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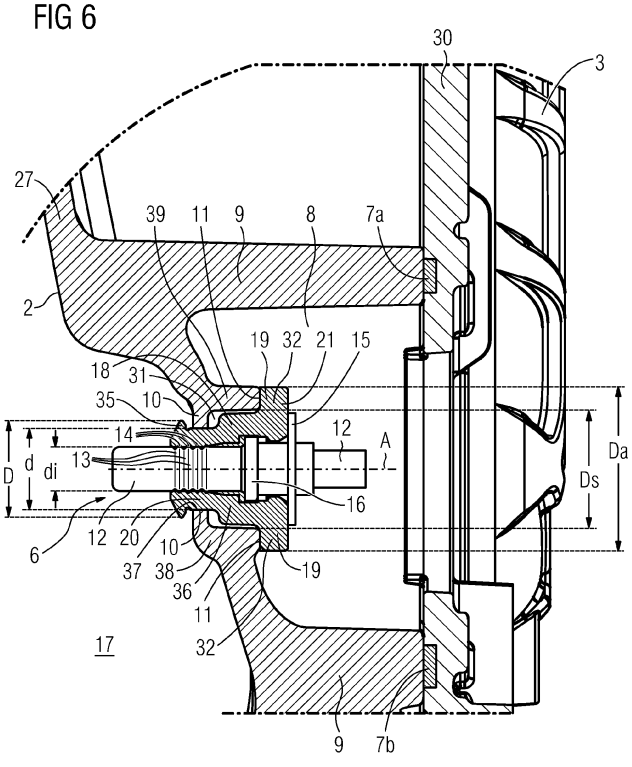
(54) Laundry machine with sensor unit

(57) Laundry machine such as a washer/dryer or a washing machine, comprising:
- an interior space (17) for receiving laundry to be treated;
- at least one sensor unit (6) for sensing at least one process parameter of a laundry treatment process performed by the laundry machine within its interior space (17);
- wherein the sensor unit (6) comprises at least one gasket (18) and at least one sensor probe body (12), wherein the sensor probe body (12) is fixedly arranged within the gasket (18);
- wherein the gasket (18) of the sensor unit (6) is fixedly mounted in a gasket seat (38) of the laundry machine;
- wherein said gasket (18) comprises at least one force receiving element (22, 32) adapted to receive and to transfer a rotational force to said gasket (18).

FIG 6



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Description

[0001] The present invention relates to a laundry machine such as a washer/dryer or a washing machine.

[0002] Laundry machines usually comprise one or more kinds of sensors for measuring or detecting process parameters of the laundry treatment process. Some of these sensors have sensor probes which have to be placed within an interior space of a laundry treatment container, e.g. a tub, in what the laundry treatment process is operated. Parameters of the laundry treatment process to be sensed may be for example the temperature or the concentration of moisture in the atmosphere of the laundry treatment container or the humidity of the laundry which is placed inside the container.

[0003] The sensor probe can be arranged in a seat in a wall of the laundry treatment container, the detecting or measuring part of the sensor probe thereby within the interior space of the laundry treatment container and a part having electric or electronic connecting means on the outside of the laundry treatment container.

[0004] The walls of the laundry treatment container usually comprise rib structures on the exterior side for structural enforcing the stability of the laundry treatment container. Further, e.g. washing machines with drying function can have additional components such as condensers which have to be arranged or attached to the wall of the laundry treatment container on the exterior side.

[0005] Such rib structures or additional parts complicate or impede the arrangement of the sensor probe in a desired position. Also the handling of the sensor probe in the mounting process is made difficult.

[0006] The document EP 1 458 921 B1 discloses a water storage tub of a washing machine with a through hole, through which a fore end of a sensor is exposed to an inside of the water storage tub. For firm fixation of the sensor, the sensor has a mounting plate fastened to a fastening boss by fastening screws. A sealing material is applied between the mounting plate and the water storage for prevention of washing water leakage through the pass through hole for the sensor.

[0007] However, this arrangement has the disadvantages to have no optimized sealing properties, to be difficult to assemble and to need additional fastening structures for applying the fastening screws.

[0008] To improve this arrangement said document describes a sensor that is fitted to the outside surface of the water storage tub firmly as the sensor is inserted into the pocket in the water storage tub from a fore end and a fixing plate seated on bosses is fastened with screws. Once the sensor is fitted thus, the sensor can receive the temperature of the water storage tub because the fore end of the sensor is in close contact with the pocket in the water storage tub. Thus, the washing water temperature can be measured indirectly.

[0009] This arrangement is only useful in a region of the washing tub where water is stored over a sufficient time, because a temperature equilibrium has to be reached between water, tub wall and sensor. E.g. air temperatures cannot be measured reliable in such way.

[0010] Furthermore these arrangements are not adapted to be mounted to a tub wall having a complex rib structure.

[0011] It is an object of the present invention to provide a laundry machine such as a washer/dryer or a washing machine with a sensor unit having good sealing properties and adapted to be mounted in positions on a tub wall where the installation space is small and where obstacles are formed by other parts of the appliance.

[0012] These objects of the present invention are achieved by a laundry machine having the features according to the characterizing portion of claim 1. Preferred embodiments and improvements according to the invention are claimed in the dependent claims.

[0013] According to the present invention a laundry machine such as a washer/dryer or a washing machine, comprises:

- an interior space for receiving laundry to be treated;
- at least one sensor unit for sensing at least one process parameter of a laundry treatment process performed by the laundry machine within its interior space;
- wherein the sensor unit comprises at least one gasket and at least one sensor probe body, wherein the sensor probe body is fixedly arranged within the gasket;
- wherein the gasket of the sensor unit is fixedly mounted in a gasket seat of the laundry machine;
- wherein the gasket comprises at least one force receiving element adapted to receive and to transfer a rotational force to said gasket.

[0014] The possibility to apply rotational forces and, thus, rotational movement to the gasket with respect to the gasket seat in addition to the known translational or pushing forces and movement facilitates the mounting of the sensor unit in particular when there is only little space. Therefore, a rotational force can be applied to the gasket in the mounting process and the pushing-in of the gasket is easier. It is possible to push the gasket forward in its intended position at the laundry machine and at the same time to rotate it into the gasket seat. Thus, it is possible to move the sensor unit in its intended position also in an inclined manner which results in an easier mounting process.

[0015] In a preferred embodiment said at least one force receiving element is formed by at least one engagement recess and/or by at least one engagement tongue (or wing, or protrusion), preferably an alternating arrangement of at least two engagement recesses and at least two engagement tongues (or wing or protrusions), which can be gripped e.g. by a thumb and an index finger.

[0016] Advantageously, the force receiving element(s) is/are adapted to fingers of a hand (of a worker) or to

engagement elements of a tool so that for applying a rotational force fingers of a hand or engagement elements of a tool can engage in each force receiving element, in particular engagement recess and/or engagement tongue.

[0017] In an advantageous embodiment the gasket has a contact portion and a clamping portion and, preferably, also an intermediate portion arranged between the contact portion and the clamping portion; the contact portion rests, in the mounted state, on a bearing surface of the gasket seat, preferably in plane contact, and the clamping portion is, in the mounted state, clamped in a through-hole of the gasket seat; if provided, the intermediate portion is, in the mounted state, arranged in a receiving space surrounded by a circumferential wall at a distance from the circumferential wall, wherein the bearing surface is preferably provided at the circumferential wall. This embodiment has good sealing characteristics.

[0018] In an advantageous embodiment the force receiving element(s) is/are provided in an end face of the gasket. The end face is preferably arranged at the contact portion and, in the mounted state, on an opposite side opposite to the bearing surface of the gasket seat.

[0019] Furthermore, the gasket can have a securing portion at the clamping portion being, in the mounted state, snapped into the through-hole for axially securing the gasket in one direction.

