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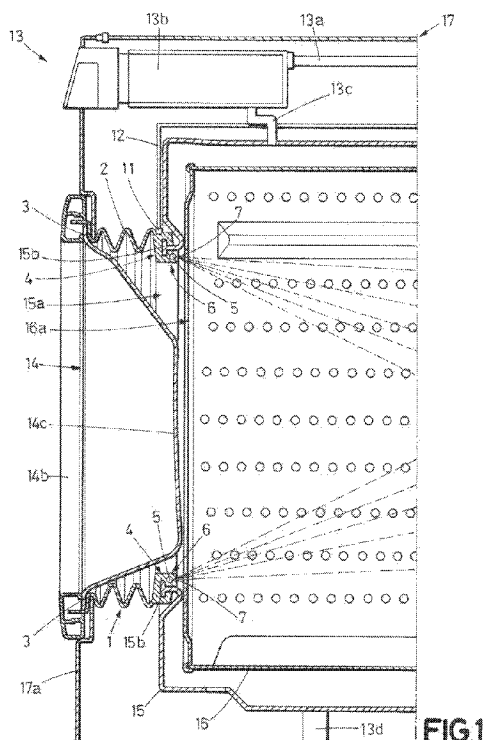
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- (54) Title: ANNULAR PORTAL ASSEMBLY FOR A FRONT-LOADING WASHING MACHINE WITH A LAUNDRY SOAK-
ING SYSTEM AND WASHING MACHINE COMPRISING THE ASSEMBLY



- (57) Abstract: Annular portal assembly for a front-loading washing machine having a laundry soaking system, comprising an annular body (2) with a first annular rib (3) mountable on a frame (14a) of a loading hatch (14) of the washing machine (13) and a second annular rib (4) mountable on an internal circumferential edge (15b) of a front opening (15a) of a wash tub (15) of the washing machine (13) wherein rotates a wash drum basket (16) comprising a front access opening (16a) facing the front opening (15a) of the wash tub (15). The annular portal assembly comprises a water duct (5) connectable to a water supply system (12) and integrated into a complementary part (6) of the second rib (4) of the annular body (2) that, in the mounted position of the annular portal assembly (1), will be arranged in at least one upper portion of the internal circumferential edge (15b) of said front opening (15a) and a plurality of sprayer nozzles (7) communicating with the water duct (5) and arranged in the complementary part (6) in radial positions that, in the mounted state of the annular portal assembly (1), will be located in a front portion (6b) of the complementary component (6) to eject water provided from the water duct (5) into the wash basket (16) through said front access opening (16a).



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**ANNULAR PORTAL ASSEMBLY FOR A FRONT-LOADING
WASHING MACHINE WITH A LAUNDRY SOAKING SYSTEM AND
WASHING MACHINE COMPRISING THE ASSEMBLY**

- 5 The present invention relates to the technical field of washing machines and, in particular, in the area of systems for the forced soaking of laundry in washing machines.

Water expenses are a significant cost factor in the use of household washing machines, both with regard to the cost of wash water consumption as well as the cost of the energy needed
10 to heat water for washing the laundry. Moreover, conserving water is of increasing importance for environmental reasons. On the other hand, to achieve an adequate washing of laundry requires soaking in which the water penetrates all of the laundry as uniformly and deeply as possible.

15 To combine the conservation of wash water with the proper soaking of the laundry, systems have been devised for forced soaking by means of water droplets projected from the window toward the wash basket, that is, from the loading door window, or from injection nozzles arranged in the annular assembly area that joins the loading hatch to the wash tub. A wash-
20 ing machine of this type wherein the injection nozzle is arranged in the annular assembly area of the loading hatch for spraying water toward the internal side wall and toward the internal rear wall of the drum is described in the document WO 2011/053091 A2. Specifically, the injection nozzle is mounted in the area of the ring that joins the annular assembly to the front opening of the tub so as to project vertically toward the internal passage of the annular assembly.

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Although the injection nozzle soaking system of document WO 2011/053091 A2 provides effective injection of water into the wash drum, it has the disadvantage of being a component that protrudes into the annular assembly wherein the laundry can become entangled while being loaded or unloaded through the loading hatch to the basket, or while being
30 washed.

The aim of the present invention is to overcome the disadvantages of the state of the art described above by means of a novel annular portal assembly for a front-loading washing machine with a system for soaking laundry, and a front-loading washing machine comprising the assembly.

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Accordingly the present invention provides an annular portal assembly and a front-loading washing machine comprising such assembly in accordance with the respective independent claim attached. Preferred embodiments of the annular portal assembly and the washing machine are subjects of the subsequent description, the attached drawing and the dependent claims attached. Insofar as technically feasible, preferred embodiments of the annular portal assembly correspond to preferred embodiments of the washing machine and vice versa even if not outlined in detail herein.

The annular portal assembly relating to the present invention comprises an annular body with a first annular rib mountable on a frame of a loading hatch of the washing machine, and a second annular rib mountable on an internal circumferential edge of a front opening of a wash tub of the washing machine wherein rotates a wash drum basket comprising a front access opening that faces the front opening of the wash tub, comprising:

a water duct connectable to a water supply system and integrated into a complementary part of the second rib of the annular body that, in the mounted position of the annular portal assembly, will be arranged in at least one upper portion of the internal circumferential edge of said front opening;

a plurality of sprayer nozzles communicating with the water duct and arranged in the complementary part in radial positions that, in a mounted state of the annular portal assembly, will be located in a front portion of the complementary component to eject water provided from the water duct into the wash basket through said front access opening.

The water duct can comprise at least one connector connectable to the washing machine water supply system. Moreover, it can comprise a first end connectable to the connector and a second closed end. On the other hand, sprayer nozzles can be arranged in radial positions spaced apart from one another along the entire length of the complementary part or, alterna

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tively, along only one segment of the complementary part. In turn, the complementary part can be integrated into an area of said second rib that, in the mounted position of the annular portal assembly, will be arranged in the upper portion of the internal circumferential edge of said front opening, or can extend along the entire length of the rib.

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The second rib preferably comprises a first lip comprising the complementary part and that is mountable in the internal circumferential edge of the front opening of the wash tub. The first lip can comprise a rear mounting segment mountable externally about the front opening of the wash tub, and a front mounting segment mountable internally about the front opening of the wash tub and joined to the rear mounting segment by a joining segment.

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According to a preferred embodiment of the annular portal assembly, the complementary part is formed by two axial extensions of the rear mounting segment and the front mounting segment that project into the interior of the front opening of the wash tub, and which comprise ends joined by the joining segment, while the front portion of the complementary part is formed by the axial extension of the front mounting segment. The water duct is formed between said extensions of the rear mounting segment and the front mounting segment, the joining segment and the internal circumferential edge of the front opening of the wash tub and the extension of the front mounting segment is penetrated by through-holes communicating with the water duct.

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In this embodiment, at least one mounting segment preferably comprises a coupling recess elastically coupleable to at least one complementary projection provided in one side in the internal circumferential edge of the front opening of the wash tub. Alternatively, each one of the mounting segments can comprise a coupling recess elastically coupleable to at least one complementary projection provided in one side in the internal circumferential edge of the front opening of the wash tub.

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Likewise, in this embodiment the water duct preferably comprises a tube arranged in a casing in said complementary part and communicating with the sprayer nozzles by means of respective sleeves. The tube is provided with a fastening means for fastening the tube to the internal circumferential edge of the front opening of the wash tub, and the casing is formed between the internal circumferential edge of the front opening of the wash tub, the joining segment, and the extensions of the rear mounting segment and the front mounting segment

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of the first lip. In this way, the joining segment and the extensions of the rear mounting segment and the front mounting segment engage the tube. The fastening means can comprise a plurality of pairs of flanges protruding from the exterior periphery of the tube and engaging the extensions of the rear mounting segment and the front mounting segment.

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According to an alternative preferred embodiment of the annular portal assembly, the joining segment contacts the internal circumferential edge of the front opening of the wash tub, and the complementary part is integrated into a protruding part of said joining segment that projects toward the interior of the front opening of the wash tub such that the front portion of the complementary part forms part of said protruding part, or the front mounting segment is integrated such that the front portion of the complementary part forms part of the front mounting segment.

