in the embodiment of figures 6.

[0034] The number and length of the segments forming the second articulated portion 7 of the closing device 5 can be chosen according to the needs. In general, a higher number of relatively short segments brings about less internal volume taken when the second articulated portion 7 is folded inside the drum 1, as it can be seen by comparing the embodiments of figure 5 and figure 6.

[0035] Moreover, the higher the folding angle between two subsequent segments of the second articulated portion 7, the lower the internal volume taken by the second articulated portion 7 when the door assembly is open, such angle being normally greater than 180°, and preferably greater than 270°.

[0036] In other words, in the embodiment of figures 1-5, in the totally open position of figure 5, the segment 91 is closely folded on segment 93 and the segment 92 is also closely folded on segment 93; then segment 91 is closely folded also on the lateral wall 2 of the drum 1, while segment 92 is closely folded on the first sliding portion 6.

[0037] In a largely preferred embodiment of the top loading drum 1 according to the present invention, the closing device 5 comprises elastic means which are positioned in correspondence of one or more of the terminal hinged connections 81, 82 and/or intermediate hinged connections 83, 84, 85.

[0038] In this way, thanks to the elastic means, it is possible to have an automatic opening of the door assembly, once the closing mechanism 5 is unlocked. Torsion springs are preferably used as elastic means, but other equivalent means can be used.

[0039] In particular, with reference to the embodiment of figures 1-5, preferably the elastic means, e.g. torsion springs, are positioned in correspondence of said first terminal hinged connection 71 and of said second intermediate hinged connection 84. In this way, once the closing mechanism 5 is unlocked by manually moving the sliding portion 6 from the position of figure 1 into the position of figure 2, the action of the springs will prompt the folding action of the segments 91, 92 and 93 on each other and towards the lateral wall 2 of the drum 1, without the need of any manual action by the user.

[0040] In practice, in order to open the door assembly 5 of the drum 1, the user simply moves the sliding portion 6 in the closing direction to unlock it and then release it; the door assembly will open automatically without the need of any further action by the user.

[0041] Several variations can be made to the top loading drum thus conceived, all falling within the scope of the present invention. In practice, the materials used and the contingent dimensions and shapes can be any, according to requirements and to the state of the art.

Claims

1. A top loading drum (1) for laundry appliances having a substantially cylindrical lateral wall (2) that defines an internal volume (3) of said drum (1), an opening (4) positioned on said lateral wall (2) for accessing said internal volume (3), and a closing device (5) for closing said opening (4) and movable between a closed position and an open position, **characterized in that** said closing device (5) comprises a first, sliding, portion (6) slidingly coupled to said lateral wall (2) and slidingly movable on said lateral wall (2) between said closed position and said open position, and a second, articulated, portion (7) having a first end (71) with a first terminal hinged connection (81) on said lateral wall (2) and a second end (72) with a second terminal hinged connection (82) on said first,

sliding, portion (6), said second, articulated, portion (7) having a plurality of segments (91, 92, 93) and being provided with at least one intermediate hinged connection (83, 84, 85) between two subsequent segments of said plurality of segments (91, 92, 93).

2. The top loading drum (1) according to claim 1, **characterized in that** said segments (91, 92, 93) are curved segments having substantially the same curvature radius of said cylindrical lateral wall (2).

3. The top loading drum (1) according to claim 1 or 2, **characterized in that** said second, articulated, portion (7) follows the profile of said lateral wall (2) when the closing device (5) is in the closed position and is folded in the internal volume (3) of the drum (1) when the closing device (5) is in the open position.

4. The top loading drum (1) according to one or more of the previous claims, **characterized in that** said second, articulated, portion (7) comprises a first segment (91) having a first end (71) with a first terminal hinged connection (81) on said lateral wall (2), a second segment (92) having a second end (72) with a second terminal hinged connection (82) on said first, sliding, portion (6), said intermediate hinged connection (85) being positioned between a second end (73) of said first segment (91) and a first end (74) of said second segment (92).