[0020] Preferably, each or the at least one engagement recess is open, i.e. has no side wall, at the outside or at the circumference of the end face or the contact portion.

[0021] In a preferred embodiment at least one pair or pairs of two engagement recesses and/or two engagement tongues (or wings or protrusions) are diametrically opposed which allows for a symmetric and easy gripping.

[0022] Preferably, steps are formed in the side walls of the engagement recesses and/or engagement tongues or wings or protrusions) for an improved gripping of the gasket.

[0023] In a specific embodiment the force receiving element(s) is/are shaped like ring segments.

[0024] In an advantageous embodiment said laundry machine comprises a tub unit having at least one tub wall and the at least one through hole of the gasket seat is provided in said tub wall, wherein, preferably, said sensor unit is fixedly mounted to said through hole.

[0025] Further advantageous is an embodiment where the end face of the gasket is arranged on the exterior side of the tub unit in a mounted state of the sensor unit. Thus, the sensor probe unit can be mounted or installed to the tub unit from the exterior of the tub in a mounting process. The sensor probe unit is easy to install.

[0026] In order to provide a good sealing between gasket and sensor probe body and a reliable positioning of the sensor probe body with respect to the gasket which enables reliable and reproducible measurement of the process parameters the following measures can be provided alone or in combination:

- In one advantageous embodiment the sensor probe body is fixed in a central hole of the gasket and comprises at least one clamping rib co-operating with at least one clamping groove in the central hole of the gasket or vice versa (i.e. rib(s) in the hole and grove (s) in the sensor probe body).

- In a further advantageous embodiment the sensor unit comprises at least one ring arranged within the gasket and/or at least one flange which are fixedly attached to said sensor probe body and preferably resting, in the mounted state, on the end face of the contact portion.

[0027] In such a configuration the sensor probe body is secured to the gasket in a way that safely fixes the sensor probe body in its position relative to the gasket. Further ring and flange improve the tightness between sensor probe body and gasket. According to a further advantageous embodiment of the invention said ring and said flange impede a movement of the sensor probe body relative to the gasket along its longitudinal extension.

[0028] According to a further advantageous embodiment of the invention said sensor unit is arranged in a region of the tub wall that is covered by a condenser wall, wherein the condenser wall has an opening through which the sensor unit can be installed to the tub wall of said tub unit in a mounting process.

[0029] The sensor unit is particularly advantageous when it is used in a region of the tub where the condenser is arranged. The sensor unit can be mounted easily to the tub wall even so when the accessibility of the intended seat of the sensor probe unit in the tub wall is limited.

[0030] In a further advantageous embodiment of the invention the tub unit has a flow channel formed thereto, through which drying air can be fed to a condenser unit which is provided on the exterior side of the tub unit, wherein said sensor unit is arranged in a region of the flow channel to sense the temperature of the drying air streaming within the flow channel.

[0031] The gasket can be mounted from outside the tub into an advantageous position where the flow channel is arranged and where the air flowing through the flow channel can be measured reliably.

[0032] According to a further advantageous embodiment of the invention a tool (for example a sort of screwdriver which engaging head is substantially countershaped to the force receiving element, so as to be able to engage this element for transmitting a force to the latter) is provided having at least one engagement element for cooperating with said at least one force receiving element.

[0033] Such a tool could be used manually or connected to a machine and facilitates the reliable mounting and reproducible positioning of the sensor unit.

[0034] In a further advantageous embodiment said tool has a plurality of engagement elements for engaging into corresponding engagement recesses of said gasket and

adapted to mount the sensor unit as a whole into the through hole of the tub wall by a forward movement and a rotational movement.

[0035] A tool of such configuration allows manual or automatic mounting of the gasket in a reliable and repeatable way.

[0036] A non limiting embodiment of the invention will be described further with reference to the enclosed drawings, in which

FIG 1 illustrates a perspective view of a laundry machine according to the invention, comprising a laundry treatment assembly, in which some parts have been removed;

FIG 2 shows a rear view of a laundry treatment assembly according to the invention comprising a sensor unit;

FIG 3 illustrates a sectional view of a gasket seat for the gasket of the sensor unit according to the invention;

FIG 4 depicts a gasket according to the invention for the sensor unit in a perspective view;

FIG 5 shows a sensor unit having a gasket according to FIG 4 in a perspective view,

FIG 6 illustrates a sensor unit according to FIG 5 with its gasket mounted in the gasket seat according to FIG 3 in a sectional view;

FIG 7 illustrates a sensor unit according to FIG 5 with its gasket mounted in the gasket seat according to FIG 3 in another sectional view where the gasket is rotated in comparison to FIG 6;

FIG 8 shows in a front view the internal side of the back wall of the tub assembly of the laundry treatment assembly according to FIG 1 and 2.

[0037] The laundry machine 40 shown in FIG 1 (which in this case is advantageously a washer/drier, i.e. a washing machine comprising also drying functions) comprises a laundry treatment assembly 1 built-in the laundry machine 40. Laundry machine 40 has a housing with a front wall 41, side walls 42 and a rear wall 43. A front door 44 is provided in the front wall 41 for providing access to a treatment chamber of the laundry treatment assembly 1. Further a hot air duct 45 is advantageously coupled to the laundry treatment assembly 1 for providing a flow of hot or warm air to the treatment chamber.

[0038] FIG 2 illustrates a rear view of a laundry treatment assembly 1 which, as mentioned above, in this advantageous example is be comprised in a washing machine with drying function (so called washer/dryer). However, the claimed invention can be applied also to a washing machine without drying function or any other laundry treatment appliance with the need for a sensor application as exemplified and described below. Rear view means that the side of the laundry treatment assembly 1 which is shown in FIG 2 corresponds to the rear side of the appliance where the laundry treatment assembly 1 is built in.

[0039] The laundry treatment assembly 1 comprises a tub unit 2 and preferably a condenser unit 3. In the drying process heated air, coming from the hot air duct 45, is passed through the laundry which is placed inside a drum (not shown) arranged within the tub unit 2. The air is then guided into the condenser unit 3, wherein the air is cooled down and the water vapour is preferably condensed into a drain pipe or tank or is given to the sump 25 which is provided in a bottom part of the tub unit 2.

[0040] The condenser unit 3 has a condenser wall 30, wherein the condenser unit 3 is arranged relative to the tub unit 2 in such a way that a condenser wall 30 covers a part of a back wall 27 of the tub unit 2.

[0041] The tub unit 2 has preferably several support structures 4 by means of which a motor can be fixed to the tub unit 2. A back wall 27 of the tub unit 2 advantageously comprises a plurality of enforcement ribs 5 which provide additional stability for the tub unit 2, in particular, when the tub unit is made from plastic material. Also the condenser unit can be made from plastic material and can be advantageously provided with ribs for additional stability and support. One or more bushings 24 are advantageously integrated within the tub unit 2 serving as support or as a bearing for the rotating shaft of the drum.

[0042] A sensor unit 6 is attached to the laundry treatment assembly 1, preferably in a recess formed in the tub unit 2, more preferably the recess being made also in the condenser unit 3, as in the example of FIG 2. The recess is preferably provided in a region between two enforcement ribs of the condenser, in such a configuration, that the enforcement ribs almost need not to be discontinued and still a stable structure of the condenser wall is provided. The sensor unit 6 is preferably arranged in a lower region of the tub unit 2, but advantageously distanced from the sump 25 and preferably in a region where the condenser unit 3 is attached to the tub unit 2.

[0043] FIG 3 shows the recess of the tub unit 2 without the sensor unit 6. The recess is formed as a gasket seat 38 for receiving and holding a gasket 18 of the sensor unit 6 as is shown in the mounted state in FIG 6 and FIG 7. FIG 4 shows an advantageous embodiment of the gasket 18, FIG 5 shows a sensor unit 6 comprising this gasket 18 of FIG 4 with a sensor probe body 12 mounted therein.