According to this alternative embodiment, the complementary part preferably is a solid body such that it extends the water duct. Alternatively, in the case wherein the complementary part (6) is integrated into a protruding part of said joining segment, the complementary part preferably comprises an elastic flap with a first straight segment having a first lip that protrudes from one side of the joining segment, a second straight segment having an open end, and a connecting segment that connects the first straight segment with the second straight segment. The joining segment and the second straight segment are provided with means for complementary coupling with one another, to couple the second straight segment with the joining segment in such a manner as to form the water duct when the second straight segment is coupled with the joining segment, between said straight segments, said connecting segment of the elastic flap, and said joining segment. The coupling means can comprise at least one coupling flange coupleable to a coupling recess, for example, as a coupling flange provided in said second straight segment of the elastic flap, and a coupling recess provided in the joining segment of the first lip. Preferably, the connecting segment is elastic and, in the non-coupled position of the second straight segment to the joining segment, the first straight segment and the second straight segment define an angle of less than 90° between one another. Likewise preferably, the second straight segment constitutes the front portion of the complementary component.

In the aforementioned alternative embodiment of the annular portal assembly, the front portion of the complementary part preferably comprises an insertion slot defined between coaxial edges with the water duct, and the water duct comprises a tube inserted into a casing in said complementary part through an insertion slot. The sprayer nozzles form part of the tube, and for example can be openings in the respective open ends of the two sleeves provided in the tube. In this case, the tube preferably is encased in the casing pressing strongly against the coaxial edges of the insertion slot to separate them leaving a free gap that extends coaxially with the tube and that, in the mounted position of the portal assembly, will be oriented to face the front access opening of the basket. The sprayer nozzles that form part of the tube are arranged to correspond to the free gap, and preferably are also holes in the tube. Alternatively, the front portion of the complementary part comprises through-holes communicating with the casing that, in the mounted position of the portal assembly, will be oriented toward the front access opening of the basket, and the sleeves extend through said through-holes.

The front-loading washing machine according to the present invention comprises a loading hatch in a front wall of a housing, a wash tub having a front opening and mounted inside the housing wherein rotates a wash drum basket comprising a front access opening with a perimeter not smaller than the diameter of the front opening of the wash tub, an annular portal assembly comprising an annular body with a first annular rib mounted in a frame (of the loading hatch of the washing machine and a second annular rib mounted in the front opening) of the wash tub, and a laundry forced soaking system comprising a sprayer system connected to a water supply system to direct water to the basket through said front access opening. Additionally the annular portal system has the characteristics previously described with reference to the present invention, and in comprising a water supply system connected to a water duct.

Aspects and preferred embodiments of the invention are described below with reference to the figures of the drawing attached, wherein

Figure 1 is a partial side elevation cross-sectional view of an embodiment of a washing machine;

Figure 2 is a partial side cross-sectional view of a first embodiment of an annular portal assembly;

Figure 3 is an elevated posterior view of the annular portal assembly shown in Figure 2;

Figure 4 is a partial side cross-sectional view of a second embodiment of an annular portal assembly;

Figure 5 is an elevated posterior view of the annular portal assembly shown in Figure 4;

Figure 6 is a partial frontal perspective partially cross-sectional view of a third embodiment of an annular portal assembly;

Figure 7 is a partial rear perspective partially cross-sectional view of the annular portal assembly shown in Figure 6;

Figure 8 is a partial frontal perspective partially cross-sectional view of a fourth embodiment of an annular portal assembly;

Figure 9 is a partial lateral perspective partially cross-sectional view of the complementary part of Figure 8;

Figure 10 is an elevated posterior view of an embodiment of the mountable tube in the embodiment of the annular portal assembly from Figure 8;

Figure 11 is a partial lateral perspective view of an embodiment of a tube that serves as a water duct in the annular portal assembly;

Figure 12 is a partial perspective view of a fifth embodiment of an annular portal assembly that incorporates the tube shown in Figure 11;

Figure 13 is a cross-sectional view that shows the annular portal assembly of Figure 12 mounted on a washing machine;

Figure 14 is an antero-lateral perspective partially cross-sectional view of a sixth embodiment of an annular portal assembly;

Figure 15 is a cross-sectional view of a seventh embodiment of an annular portal assembly; and

Figure 16 is an antero-lateral perspective partially cross-sectional view of the annular portal assembly of Figure 15 mounted on a washing machine.

In the embodiment illustrated in Figure 1, washing machine 13 comprises housing 17 having front wall 17a wherein loading hatch 14 is located. Loading hatch 14 comprises frame 14a wherein loading door 14b provided with transparent window 14c is mounted in the conventional manner. Loading hatch 14 is aligned with front opening 15a of wash tub 15 mounted inside housing 17, having front access opening 16a of wash drum basket 16 that is driven by a motor (not shown in the figures) to rotate inside wash tub 15.

Washing machine 13 additionally comprises water supply duct 13a connected to detergent compartment 13b, which in turn is connected to inlet duct 13c that flows into the upper portion of wash tub 15. The lower portion of wash tub 15 is provided with outlet duct 13d such that water present in wash tub 15 can be emptied by the action of a pump (not shown in the figures).

Between frame 14a of loading hatch 14 and front opening 15a of wash tub 15 is mounted annular portal assembly 1 comprising annular body 2 with first annular rib 3 mounted to frame 14a of loading hatch 14 of washing machine 13 and second annular rib 4 mounted to front opening 15a of wash tub 15.

Washing machine 13 additionally comprises a sprayer system connected to water supply system 12, which is connected by means of connector 11 to water duct 5 integrated into complementary part 6 of second rib 4 of annular body 2 as well as a plurality of sprayer noz

zles 7 communicating with water duct 5 and arranged in complementary part 6 in radial positions located for spraying water provided by water duct 5 into wash basket 16 through front access opening 16a.

5 In all of the embodiments of the annular portal assembly shown in Figures 2 through 16, second rib 4 comprises first lip 8 that comprises complementary part 6 and is mountable on internal circumferential edge 15b of front opening 15a of wash tub 15, as well as second lip 18 mountable on external circumferential edge 15d of wash tub 15. Lips 8, 18 define an annular cavity between one another. Additionally, in these embodiments, first lip 8 comprises
10 rear mounting segment 8a externally mountable about front opening 15a of wash tub 15, front mounting segment 8c internally mountable about front opening 15a of wash tub 15, and joined to rear mounting segment 8a by joining segment 8b.

In the first embodiment of the annular portal assembly shown in Figures 2 and 3, joining
15 segment 8b contacts internal circumferential edge 15b of front opening 15a of wash tub 15, while complementary part 6 is a solid body such that it extends water duct 5 integrating front mounting segment 8c. Front portion 6b of complementary part 6 forms part of front mounting segment 8c. As can be seen, internal duct 11a passes through connector 11 to permit water provided by water supply system 12 to enter water duct 5. Sprayer nozzles 7 are arranged in
20 radial positions spaced apart from one another along the entire length of complementary part 6.

The second embodiment of the annular portal assembly shown in Figures 4 and 5 differs from the first embodiment illustrated in Figures 2 and 3 such that complementary part 6 is a
25 solid body integrated into protruding part 8d of joining segment 8b, which projects toward the interior of front opening 15a of wash tub 15 such that front portion 6b of complementary part 6 forms part of protruding part 8d, and such that sprayer nozzles 7 are arranged in radial positions spaced apart from one another along the length of only one segment, specifically one segment of complementary part 6 that, in the mounted position of annular portal assembly 1, will be arranged in an upper segment of internal circumferential edge 15b of front
30 opening 15a of wash tub 15.

In the third embodiment of the annular portal assembly shown in Figures 6 and 7, front portion 6b of complementary part 6 comprises insertion slot 6c defined between coaxial edges 6d with water duct 5 as well as through-holes 6f communicating with casing 6a that, in the mounted position of annular portal assembly 1, will be oriented toward front opening 16a of basket 16. In turn, water duct 5 comprises tube 9 inserted into casing 6a in said complementary part 6 through insertion slot 6c. Sprayer nozzles 7 are open at the respective free ends of the two sleeves 7a provided in tube 9 that extend through said through-holes 6f.

In the fourth embodiment of the annular portal assembly shown in Figures 8 through 10, tube 9 is encased in casing 6a pressing strongly against coaxial edges 6d of insertion slot 6c to separate them leaving free gap 6e that extends coaxially with tube 9 and that, in the mounted position of portal assembly 1, will be oriented to face front access opening 16a of basket 16. In these figures, sprayer nozzles 7 are open at the respective free ends of the two sleeves 7a that form part of tube 9 and are arranged to correspond with free gap 6e, while holes can also be in the same tube 9 and, in the mounted position of annular portal assembly 1, will be oriented to face front access opening 16a of basket 16. As can be seen in Figure 10, tube 9 comprises first end 5a connected to connector 11 and second end 5b that is closed. Sprayer nozzles 7 are arranged in radial positions spaced apart from one another along the entire length of complementary part 6.