5. The top loading drum (1) according to one or more of claims 1-3, **characterized in that** said second, articulated, portion (7) comprises a first segment (91) having a first end (71) with a first terminal hinged connection (81) on said lateral wall (2), a second segment (92) having a second end (72) with a second terminal hinged connection (82) on said first, sliding, portion (6), a third segment (93) positioned between said first (91) and second (92) segment, a first intermediate hinged connection (83) connecting said third segment (93) to said first segment (91) and a second intermediate hinged connection (84) connecting said third segment (93) to said second segment (92).

6. The top loading (1) drum according to one or more of the previous claims, **characterized in that** in the open position of said closing device (5) the angle between two subsequent segments of said second articulated portion (7) as measured form the interior (3) of said drum (2) is greater than 180°.

7. The top loading drum (1) according to claim 6, **characterized in that** said angle between two subsequent segments of said second articulated portion (7) as measured form the interior (3) of said drum (1) is greater than 270°.

8. The top loading drum (1) according to one or more of the previous claims, **characterized in that** in the open position of said closing device (5) the angles between the first end (71) of said second, articulated, portion (7) and the lateral wall (2) of the drum (1) and between the second end (72) of said second, articulated, portion (7) and said first, sliding, portion (6) as measured form the interior (3) of said drum (1) are lower than 180°.

9. The top loading drum (1) according to claim 9, **characterized in that** said angles between the first end (71) of said second, articulated, portion (7) and the lateral wall (2) of the drum (1) and between the second end (72) of said second, articulated, portion (7) and said first, sliding, portion (6) are lower than 90°.

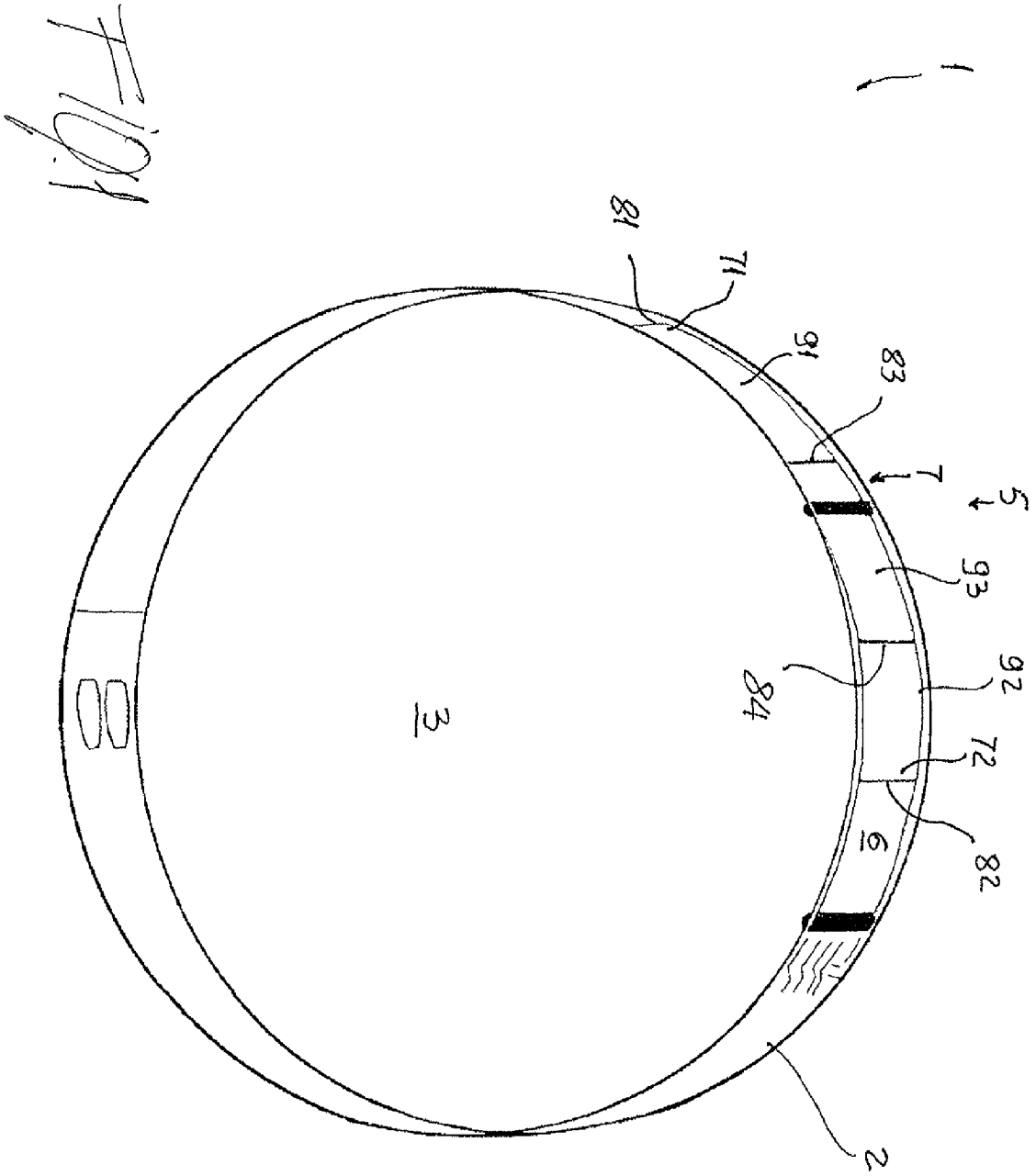
10. The top loading drum (1) according to one or more of the previous claims, **characterized in that** said closing device (5) comprises elastic means positioned in correspondence of one or more of said terminal hinged connections (81, 82) and/or intermediate hinged connections (83, 84, 85).