[0044] As can be seen in FIG 3 and also in FIG 6 and 7, the gasket seat 38 of the tub unit 2 has a through hole 37 in a clamping section 10 formed by the tub unit 2. The through hole 37 has a diameter d and is preferably cylindrical or circular-shaped around a central axis A.

[0045] Adjacent to the clamping section 10 the gasket seat 38 comprises a circumferential wall 39 shaped preferably approximately cylindrically around the axis A

and/or like a bushing or the like and enclosing a receiving space 31 having a (maximum) diameter Ds. At an end face of the circumferential wall 39 a bearing shoulder 11 is defined for bearing the contact portion 19 of the gasket 18 in the mounted state.

[0046] The gasket seat 38 is, in the embodiment shown, preferably surrounded by circumferential wall(s) 9 which can be e.g. enforcement ribs of the tub unit 2. The circumferential walls 9 and 39 advantageously protrude in a direction opposite to the interior space 17 of the tub, i.e. in an outward direction. Joining portions 7a, 7b can be advantageously provided at the circumferential walls 9, to which the condenser unit 3 may be advantageously fixedly attached, e.g. by gluing or welding or in any other applicable way to form a water- and air-tight connection between tub unit 2 and condenser unit 3.

[0047] The gasket 18 according to FIG 4 and 5 and FIG 6 and 7 has advantageously a central hole 26 around the central axis A, in which the sensor probe body 12 is or can be accommodated or fixed. The sensor probe body 12 is preferably at least partially cylindrical and/or has a diameter di which is slightly larger than the inner diameter of the central hole 26 to achieve a tight connection. In addition, the sensor probe body 12 can be advantageously provided with clamping ribs 13 which cooperate with corresponding clamping grooves 14 being provided in the clamping portion 20 of the gasket 18.

[0048] The gasket 18 is preferably made from a resilient material such as an elastomeric material or rubber material. Furthermore, a ring 16 can be advantageously fixedly attached or integrally formed to the sensor probe body 12. The ring 16 can be accommodated within a corresponding free inner space preferably provided inside the gasket 18 to define a space for gluing or, in addition or alternatively, support the tight connection between sensor probe body 12 and gasket 18.

[0049] Advantageously, the gasket 18 has a contact portion 19 and a clamping portion 20 arranged axially with respect to the axis A, preferably displaced one from another by an intermediate portion 36. In a further advantageous embodiment, the contact portion 19 is directly connected to the clamping portion 20, i.e. without any intermediate portion.

[0050] In a mounted state of the gasket 18, the clamping portion 20 of the gasket 18 is positioned in the region of the clamping section 10 of the gasket seat 38. Preferably, the clamping portion 20 of the gasket 18 has a diameter d' in the uncompressed state that is slightly larger than the diameter d of the through hole 37 in the clamping section 10 of the gasket seat 38. Thus, the clamping portion 20 of the gasket 18 is compressed within the through hole 37 in the mounted state and forms an air- and water-tight connection between gasket 18 and clamping portion 10.

[0051] In the mounted state, the intermediate portion 36 between the contact portion 19 and the clamping portion 20 of the gasket 18 is arranged within the receiving space 31 surrounded by the circumferential wall 39 advantageously at a distance or gap to the circumferential wall 39, thus not being in contact with the gasket seat 38. The intermediate portion 36 therefore has an outer diameter which is preferably smaller than the diameter Ds of the receiving space 31 and larger than the diameter d of the through hole 37 and preferably also larger than the diameter d' of the uncompressed clamping section 20 of the gasket 18.

[0052] At the free end of the clamping portion 20 of the gasket 18 a securing portion 35 is arranged which is in the exemplary embodiment shown, is preferably ring-shaped and has advantageously a diameter D which is larger than the diameter d of the through hole 37. Thus, when introducing the gasket into the through hole 37 in a direction for instance from the right in FIG 6 and 7, securing portion 35 is deflected and compressed, and after passing the through hole 37, it returns in its uncompressed state (i.e. to diameter D). Such a snapping mechanism allows impeding that the gasket 18 falls off the tub wall 27in a direction from the tub interior 17 to the outside.

[0053] When the gasket 18 is arranged in the gasket seat 38 an axial (with regard to the central axis A) end face 21 of the contact portion 19 of the gasket 18 is arranged on the exterior side of the tub unit 2.

[0054] The axial end face 21 of the gasket 18 preferably acts as an actuation or gripping surface for a hand of a worker or a tool reaching to the gasket 18 from outside the tub for inserting the gasket 18 into its gasket seat 38, e.g. for pushing it into the through hole 37.

[0055] As the space for handling the gasket 18 and the whole sensor unit 6 during mounting of the appliance is typically rather limited, (for example in the embodiment shown this is due to the presence of circumferential wall (s) 9), the end face 21 is preferably formed in a special way, as described in the following, so as to allow for transfer of rotational forces/momentum onto the gasket 18 and, thus, rotational movement of the gasket 18 during mounting in the gasket seat 38 which improves and facilitates the mounting process significantly.

[0056] In the embodiment shown in FIG 4 and 5 the gasket 18 has at its front end face 21 an arrangement of engagement recesses 22 arranged at its circumference or periphery around the axis A, preferably at equal angular distances, and interposed engagement tongues (or wings or protrusions) 32 which reach to the circumference of the contact portion 19. The engagement recesses 22 are preferably open at their outside or towards the circumference or periphery of the end face 21 or contact portion 19, so that the recesses 22 can be accessed radially from the outside or bigger fingers or tool elements can reach outside.

[0057] In the exemplary embodiment shown, there are advantageously four engagement recesses 22 and four engagement tongues (or wings or protrusions) 32 which are, preferably, arranged symmetrically at an angle of 90° to each other. The shape of the engagement recesses 22 and the engagement tongues 32 is preferably like a ring segment, although other shapes are of course pos-

sible.

[0058] The gasket 18 shown has advantageously a rotational symmetry around the axis A wherein the contact portion 19 with the engagement recesses 22 and the engagement tongues 32 has a rotational symmetry with regard to multiples of 90° and the rest of the gasket has a rotational symmetry with regard to an arbitrary angle.

[0059] In this way two engagement recesses 22 are diametrically opposed with regard to the central axis A which allows for easy gripping by two fingers of a worker or two elements of a, e.g. fork-shaped, tool.

[0060] The engagement recesses 22 and also the engagement tongues 32 constitute force receiving elements for receiving not only translational forces but in particular rotational forces or momentums around the axis A which are exerted manually or by means of a tool and facilitate the mounting of the sensor unit 6.

[0061] Steps (or: grooves) 29 are preferably formed in the side walls of the engagement recesses 22 which further facilitate the gripping of the gasket 18. The steps 29 allow a transfer of a rotational force given by the worker's hand or the tool to the gasket 18. In addition to the rotational force, the gasket 18 can be pushed forward. Thus, by means of the engagement recesses 22 and the steps 29 formed thereby it is possible to move the gasket 18 into the through hole 37 of the back wall 27 by a rotational movement in addition to a forward movement.

[0062] Of course, the number and arrangement of engagement recesses 22 and engagement tongues 32 or force receiving elements in general can vary and be for instance only two, preferably arranged at an angle of 180°, or three, preferably arranged at an angle of 120°.

[0063] Also, the shape of the force receiving elements can vary in wide ranges, as long as a rotational force or momentum can be exerted onto the gasket 18 by gripping the force receiving elements arranged at the contact portion 19 at its end face 21. For instance, instead of engagement recesses 22 also protruding parts such as lugs or pins or the like can be arranged at the end face 21 of the contact portion 19.

[0064] The outer diameter of the contact portion 19 preferably corresponds to the outer diameter of the engagement tongues 32 and is designated by Da. The outer diameter Da is larger than the diameter Ds of the receiving space 31 and corresponds preferably to the outer diameter of the circumferential wall 39 so that the contact portion 19 bears on the bearing shoulder 11 axially with regard to the axis A over its complete surface. However, the outer dimensions of the circumferential wall 39 and the contact portion 19 can vary with respect to each other and do not have to be the same.