In the fifth embodiment of the annular portal assembly shown in Figures 11 through 13, complementary part 6 is formed by two axial extensions 8f, 8g of rear mounting segment 8a and front mounting segment 8c that project into the interior of front opening 15a of wash tub 15, and which comprise ends joined by joining segment 8b, such that front portion 6b of complementary part 6 is formed by axial extension 8g of front mounting segment 8c. Water duct 5 is formed between said extensions 8f, 8g from rear mounting segment 8a and front mounting segment 8c, joining segment 8b, and internal circumferential edge 15b of front opening 15a of wash tub 15; Extension 8g of front mounting segment 8c is penetrated by through-holes 6f communicating with the water duct 5. On the other hand, water duct 5 comprises tube 9 arranged in casing 6a in said complementary part 6 and communicating with sprayer nozzles 7 by means of respective sleeves 7a that form part of tube 9. Casing 6a is formed between internal circumferential edge 15b of front opening 15a of wash tub 15, joining segment 8b, extensions 8f, 8g of rear mounting segment 8a and front mounting segment 8c of first lip 8; In turn, tube 9 is provided with a fastening means to fasten tube 9 to internal

circumferential edge 15b of front opening 15a of wash tub 15, such that joining segment 8b and extensions 8f, 8g of rear mounting segment 8a and front mounting segment 8c engage tube 9. Aforementioned fastening means comprises a plurality of pairs of flanges 10 protruding from the external periphery of tube 9 clipped onto thickened portion 15e of internal circumferential edge 15b of portal 15a of wash tub 15. Flanges 10 are engaged by extensions 8f, 8g of rear mounting segment 8a and front mounting segment 8c. In this embodiment, sprayer nozzles 7 of tube 9 are arranged in an area of second rib 4 that, in the mounted position of annular portal assembly 1, will be arranged in the upper portion of internal circumferential edge 15b of front opening 15a. Tube 9 comprises supply duct 9a to receive water. Supply duct 9a is integrated into complementary part 6.

In the sixth embodiment of the annular portal assembly shown in Figure 14, complementary part 6 is also formed by two axial extensions 8f, 8g of rear mounting segment 8a and front mounting segment 8c that project into the interior of front opening 15a of wash tub 15, and which comprise ends joined by joining segment 8b, such that front portion 6b of complementary part 6 is formed by axial extension 8g of front mounting segment 8c. Front mounting segment 8c comprises coupling recess 8e elastically coupleable to at least one complementary projection 15c provided in one side in internal circumferential edge 15b of front opening 15a of wash tub 15. Water duct 5 is formed between said extensions 8f, 8g from rear mounting segment 8a and front mounting segment 8c, joining segment 8b, and internal circumferential edge 15b of front opening 15a of wash tub 15; Extension 8g of front mounting segment 8c is penetrated by through-holes 6f communicating with the water duct 5.

In the seventh embodiment of the annular portal assembly shown in Figures 15 and 16, complementary part 6 comprises elastic flap 19 having first straight segment 19a that protrudes from one side of joining segment 8b of first lip 8, second straight segment 19b that has free end 19c, and connecting segment 19d that connects first straight segment 19a with second straight segment 19b. Second straight segment 19b constitutes front portion 6b of complementary component 6. Joining segment 8b and second straight segment 19b are provided with means for complementary coupling 8e, 19d with one another, to couple second straight segment 19b with joining segment 8b in such a manner as to form water duct 5 when second straight segment 19b is coupled with joining segment 8b, between said straight segments 19a, 19b, said connecting segment 19d of elastic flap 19, and said joining segment 8b. The coupling means comprises annular coupling flange 19e protruding from the internal

side of second straight segment 19b of elastic flap 19 and coupling recess 8e provided in joining segment 8b of first lip 8. Connecting segment 19d is elastic and, in the non-coupled position of second straight segment 19b to joining segment 8b, first straight segment 19a and second straight segment 19d define an angle of less than 90° between one another.

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While complementary part 6 extends along the entire length of rib 4 in the embodiments shown in Figures 2 through 16, it is also possible that complementary part 6 is integrated only in one area of second rib 4 that, in the mounted position of annular portal assembly 1, will be arranged in the upper portion of internal circumferential edge 15b of front opening

10 15a.

REFERENCE NUMERALS

5	1	Annular portal assembly
	2	Annular body
	3	First rib
	4	Second rib
	4a	Annular cavity
10	5	Water duct
	5a	First end
	5b	Second end
	6	Complementary part
	6a	Casing
15	6b	Front portion
	6c	Insertion slot
	6d	Coaxial edges
	6e	Free gap
	6f	Through-holes
20	7	Sprayer nozzles
	7a	Sleeves
	8	First lip
	8a	Rear mounting segment
	8b	Joining segment
25	8c	Front mounting segment
	8d	Protruding part
	8e	Coupling recess
	8f	Rear mounting segment extension
	8g	Front mounting segment extension
30	9	Tube
	9a	Supply duct
	10	Flanges
	11	Connector

	11a	Internal duct
	12	Water supply system
	13	Washing machine
	13a	Water supply duct
5	13b	Detergent compartment
	13c	Inlet duct
	13d	Outlet duct
	14	Loading hatch
	14a	Frame
10	14b	Loading door
	14c	Window
	15	Wash tub
	15a	Front opening
	15b	Internal circumferential edge
15	15c	Complementary projection
	15d	External circumferential edge
	15e	Thickened part
	16	Basket
	16a	Front access opening
20	17	Housing
	17a	Front wall
	18	Second lip
	19	Elastic flap
	19a	First straight segment
25	19b	Second straight segment
	19c	Free end
	19d	Connecting segment
	19e	Coupling flange

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CLAIMS

- 5 1. Annular portal assembly for a front-loading washing machine having a laundry soaking system, comprising an annular body (2) having
- a first annular rib (3) mountable on a frame (14a) of a loading hatch (14) of a washing machine (13), and a second annular rib (4) mountable on an internal circumferential edge (15b) of a front opening (15a) of a wash tub (15) of a washing machine (13) wherein rotates
- 10 a wash drum basket (16) that comprises a front access opening (16a) facing the front opening (15a) of the wash tub (15);
- characterized** in comprising
- a water duct (5) connectable to a water supply system (12) and integrated into a complementary part (6) of the second rib (4) of the annular body (2) that, in the mounted position
- 15 of the annular portal assembly (1), will be arranged in at least one upper portion of the internal circumferential edge (15b) of said front opening (15a); and,
- at least one and preferably a plurality of sprayer nozzles (7) communicating with the water duct (5) and arranged in a complementary part (6) in radial positions that, in a mounted state of the annular portal assembly (1), will be located in a front portion (6b) of the complementary component (6) to eject water provided from the water duct (5) to the wash basket
- 20 (16) through said front access opening (16a).
2. Annular portal assembly according to Claim 1, characterized in that the second rib (4) has a first lip (8) comprising the complementary part (6) and that is mountable to the internal circumferential edge (15b) of the front opening (15a) of the wash tub (15).
- 25 3. Annular portal assembly according to Claim 2, characterized in that the first lip (8) comprising
- a rear mounting segment (8a) externally mountable about the front opening (15a) of
- 30 the wash tub (15), and
- a front mounting segment (8c) internally mountable about the front opening (15a) of the wash tub (15), and joined to the rear mounting segment (8a) by a joining segment (8b).

4. Annular portal assembly according to Claim 3, characterized in that

the complementary part (6) is formed through the two axial extensions (8f, 8g) from the rear mounting segment (8a) and front mounting segment (8c) that protrude into the front opening (15a) of the wash tub (15) and that comprise ends joined by the joining section (8b);

5 The front portion (6b) of the complementary part (6) is formed through the axial extension (8g) of the front mounting segment (8c);

the water duct (5) is formed between said extensions (8f, 8g) from the rear mounting segment (8a) and front mounting segment (8c), the joining segment (8b), and the internal circumferential edge (15b) of the front opening (15a) of the wash tub (15);

10 the extension (8g) of the front mounting segment (8c) is penetrated by through-holes (6f) communicating with the water duct (5).