11. The top loading drum (1) according to claims 5 and 10, **characterized in that** said closing device (5) comprises elastic means positioned in correspondence of said first terminal hinged connection (71) and of said second intermediate hinged connection (84).

12. The top loading drum (1) according to claim 10 and 11, **characterized in that** said elastic means are torsion springs.

13. The top loading drum (1) according to one or more of claims 10-12, **characterized in that** said elastic means actuate an automatic opening action of said closing device (5).

Fig. 1



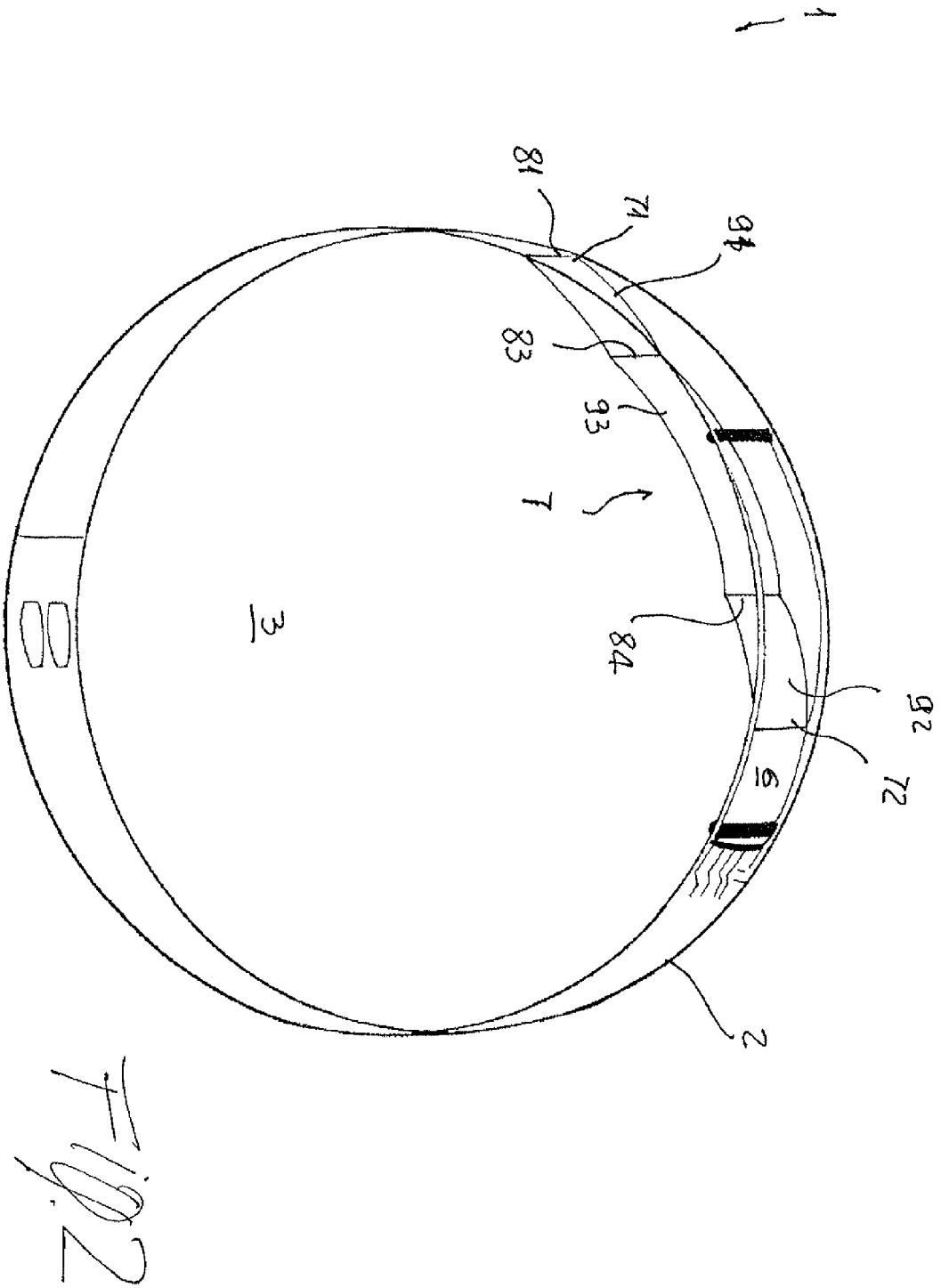


Fig. 2

Fig. 3

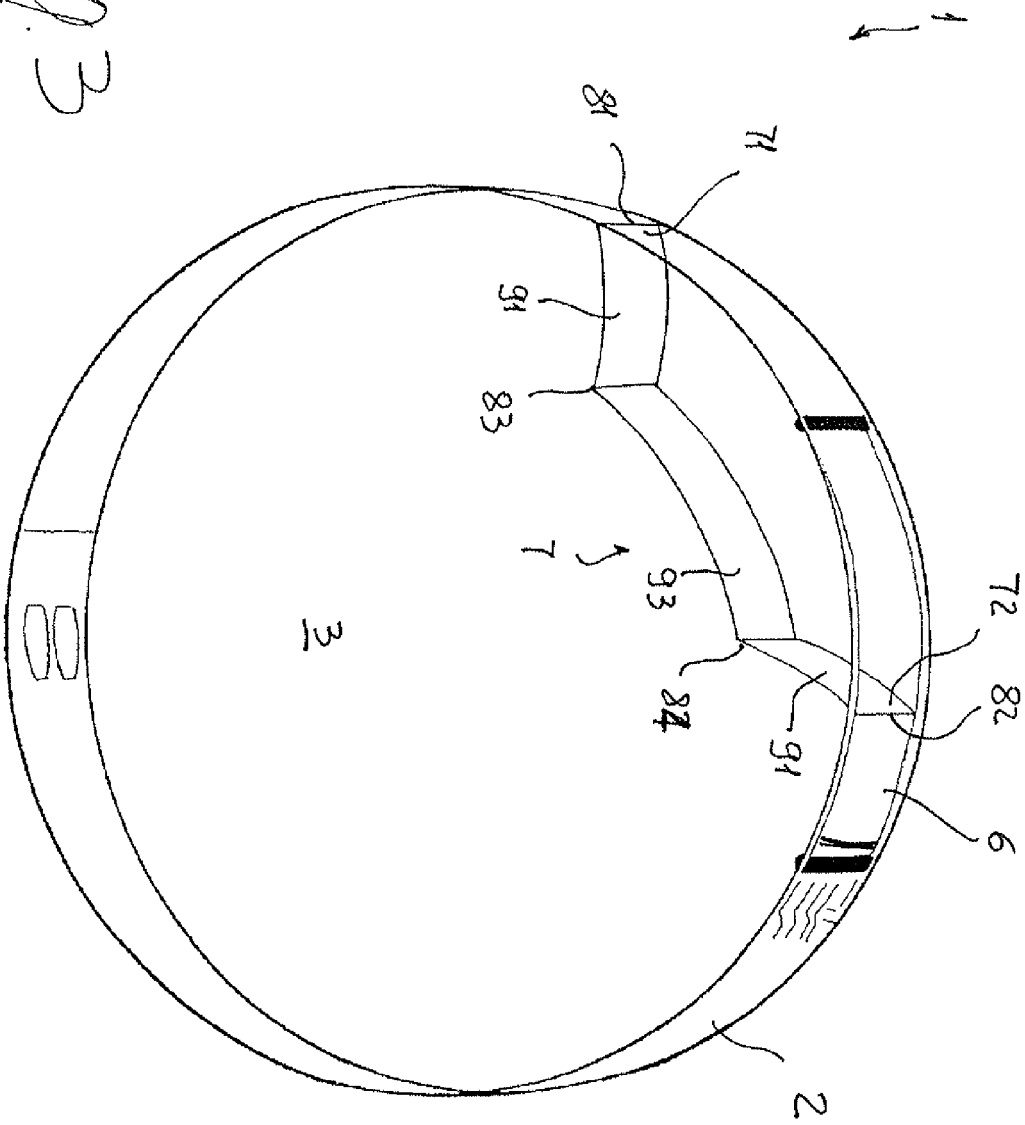
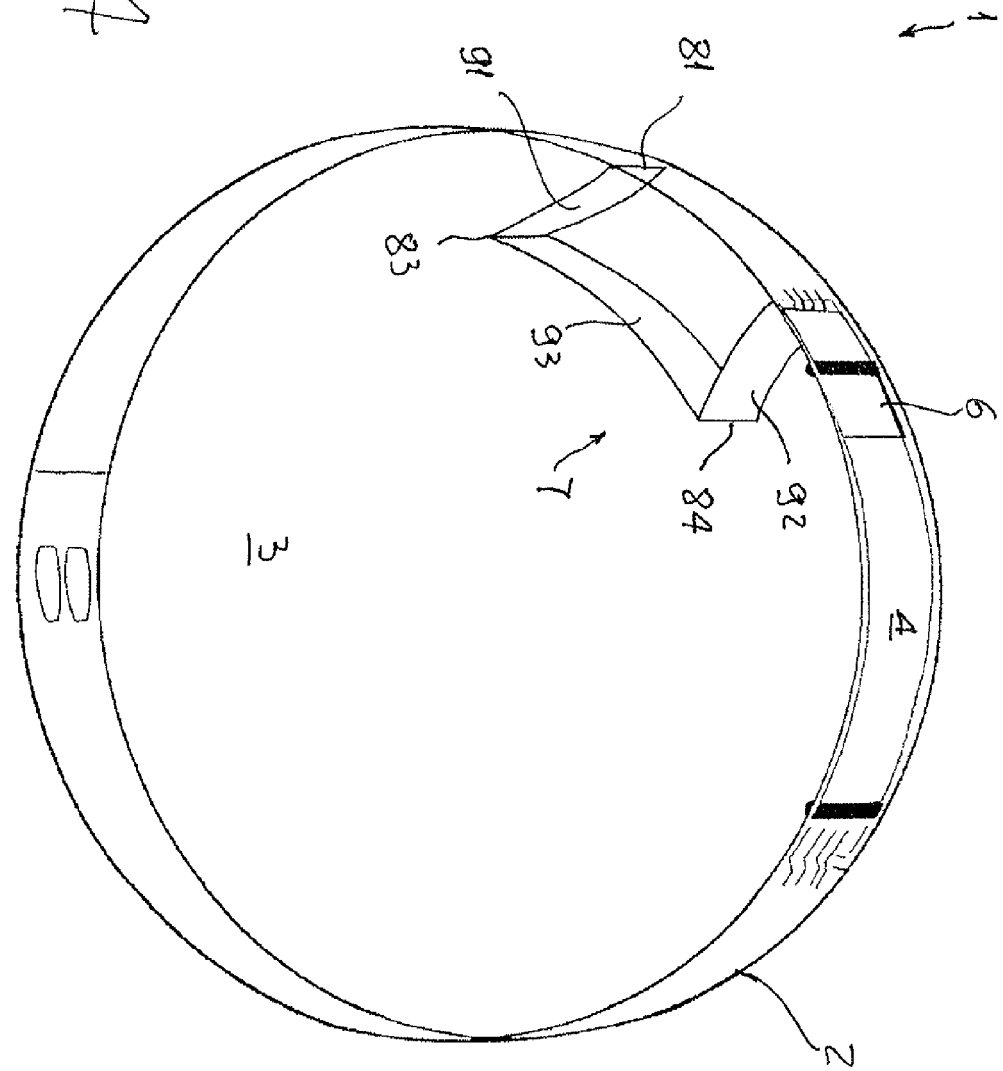