[0065] Further advantageously, in a mounted state of the gasket 18, the contact portion 19 is in flat or plane contact to the bearing shoulder 11 which improves the tightness of the connection between gasket 18 and tub unit 2.

[0066] In a mounting step for the gasket 18 or the sensor probe unit 6, respectively, the gasket 18 is pushed forward while routeing at the same time until the forward movement is stopped when the contact portion 19 comes in contact with the bearing shoulder 11 and the securing portion 35 has passed the trough-hole 37. Then, the final position of the gasket 18 is reached.

[0067] Thus, the bearing shoulder 11 can act advantageously as a stop to define the final axial position of the gasket 18 in the mounting direction. Advantageously, the cooperation of bearing shoulder 11 and contact portion 19 on one side and of clamping portion 20 and clamping section 10 on the other side, results in a tight connection of the gasket 18 in the gasket seat 38.

[0068] Preferably, a flange 15 can also be fixedly attached to the sensor probe body 12 and abuts to an outer side of the contact portion 19. Preferably, the flange 15, advantageously in flat or plane contact to the contact portion 19, secures an air- and water tight connection between sensor probe body 12 and gasket 18; the flange 15 preferably defines a final position of the sensor probe body 12 relative to the gasket 18 in the mounting process. Advantageously, the cooperation of flange 15, ring 16 and clamping ribs 13 with the corresponding elements of the gasket 18 secure an air-and water-tight connection and a stable fixation of sensor probe body 12 and gasket 18.

[0069] Thus, the through hole 37 is closed air- and water-tight by the sensor unit 6, wherein a cavity 8 is formed by the circumferential walls 9 and the gasket 18.

[0070] For mounting the sensor unit 6 with its gasket 18 in the gasket seat 38, the worker can pick up or grip the gasket 18 with e.g. two fingers and then can insert the gasket 18 into the through hole 37 in the back wall 27 by a pressing movement. The insertion is facilitated or relieved when the pressing movement is supported by a rotational movement of the gasket 18. The worker's fingers can add this rotational movement because of the engagement recesses 22 which form steps to transfer a rotational moment or a torque moment to the gasket 18. Thus, the clamping portion 20 is moved into position, where the clamping section 10 effects a clamping force on the clamped portion 20 and, thus, the gasket 18 is clamped in its intended place.

[0071] It is further possible that a tool (not shown) is provided that is formed correspondingly to the contact portion 19 and to the axial end face with the force receiving element(s) (e.g. engagement recesses 22). The tool can have engagement elements that engage the force receiving element(s) in such a way that the gasket 18 can be inserted by means of the tool into the through hole of the back wall 27 of the tub unit 2 by combined forward and rotational movement.

[0072] Preferably, the tool for the insertion of the sensor unit 6 into its seat in the back wall 27 of the tub is adapted to the engagement recesses 22 and also to the sensor probe body 12 which protrudes in its longitudinal extension over the longitudinal extension of the gasket 18. Thus, the tool can be formed having engagement elements for engaging into the engagement recesses 22

and to engage around the protruding part of the sensor probe body 12. With such a tool it is possible to mount the complete sensor unit 6 into a seat in the back wall 27 of the tub.

[0073] Alternatively is, of course, possible to mount only the gasket 18 to the back wall 27 of the tub in a first step and, in a second step to mount the sensor probe body 12to the gasket.

[0074] FIG 8 shows a front view of the internal side of the back wall of the tub unit 2 of the laundry treatment assembly 1. The tub unit 2 is shown without the drum. The bushing 24 can serve as a bearing for the drive shaft for the drum. An interior space 17 is defined by the walls of tub unit 2. The sensor unit 6 can be seen as it is arranged in its seat in a back wall 27 of the tub unit 2.

[0075] Further the back wall 27 of the tub unit 2 preferably comprises several interior cavities 23 that are arranged circumferentially around a central portion of the back wall 27 of the tub unit 2. These interior cavities can be provided for supporting or stabilizing the mechanical structure of the tub unit 2. Preferably, the interior cavities 23 are arranged in a region of the back wall 27 not comprising the bushing(s) 24 (in other words cavities 23 surrounds the bushings 24). Preferably cavities 23 are substantially parallelepiped-shaped, with an access opening substantially rectangular, preferably with the sides and/or the corners slightly rounded.

[0076] In a bottom region of the tub unit 2 a sump 25 is advantageously formed. The sump 25 is in a ventilating connection with the condenser unit 3 via a flow channel 28. The flow channel 28 is at least partially formed to the back wall 27 of the tub unit 3.

[0077] In its mounted state, the sensor unit 6 is preferably arranged in a position where the sensitive part of the sensor probe body 12 can detect or measure air which is flowing inside the flow channel 28. Advantageously, the sensor unit 6 is placed adjacent or near an outlet of the flow channel 28 or a transition section of the flow channel 28 to the condenser unit 3.

[0078] The sensor probe body 12 and the sensor unit 6 are preferably used or meant for sensing at least one process parameter of a laundry treatment process performed by the laundry machine within the interior space 17 of the laundry machine, wherein the process parameter is in particular a temperature.

Claims

1. Laundry machine such as a washer/dryer or a washing machine, comprising:

- an interior space (17) for receiving laundry to be treated;
- at least one sensor unit (6) for sensing at least one process parameter of a laundry treatment process performed by the laundry machine within its interior space (17);
- wherein the sensor unit (6) comprises at least one gasket (18) and at least one sensor probe body (12), wherein the sensor probe body (12) is fixedly arranged within the gasket (18);
- wherein the gasket (18) of the sensor unit (6) is fixedly mounted in a gasket seat (38) of the laundry machine;

characterized in that

- said gasket (18) comprises at least one force receiving element (22, 32) adapted to receive and to transfer a rotational force to said gasket (18).

2. Laundry machine according to claim 1, wherein the force receiving element(s) is/are provided in an end face (21) of the gasket (18).

3. Laundry machine according to claim 1 or claim 2, wherein the force receiving element(s) is/are adapted to fingers of a hand or engagement elements of a tool so that for applying a rotational force fingers of a hand or engagement elements of a tool can engage in each force receiving element (22,32).

4. Laundry machine according to any of the preceding claims, wherein said force receiving element(s) is/are formed by at least one engagement recess (22) and/or by at least one engagement tongue (32).

5. Laundry machine according to claim 4, wherein at least two engagement recesses (22) and at least two engagement tongues (32), each of which is arranged between two engagement recesses (22), are provided.

6. Laundry machine according to claim 4 or claim 5, wherein four engagement recesses (22) and four engagement tongues (32), each of which being arranged between two engagement recesses (22), are provided along a circumference of said end face (21) surrounding a central axis (A).

7. Laundry machine according to claim 5 or claim 6, wherein the at least one engagement recess (22) is open at the outside and/or at the circumference of said end face (21).

8. Laundry machine according to one of claims 5 to 7, wherein at least one pair or pairs of two engagement recesses (22) and/or two engagement tongues (32) are diametrically opposed.

9. Laundry machine according to one of claims 5 to 8, wherein steps (29) are formed in the side walls of the engagement recesses (22) and/or engagement tongues (32).

10. Laundry machine according to any of the preceding

claims, wherein the force receiving element(s) is/are shaped like ring segments.

11. Laundry machine according to any of the preceding claims, wherein the gasket (18) has a contact portion (19) and a clamping portion (20), the contact portion (19) resting, in the mounted state, on a bearing surface (11) of the gasket seat (38) and the clamping portion (20) being, in the mounted state, clamped in a through-hole (37) of the gasket seat (38).