5. Annular portal assembly according to Claim 4, characterized in that at least one of the mounting segments (8a, 8c) comprises a coupling recess (8e) elastically coupleable to at least one complementary projection (15c) provided in one side in the internal circumferential edge (15b) of the front opening (15a) of the wash tub (15).

6. Annular portal assembly according to Claim 4, characterized in that each one of the mounting segments (8a, 8c) comprise a coupling recess (8e) elastically coupleable to at least one complementary projection (15c) provided in one side in the internal circumferential edge (15b) of the front opening (15a) of the wash tub (15).

7. Annular portal assembly according to Claims 4, 5, or 6, characterized in that

25 the water duct (5) comprises a tube (9) arranged in a casing (6a) in said complementary part (6) and communicating with the sprayer nozzles (7) by means of respective sleeves (7a);

the tube (9) is provided with a fastening means to fasten the tube (9) to the internal circumferential edge (15b) of the front opening (15a) of the wash tub (15);

30 the casing (6a) is formed between the internal circumferential edge (15b) of the front opening (16a) of the wash tub (15), the joining segment (8b), the extensions (8f, 8g) of the rear mounting segment (8a) and the front mounting segment (8c) of the first lip (8);

the joining segment (8b) and the extensions (8f, 8g) of the rear mounting segment (8a) and the front mounting segment (8c) engage the tube (9).

8. Annular portal assembly according to Claim 7 characterized in that the fastening means comprises a plurality of pairs of flanges (10) protruding from the exterior periphery of the tube (9) and engaged by the extensions (8f, 8g) of the rear mounting segment (8a) and the front mounting segment (8c).

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9. Annular portal assembly according to Claim 3, characterized in that

the joining segment (8b) contacts the internal circumferential edge (15b) of the front opening (15a) of the wash tub (15);

the complementary part (6) is integrated into a protruding part (8d) of said joining segment (8b) that projects toward the interior of the front opening (15a) of the wash tub (15);

the front portion (6b) of the complementary part (6) forms part of said protruding part (8d).

10. Annular portal assembly according to Claim 3, characterized in that

the joining segment (8b) contacts the internal circumferential edge (15b) of the front opening (15a) of the wash tub (15);

the complementary part (6) is integrated into the front mounting segment (8c);

the front portion (6b) of the complementary part (6) forms part of the front mounting segment (8c).

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11. Annular portal assembly according to Claim 9 or Claim 10, characterized in that the complementary part (6) is a solid body through which the water duct (5) extends.

12. Annular portal assembly according to Claim 9, characterized in that

the complementary part (6) comprises an elastic flap (19) having a first straight segment (19a) that protrudes from one side of the joining segment (8b) of the first lip (8), a second straight segment (19b) that has a free end (19c), and a connecting segment (19d) that connects the first straight segment (19a) with the second straight segment (19b);

the joining segment (8b) and the second straight segment (19b) are provided between one another with complementary coupling means (8e, 19d) for coupling the second straight segment (19b) to the joining segment (8b);

when the second straight segment (19b) is coupled to the joining segment (8b), the water duct (5) is formed between said straight segments (19a, 19b), said connecting segment (19d) of the elastic flap (19), and said joining segment (8b).

13. Annular portal assembly according to Claim 12, characterized in that the coupling means comprises at least one coupling flange (19e) coupleable to a coupling recess (8e).

14. Annular portal assembly according to Claim 13, characterized in that the coupling flange (19e) is provided in said second straight segment (19b) of the elastic flap (19) and the coupling recess (8e) is provided in the joining segment (8b) of the first lip (8).

15. Annular portal assembly according to Claim 12, Claim 13, or Claim 14, characterized in that the connecting segment (19d) is elastic such that in the non-coupled position of the second straight segment (19b) and the joining segment (8b), the first straight segment (19a) and the second straight segment (19b) form an angle of less than 90° between the two.

16. Annular portal assembly according to any one of Claims 12 through 15, characterized in that the second straight segment (19b) constitutes the front portion (6b) of the complementary component (6).

17. Annular portal assembly according to Claim 9, Claim 10, or Claim 11, characterized in that

the front portion (6b) of the complementary part (6) comprises an insertion slot (6c) defined between coaxial edges (6d) with the water duct (5);

The water duct (5) comprises a tube (9) inserted into a casing (6a) in said complementary part (6) through the insertion slot (6c);

the sprayer nozzles (7) form part of the tube (9).

18. Annular portal assembly according to Claim 17, characterized in that the sprayer nozzles (7) are openings in the respective open ends of the two sleeves (7a) provided in the tube (9).

19. Annular portal assembly according to Claim 17, characterized in that

the tube (9) is encased in the casing (6a) pressing strongly against the coaxial edges (6d) of the insertion slot (6c) to separate them leaving a free gap (6e) that extends coaxially with the tube (9) and that, in the mounted position of the portal assembly (1), will be oriented to face the front access opening (16a) of the basket (16);

the sprayer nozzles (7) form part of the tube (9) and are arranged to correspond with the free gap (6e).

20. Annular portal assembly according to Claim 19, characterized in that the sprayer nozzles (7) are holes in the tube (9).

21. Annular portal assembly according to Claim 18, characterized in that

- 5 the front portion (6b) of the complementary part (6) comprises through-holes (6f) communicating with the casing (6a) that, in the mounted position of the portal assembly (1), will be oriented to face the front access opening (16a) of the basket (16);
 the sleeves (7a) extend through said through-holes (6f).

- 10 **22.** Annular portal assembly according to any one of the preceding claims, characterized in that the water duct (5) comprises at least one connector (11) connectable to the water supply system (12) of the washing machine (13).

- 15 **23.** Annular portal assembly according to Claim 22, characterized in that the water duct (5) comprises a first end (5a) connected to the connector (11) and a closed second end (5b).

- 20 **24.** Annular portal assembly according to any one of the preceding claims, characterized in that the sprayer nozzles (7) are arranged in radial positions spaced apart from one another along the length of the complementary part (6).

25. Annular portal assembly according to any one of the preceding Claims 1 through 23, characterized in that the sprayer nozzles (7) are arranged in radial positions spaced apart from one another along the length of only one segment of the complementary part (6).

- 25 **26.** Annular portal assembly according to any one of the preceding claims, characterized in that the complementary part (6) is integrated into a zone of said second rib (4) that, in the mounted position of the annular portal assembly (1), will be arranged in the upper portion of the internal circumferential edge (15b) of said front opening (15a).

- 30 **27.** Annular portal assembly according to any one of the preceding claims, characterized in that the complementary part (6) extends along the entire length of the rib (4).

28. Front-loading washing machine, comprising

a loading hatch (14) in a front wall (17a) of a housing (17), a wash tub (15) having a front opening (15a) and mounted inside the housing (17) wherein rotates a wash drum basket (16) comprising a front access opening (16a);

5 an annular portal assembly (1) comprising an annular body (2) having a first annular rib (3) mounted on a frame (14a) of the loading hatch (14) of the washing machine (13) and a second annular rib (4) mounted on the front opening (15a) of the wash tub (15);

a laundry forced soaking system comprising a sprayer system connected to a water supply system (12) that guides water into the basket (16) through said front access opening
10 (16a);

characterized in that the annular portal assembly is that defined in any one of the Claims 1 through 27, and that comprises a water supply system (12) connected to the water duct (5).