Fig. 4



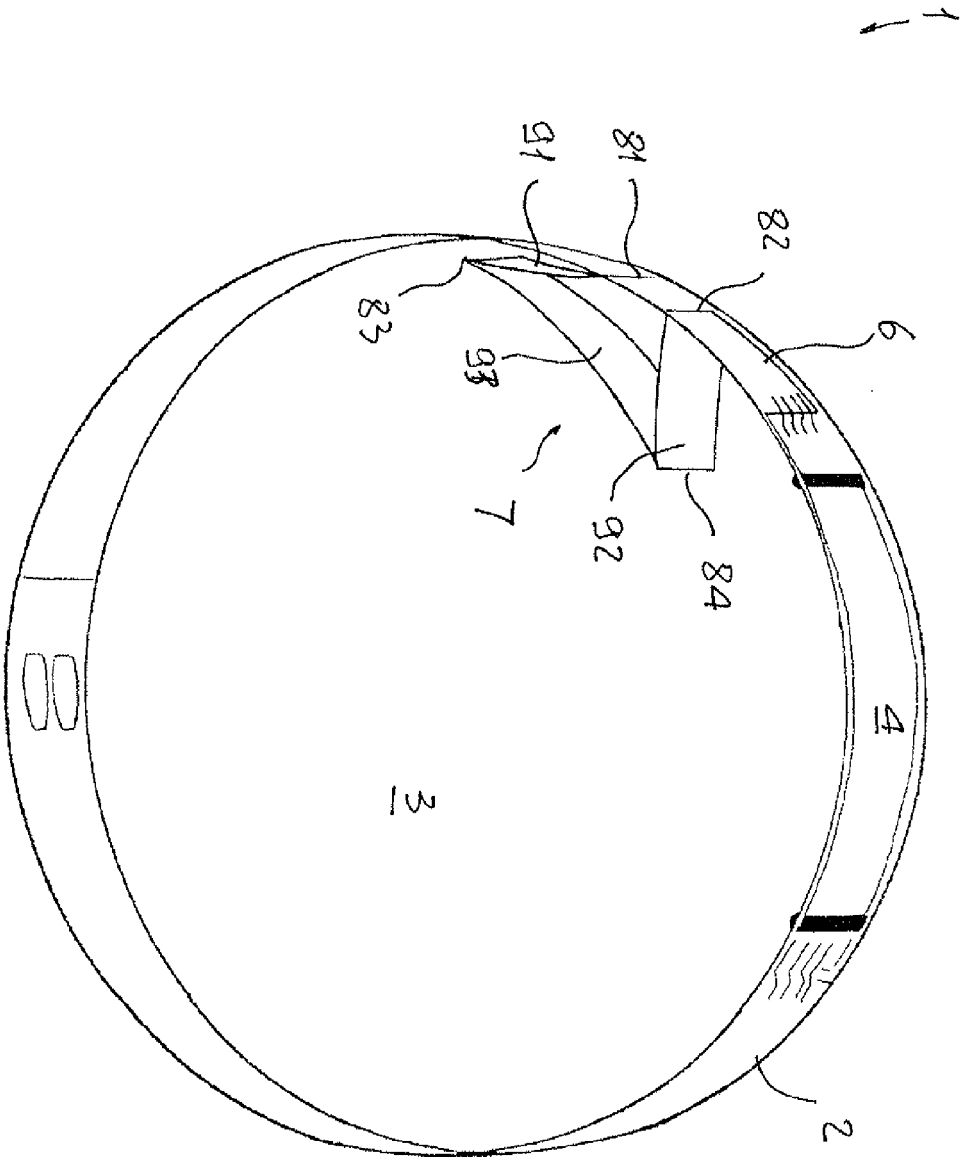
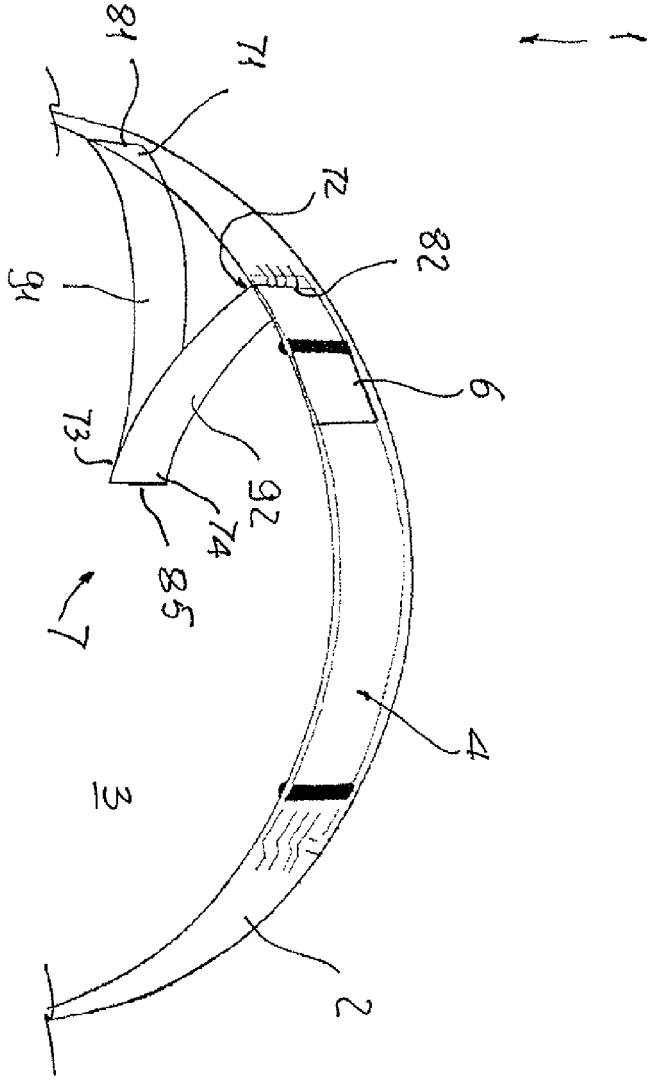


Fig. 5

Fig. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 14 19 7248

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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