12. Laundry machine according to claim 11 and claim 2, wherein said end face (21) of said gasket (18) is arranged at the contact portion (19) and, in the mounted state, on an opposite side opposite to the bearing surface (11) of the gasket seat (38).

13. Laundry machine according to one of the preceding claims, comprising a tub unit (2) having at least one tub wall (27), wherein a through hole (37) of said gasket seat (38) is provided in said tub wall (27).

14. Laundry machine according to one of the preceding claims, wherein said sensor unit (6) is arranged in a region of a tub wall (27) that is covered by a condenser wall (30), wherein the condenser wall has an opening through which the sensor unit (6) can be installed to the tub wall (27) of said tub unit (2) in a mounting process and/or wherein the tub unit (2) has a flow channel (28) formed thereto, through which drying air can be fed to a condenser unit (3) which is provided on the exterior side of the tub unit (2), wherein said sensor unit (6) is arranged in a region of the flow channel (28) to sense the temperature of the drying air streaming within the flow channel (28).

15. Laundry machine according to one of the preceding claims, wherein the sensor probe body (12) is fixed in a central hole (26) of the gasket (18) and at least one clamping rib (13) co-operating with at least one clamping groove (14) are provided at the sensor probe body and in the central hole of the gasket (18).

FIG 1

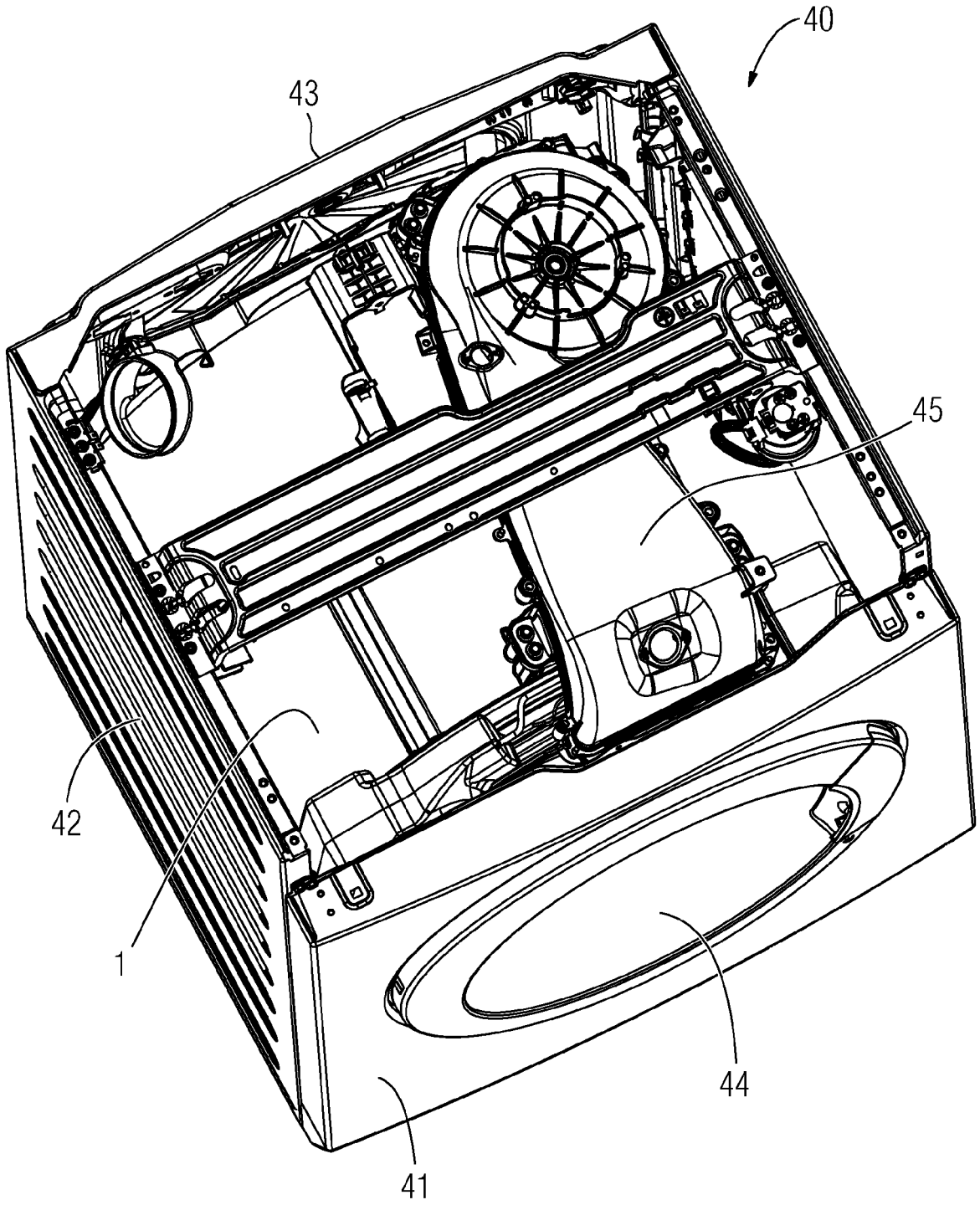
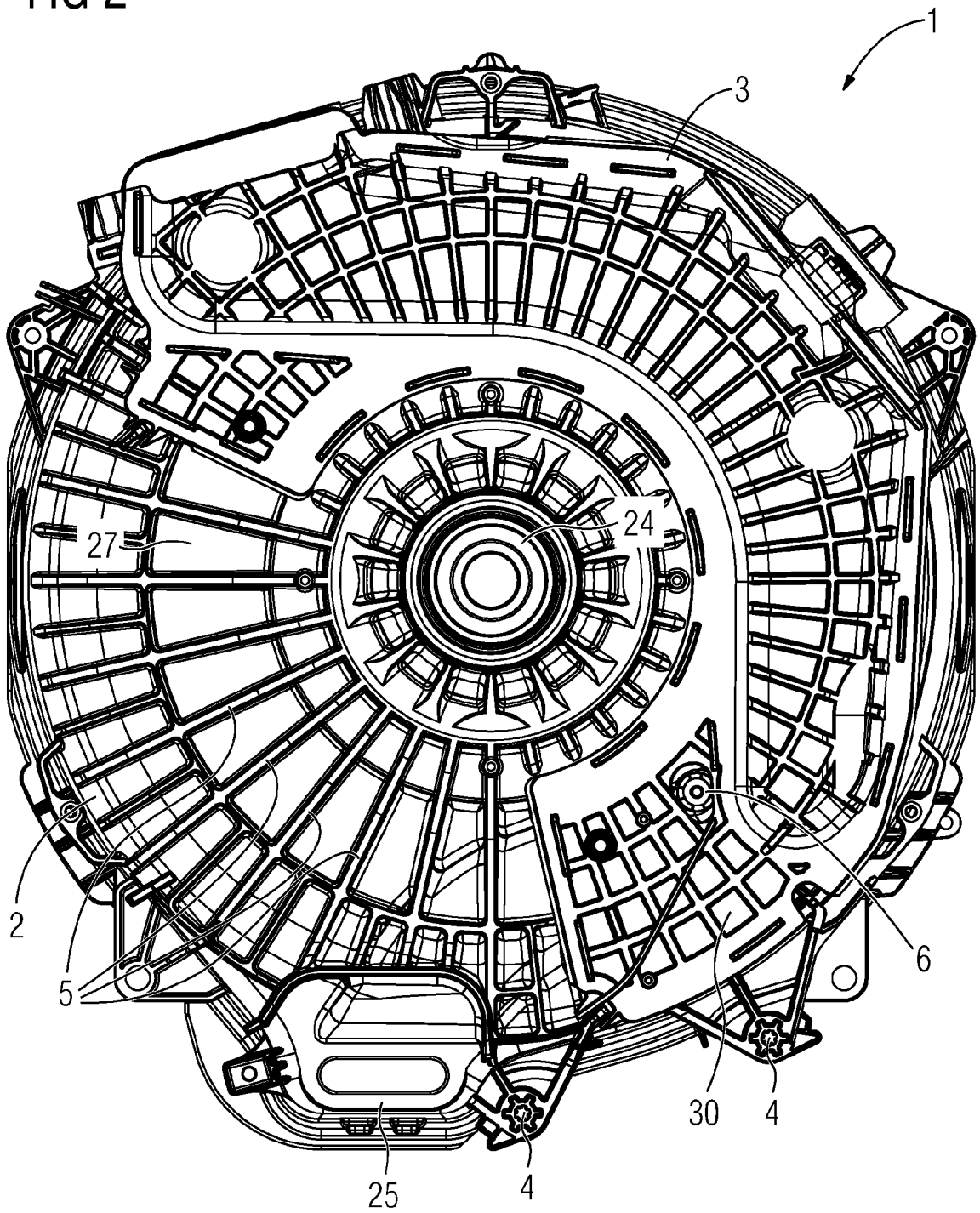