15

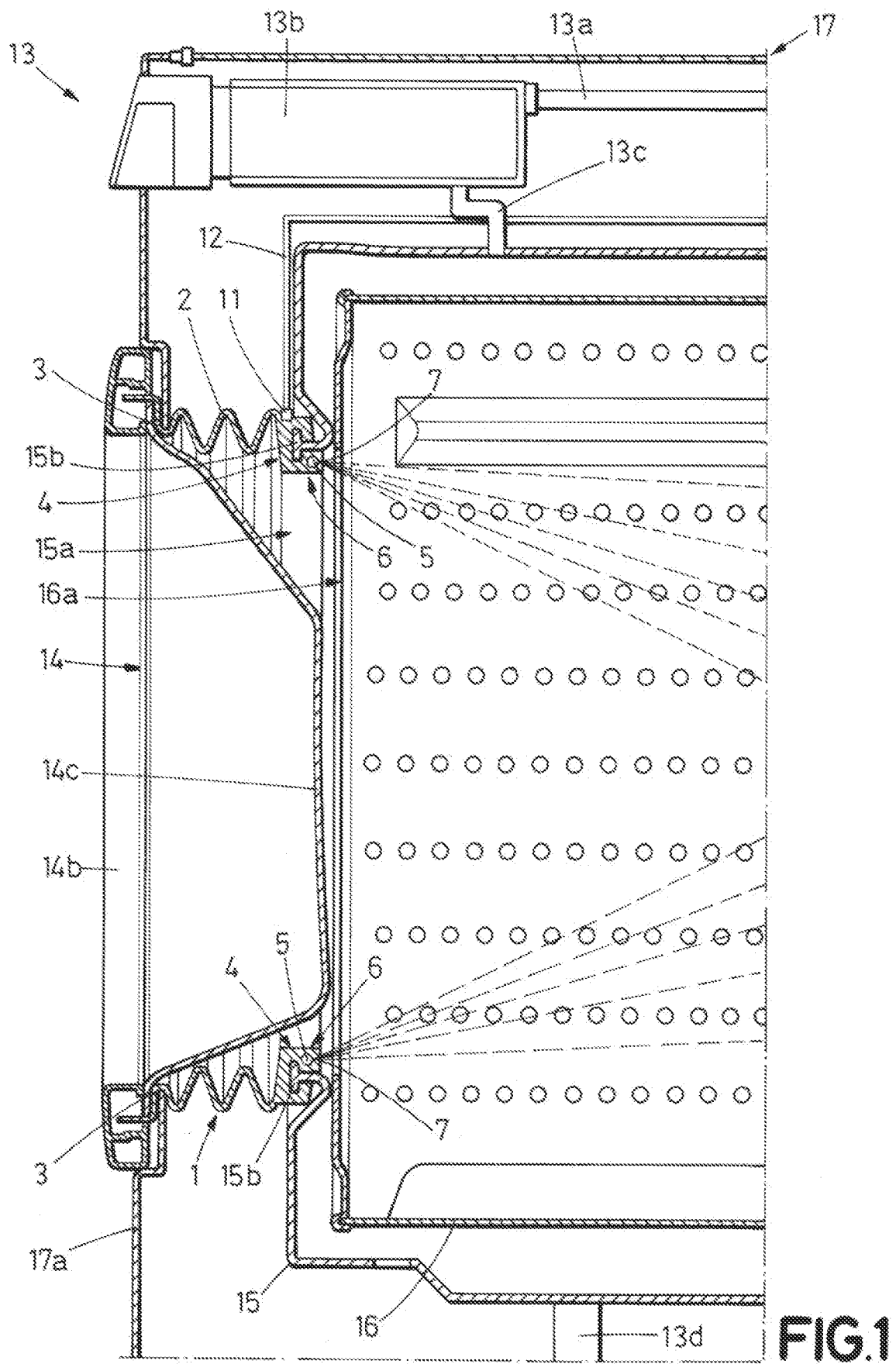
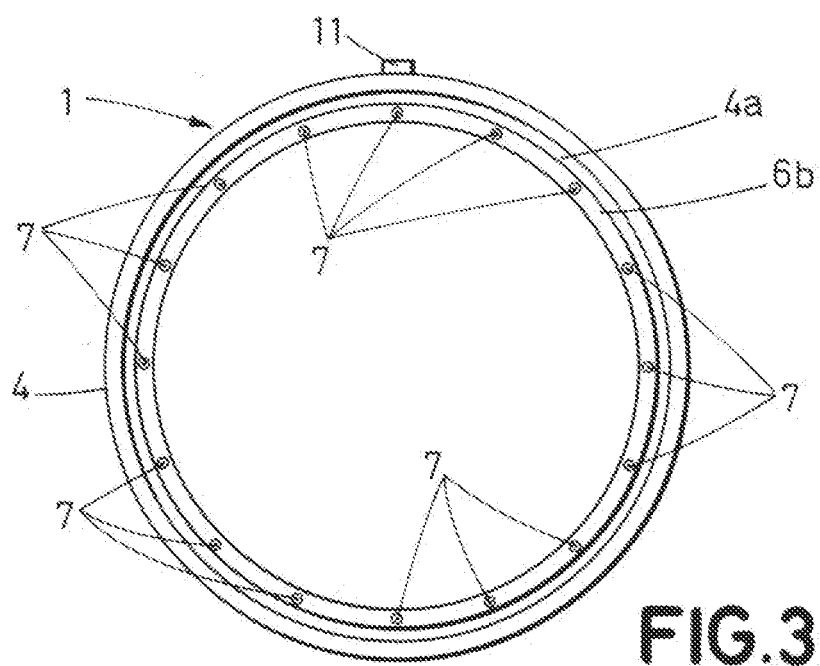
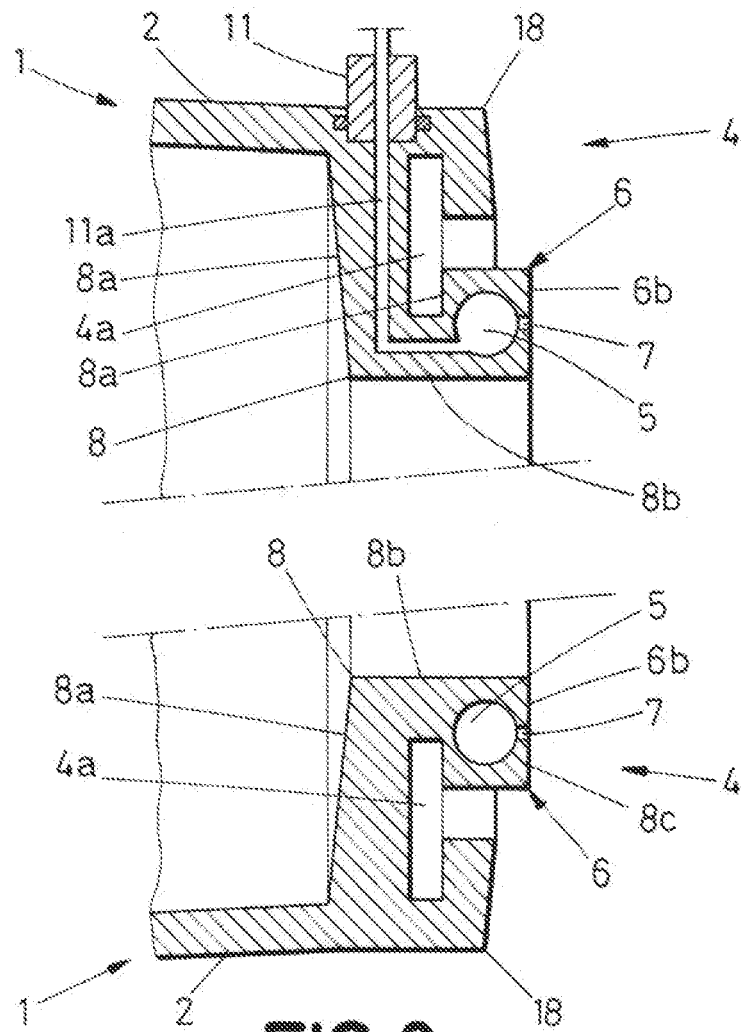
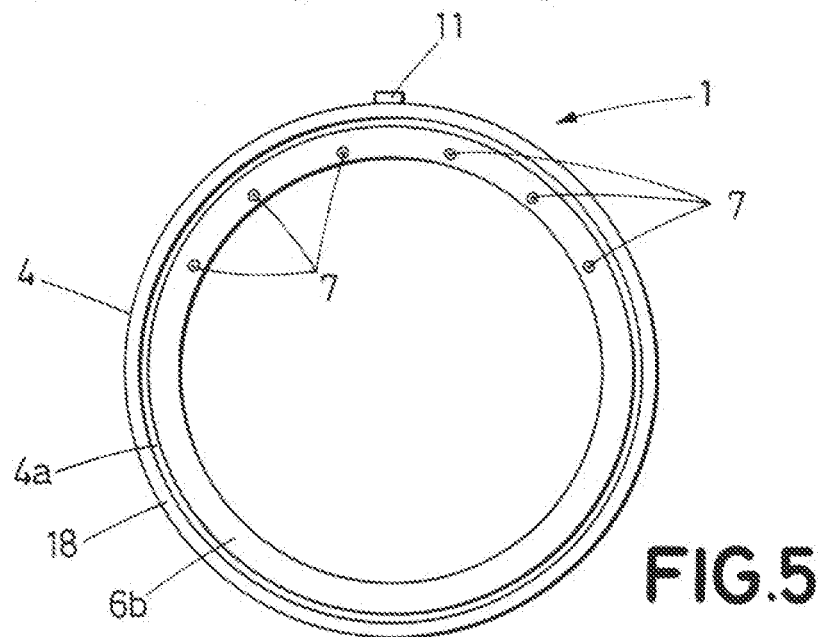
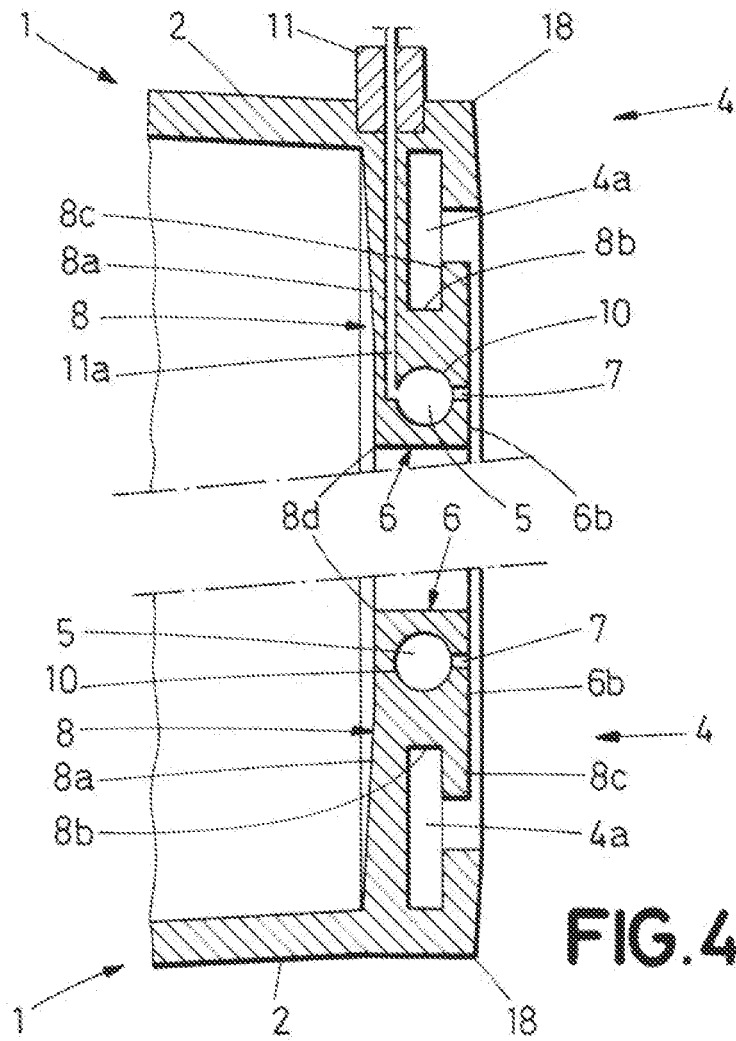