FIG 2



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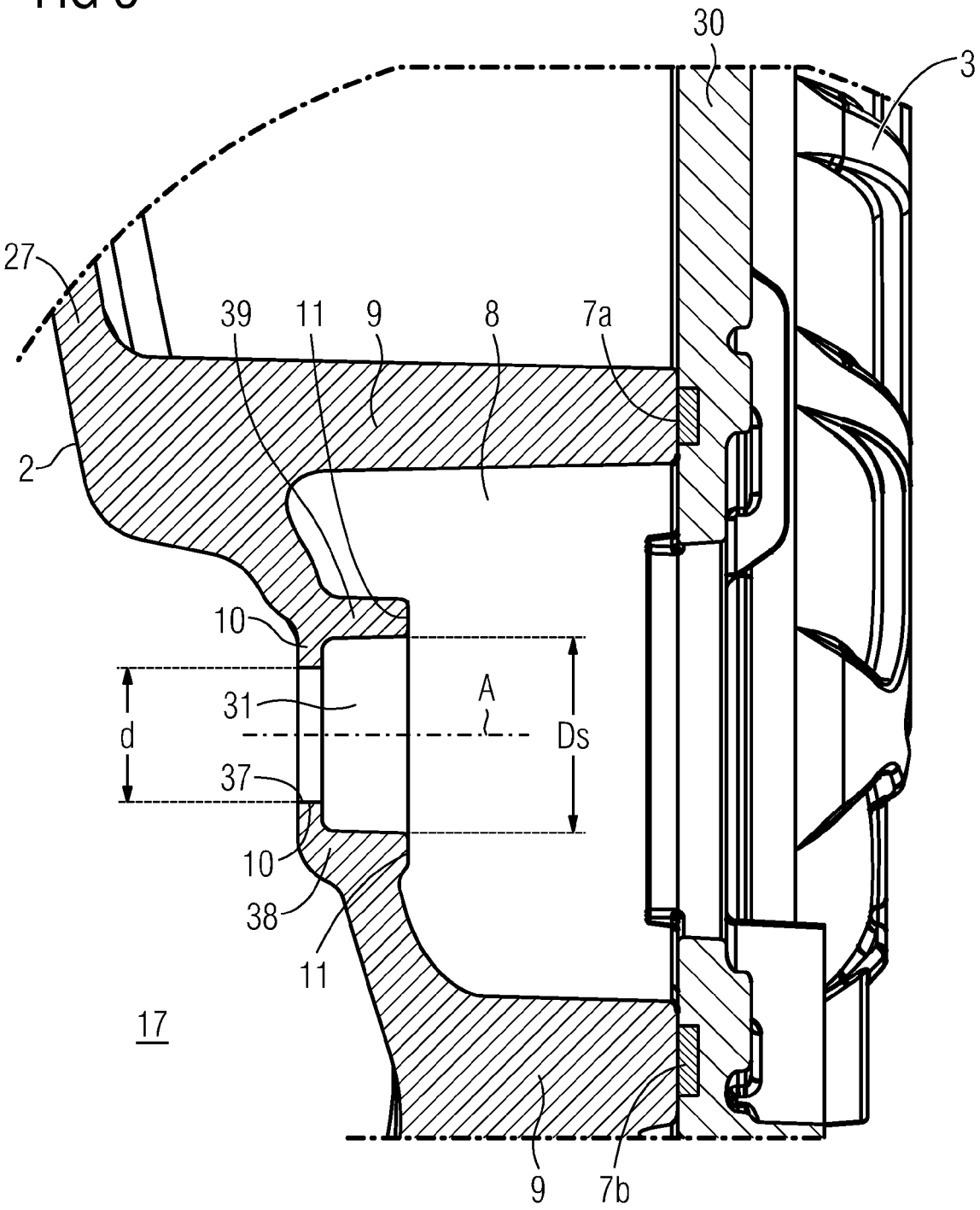

FIG 4

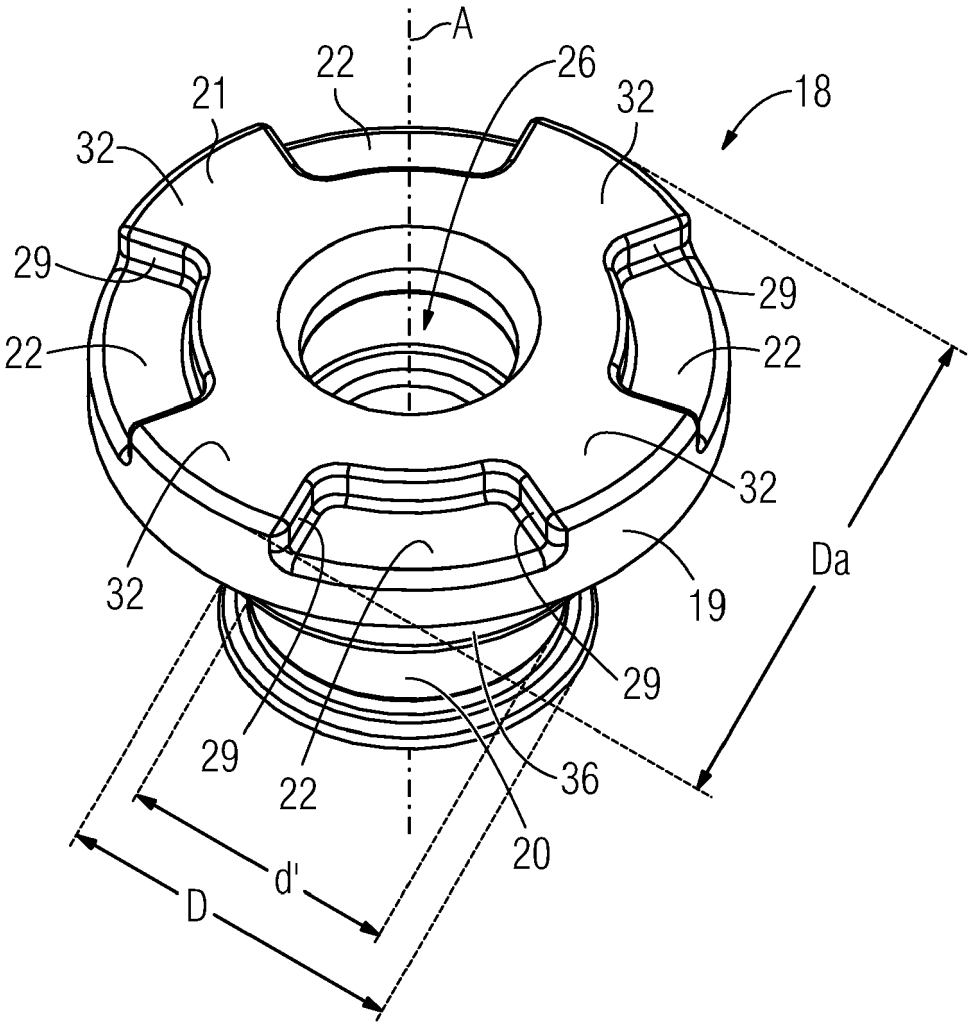

FIG 5

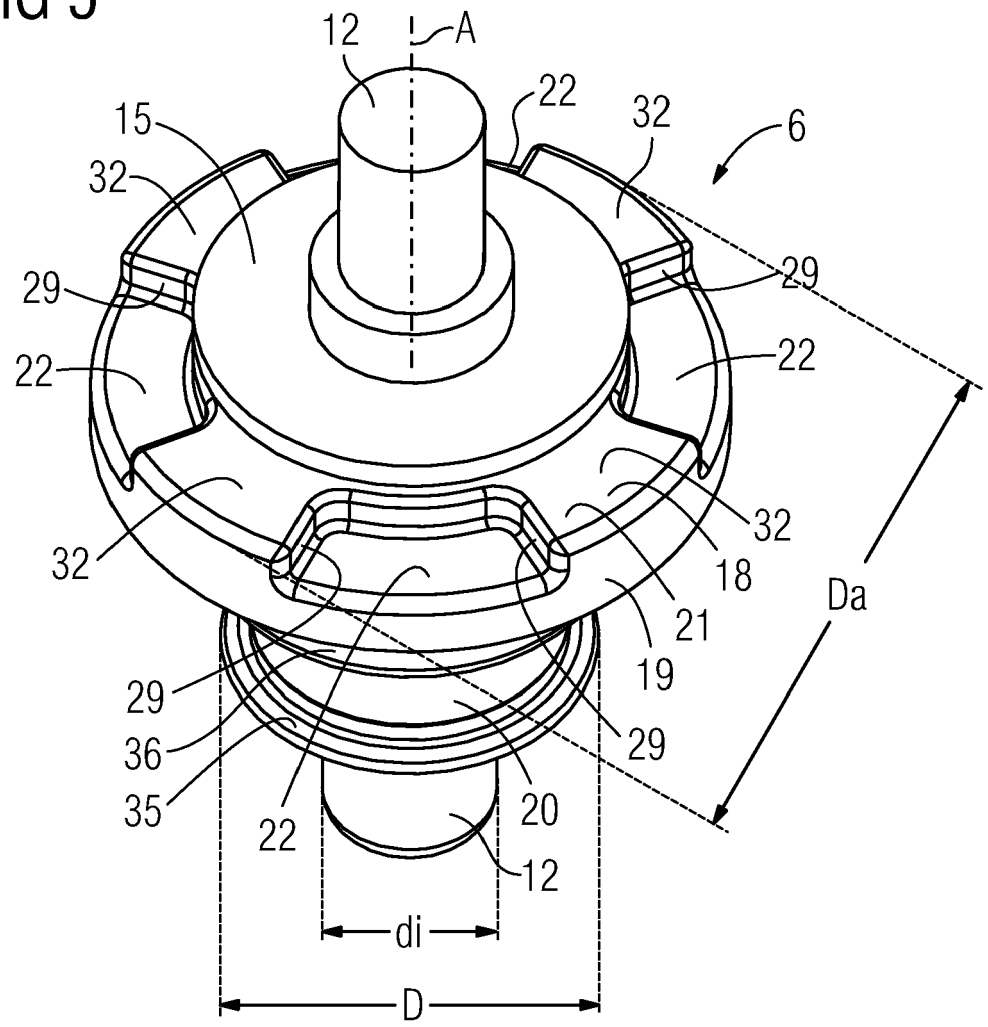

FIG 6

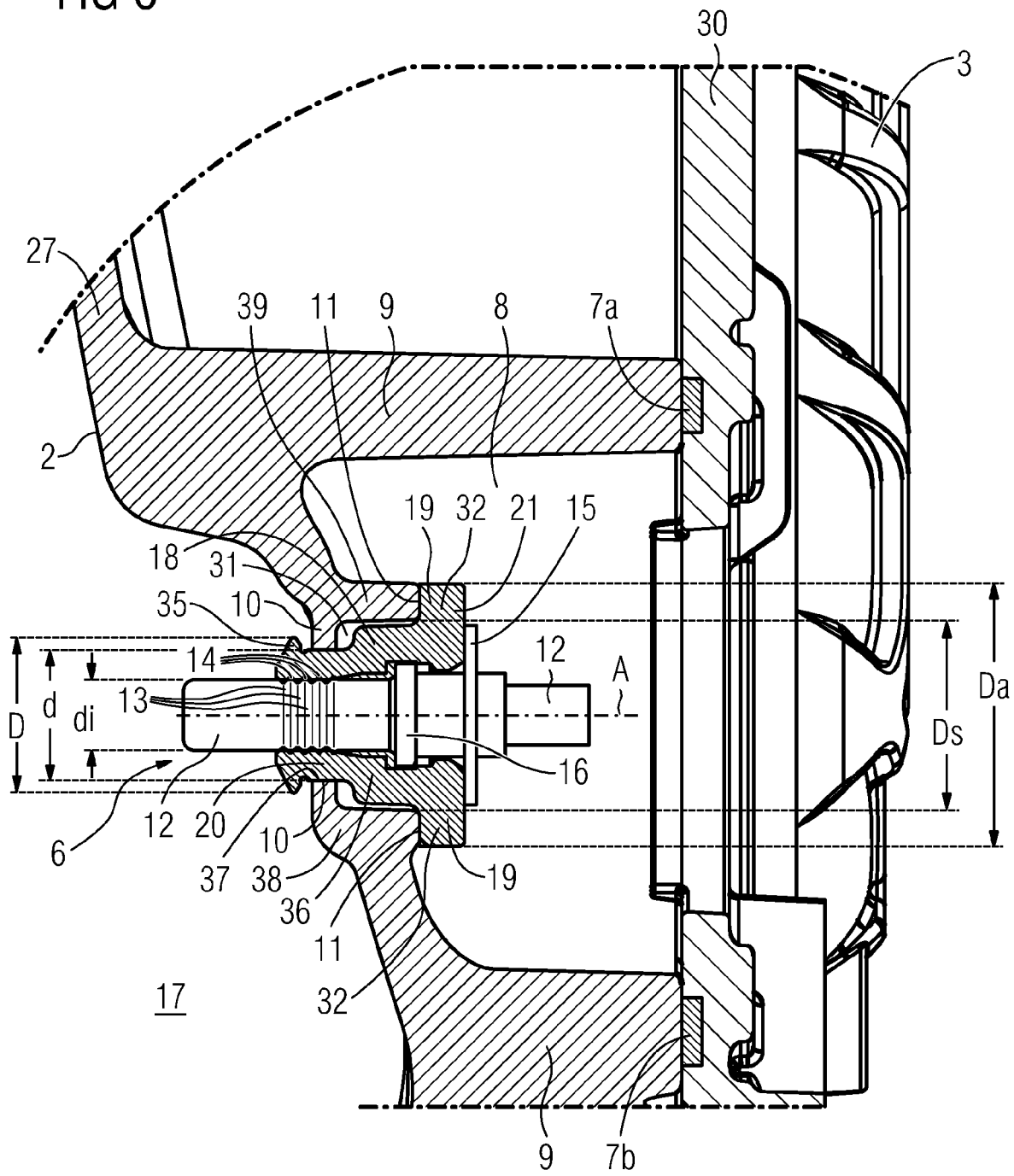
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FIG 7