FIG.1





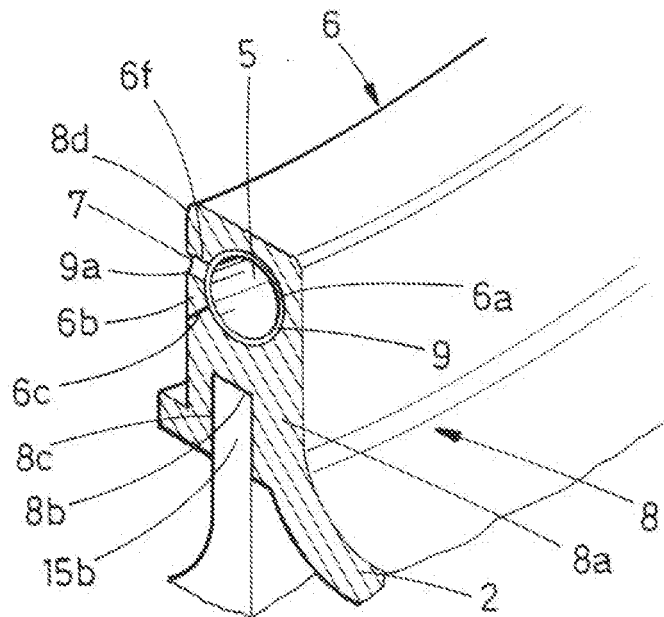


FIG. 6

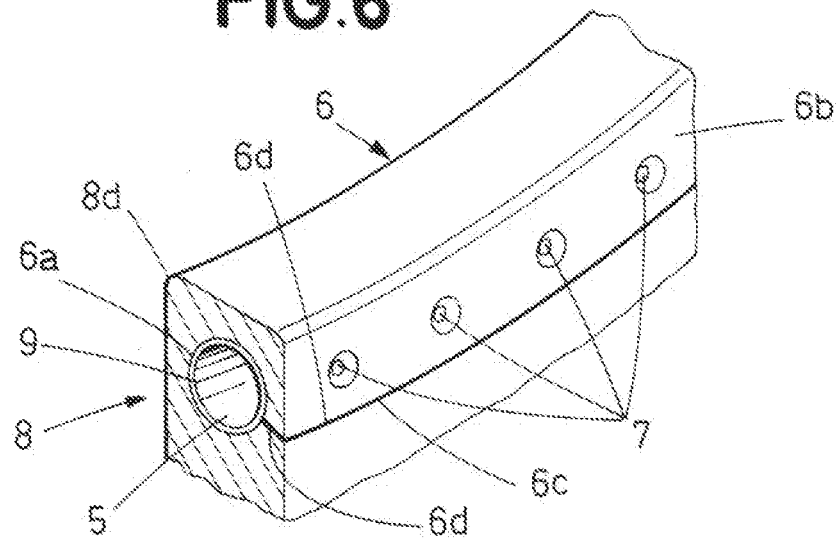


FIG. 7

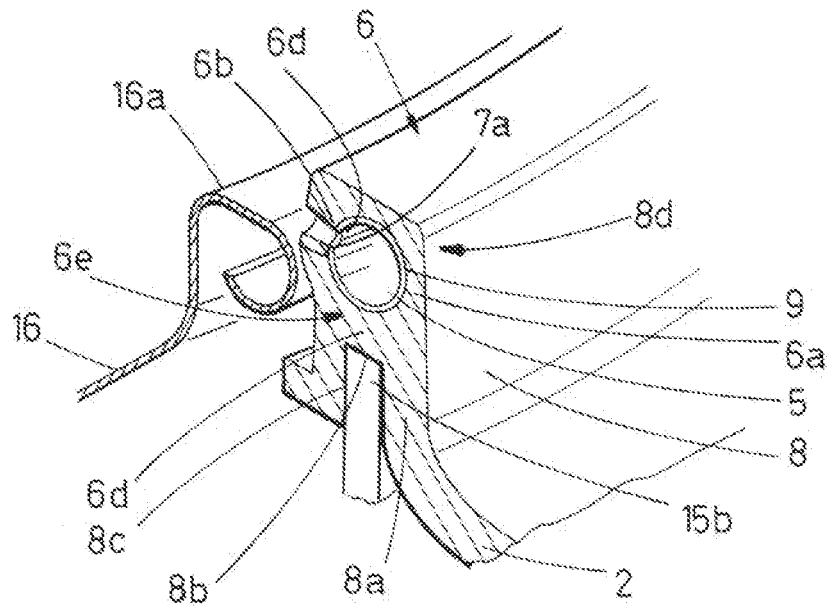


FIG. 8

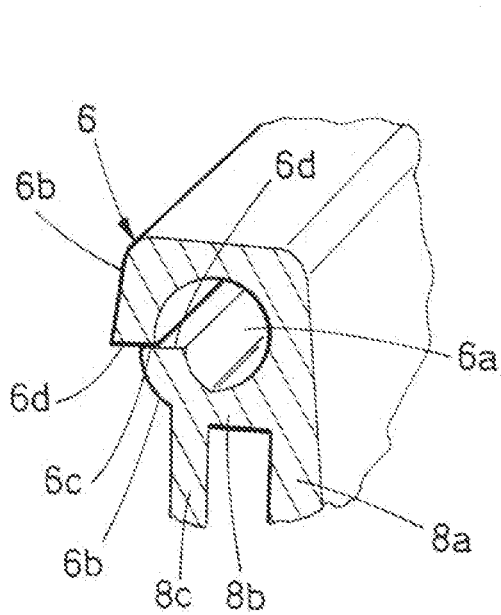


FIG. 9

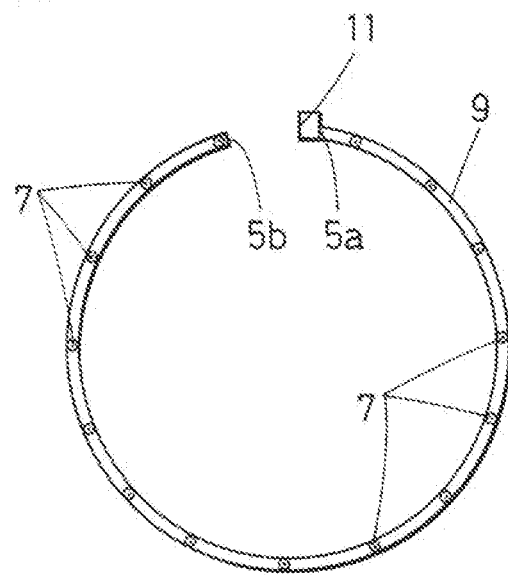


FIG. 10

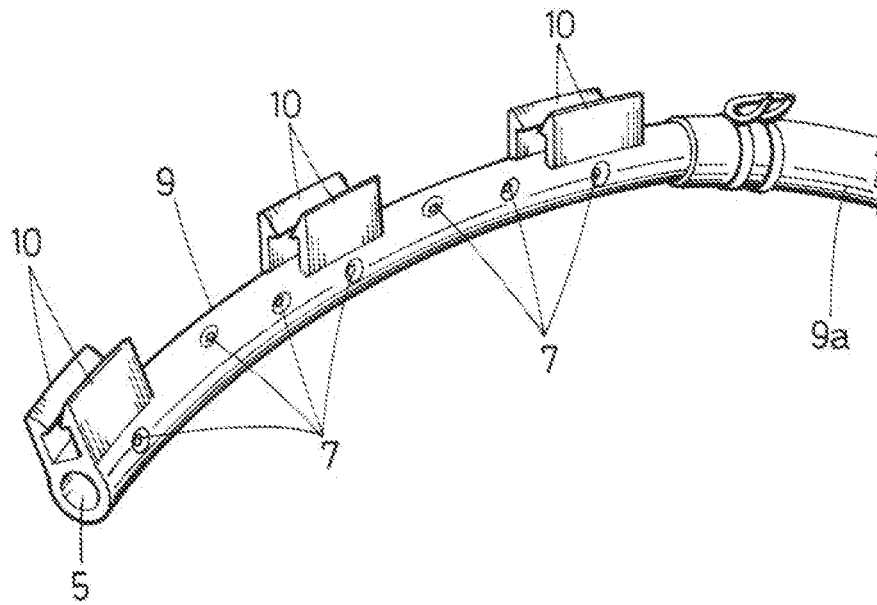


FIG.11

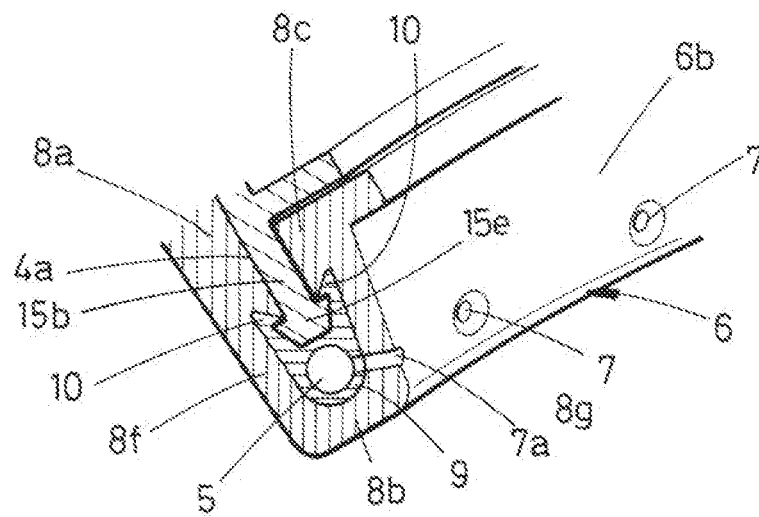


FIG.12

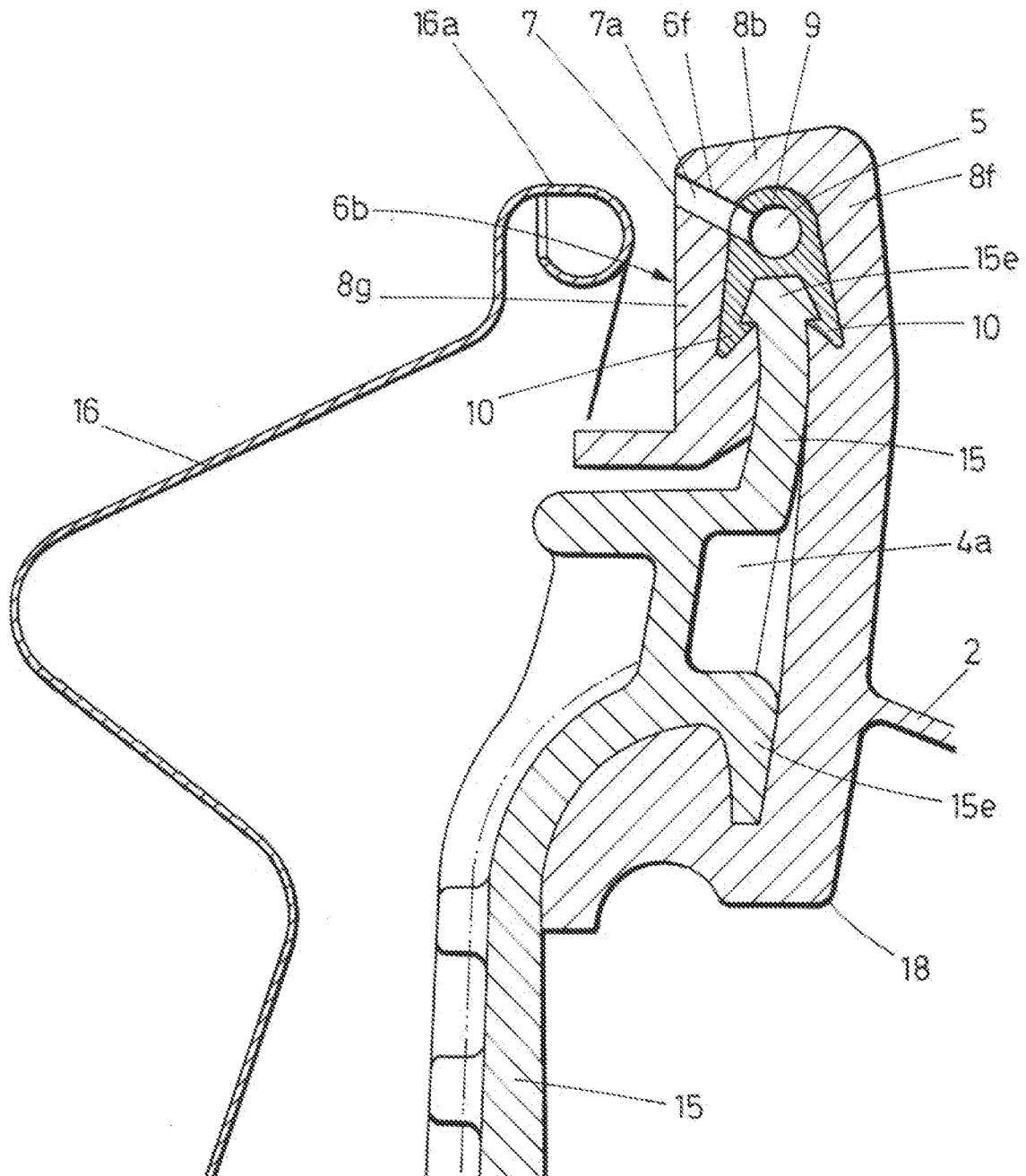


FIG.13

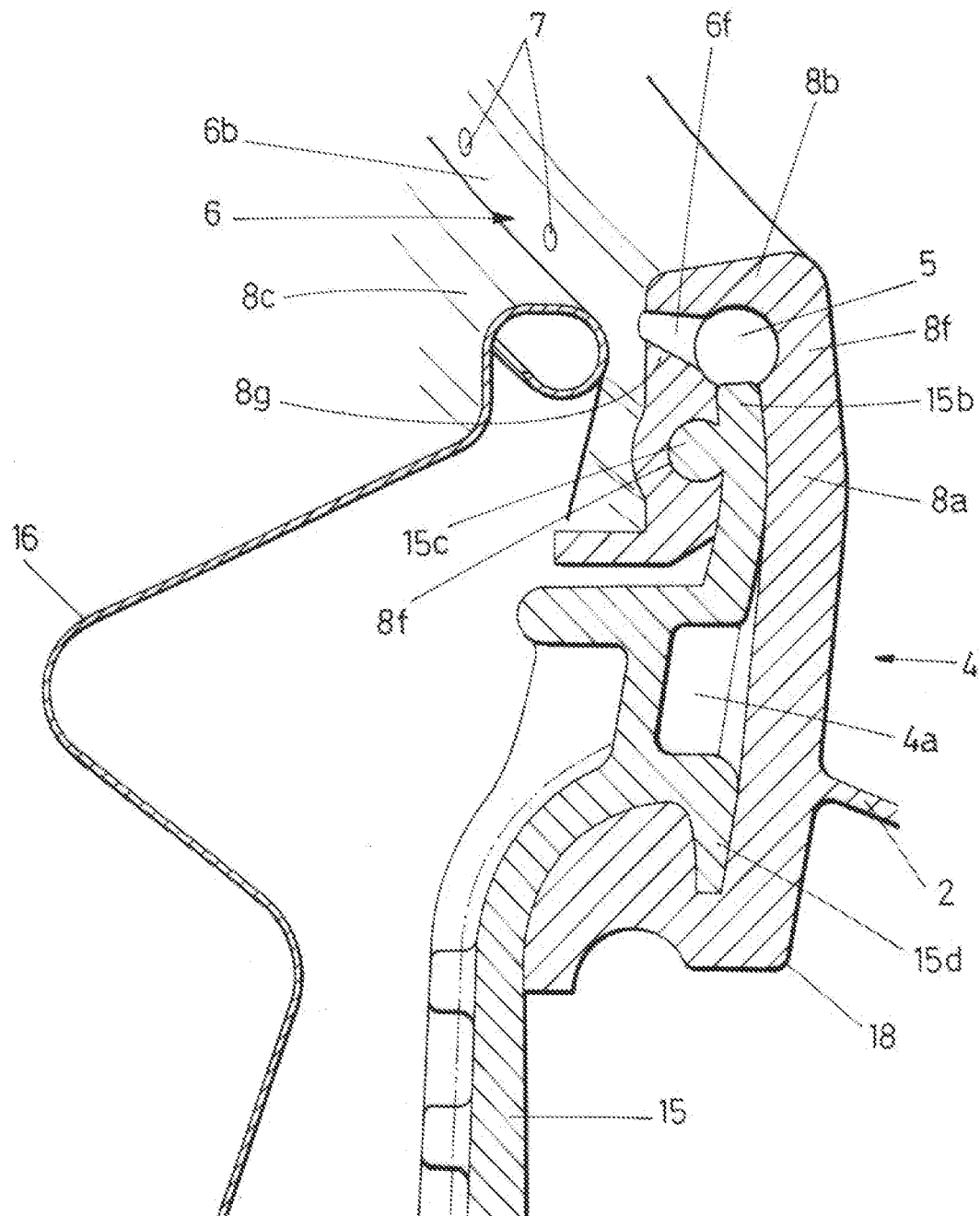