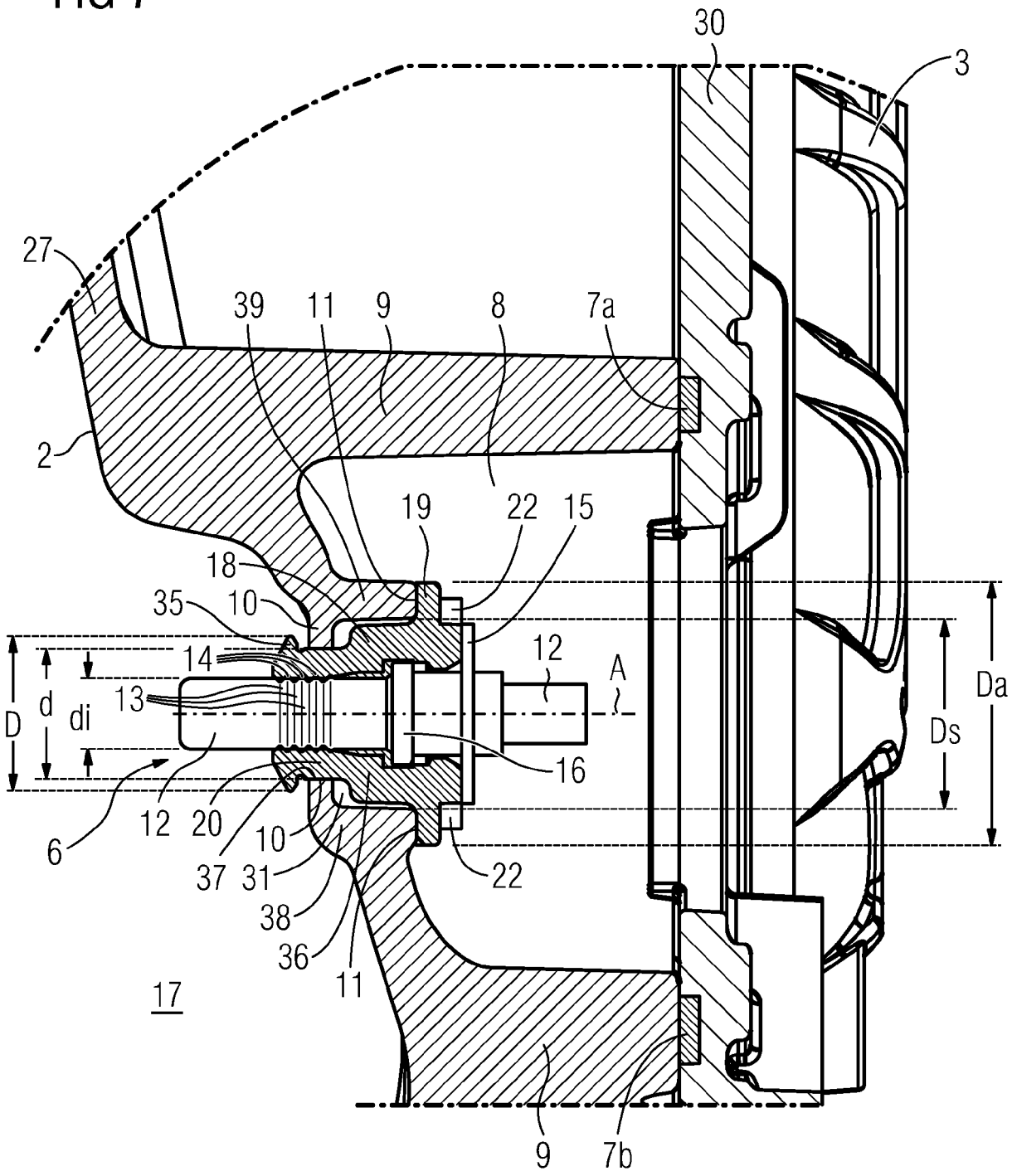
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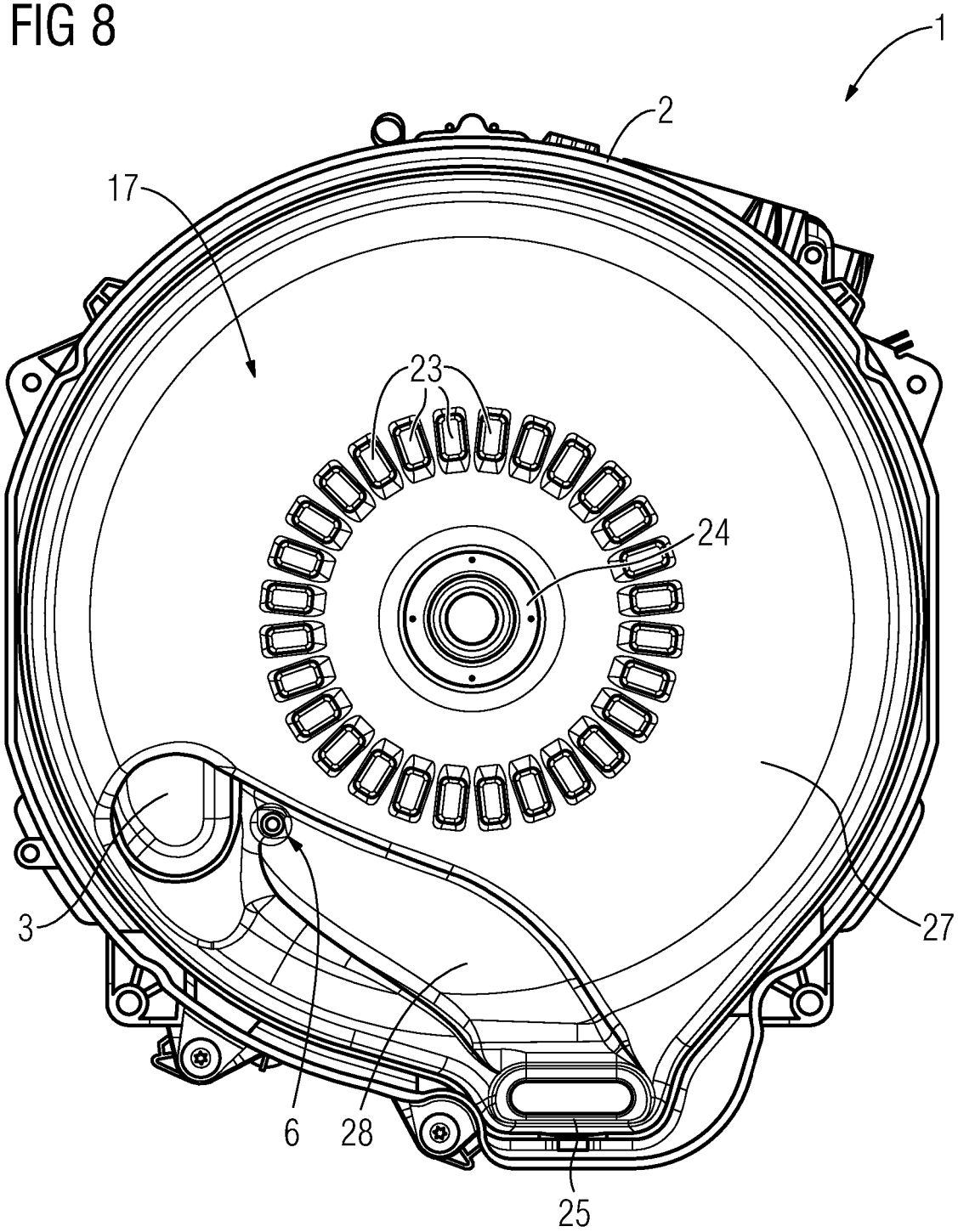
FIG 8



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EUROPEAN SEARCH REPORT

Application Number
EP 12 15 7436

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2009/066939 A2 (LG ELECTRONICS INC [KR]; IM MYONG HUN [KR]; OH SOO YOUNG [KR]; PARK TA) 28 May 2009 (2009-05-28) * pages 5-6; figures *	1-15	INV. D06F39/00 D06F37/26
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D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 August 2012	Stroppa, Giovanni

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