FIG. 14

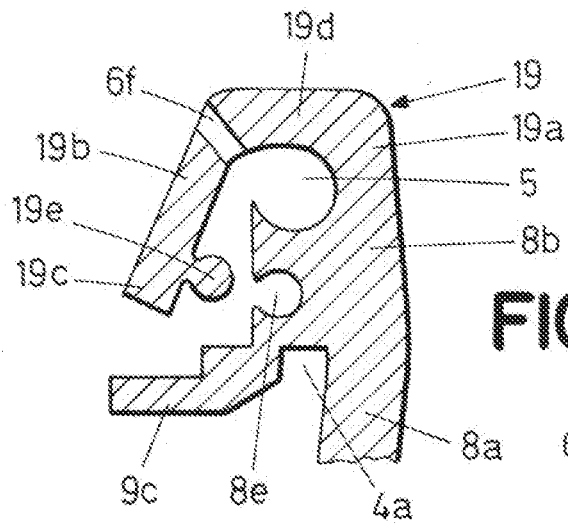


FIG.15

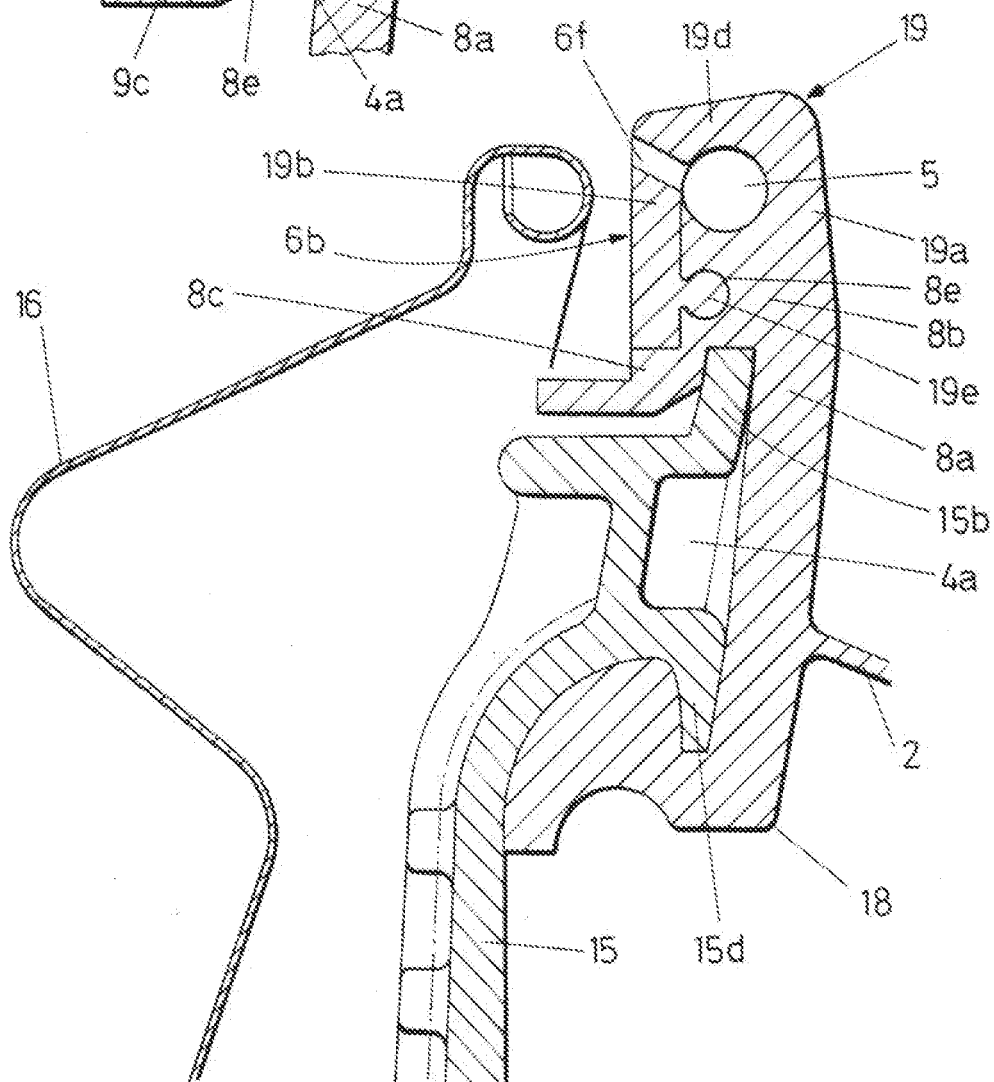


FIG.16

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/056802

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F39/08 D06F37/26
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	----- WO 2006/027149 A1 (MIELE & CIE [DE]; BLOMBERG BARBARA [DE]; FECHLER MARION [DE]; KRETSCHM) 16 March 2006 (2006-03-16) the whole document ----- -/--	1-3,22, 26,28



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

31 January 2014

Date of mailing of the international search report

07/02/2014

Name and mailing address of the ISA/

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Authorized officer

Prosig, Christina

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/056802

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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