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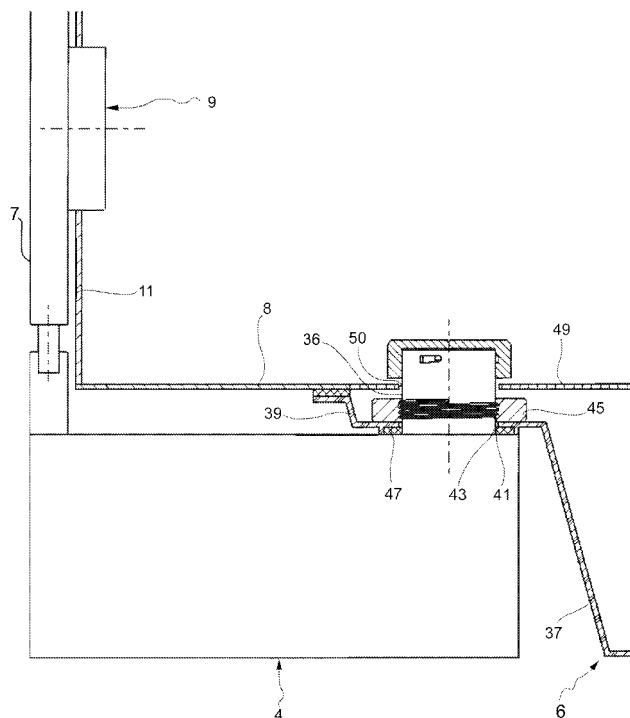
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AL BA MK RS(30) Priority: **05.09.2007 IT TO20070624**(71) Applicant: **BITRON S.p.A.****10122 Torino (IT)**(72) Inventor: **Brignone, Enzo****12025 Fraz. Monastero Dronero (Cuneo) (IT)**(74) Representative: **Gerbino, Angelo et al****Jacobacci & Partners S.p.A.****Corso Emilia, 8****10152 Torino (IT)**(54) **A water supply and treatment device in a dishwasher**

(57) The dishwasher component is formed by a water supply and treatment device (4) and a sump (6) made of plastics material. The device (4) comprises: a first reservoir (22) for holding substances with decalcifying properties, the first reservoir (22) being provided with at least one inlet opening (20) for water to be decalcified and one outlet opening (48) for decalcified water; a second reservoir (28) for holding salt, the second reservoir (28) be-

ing provided with at least one inlet opening (27) for water and one outlet opening (29) for regenerating brine that is formed as a result of the dissolving of the salt in the water, and the second reservoir (28) having a filler opening at the top. The sump (6) comprises a lower, tub-shaped portion (37) and an upper portion (39) in which there is a hole (41) in which a lower portion of the filler opening is housed in a lcahtight manner.

**FIG.2****EP 2 033 566 A1**

Description

[0001] The present invention relates to a dishwasher component comprising a water supply and treatment device. In particular, the device comprises:

- a first reservoir for holding substances with decalcifying properties, the first reservoir being provided with at least one inlet opening for water to be decalcified and one outlet opening for decalcified water, and
- a second reservoir for holding salt, the second reservoir being provided with at least one inlet opening for water and one outlet opening for regenerating brine that is formed as a result of the dissolving of the salt in the water, and the second reservoir having a filler opening at the top.

[0002] A known device of this type is described, for example, in the Applicant's patent application EP-1 844 694. In this known device the filler opening comprises a neck and an annular wall which externally surrounds at least a lower portion of the neck, forming a space, and there is also a duct connecting the outlet opening of the first reservoir to the space. In the device of EP-1 844 694 the annular wall is intended to be fitted in an opening formed through the bottom of the washing tank, where the decalcified water coming from the connecting duct is transported and caused to pass through the space.

[0003] A structure of this type avoids the use of a separate tube for connecting the device to the washing tank, resulting in simplification of the assembly procedures and savings in cost. However, it creates corrosion problems in the portion of the dishwasher bottom which surrounds the neck of the salt reservoir. In fact, when this reservoir is topped up periodically, the brine contained in the reservoir spills out, creating a saline environment which is liable to corrode the sheet metal constituting the dishwasher bottom. This corrosion is even more marked when topping-up salt is spilt outside the neck of the respective reservoir - as may frequently occur by mistake.

[0004] The object of the present invention is therefore to prevent corrosion problems of the type indicated above whilst retaining the characteristics of structural simplicity and low cost.

[0005] This object is achieved by virtue of a dishwasher component formed at least by a water supply and treatment device and by a sump made of plastics material, in which the device is of the type indicated at the beginning of the present description and the sump comprises a lower, tub-shaped portion and an upper portion in which there is a hole in which a lower portion of the filler opening is housed in a leaktight manner.

[0006] In the component of the invention, the filler opening of the salt reservoir is surrounded by the upper portion of the sump which is made of plastics material and is therefore not subject to salt corrosion.

[0007] Moreover, since the water supply and treatment

device is also typically made of plastics material, it can be assembled with the sump by direct mechanical connection with the use, at most, of a ring nut or seal, but not of specific connection parts such as sleeves or the like. This characteristic further simplifies the structure of the component, making it even less expensive to produce.

[0008] A further subject of the present invention is a dishwasher comprising a component of the type just described.

[0009] Further advantages and characteristics of the present invention will become clear from the following detailed description given with reference to the appended drawings which are provided by way of non-limiting example and in which:

Figure 1 is a schematic view of a component of the invention fitted in a dishwasher,

Figure 2 shows some details of Figure 1 on an enlarged scale,

Figure 3 is a more detailed view of a water supply and treatment device forming part of the component of the invention of Figures 1 and 2,

Figure 4 is a view corresponding to Figure 2, showing a further embodiment of the component of the invention on an enlarged scale,

Figure 5 is a view corresponding to Figure 2, showing another embodiment of the invention on an enlarged scale, and

Figure 6 is a view corresponding to Figure 2, showing yet another embodiment of the invention on an enlarged scale.

[0010] Figure 1 shows a component formed by a water supply and treatment device 4 and a sump 6. The component is mounted in a dishwasher bottom wall 8 with the use of a fixing ring nut 9 located in a hole formed in a side wall 11 of the washing tank. The ring nut 9 is a conventional element which is typically present in the dishwasher for the outlet of steam formed in the washing tank and is referred to in technical jargon as an "air break" ring nut. The ring nut is advantageously located on a further element 7 which is assembled with the component formed by the device 4 and the sump 6. These latter elements are made of plastics material, whereas the bottom wall 8 is made of metal. The sump 6 is situated beneath the washing tank in known manner, to permit emptying thereof.

[0011] The element 7 comprises (see Fig. 3 which shows a whole series of details that are not shown in Figures 1 and 2, for simplicity) a water supply duct 10 in which a filling solenoid valve 12 and a flow meter 14 are disposed. The supply duct 10 further includes an air gap portion 16 and opens into an inlet opening 20 of a first reservoir 22 for holding substances with decalcifying properties; the reservoir 22 forms part of the device 4, together with an end portion of the duct 10. The duct 10 also supplies a water collection chamber 24 which is con-

connected by a duct 26 to an inlet opening 27 of a second reservoir 28 for holding salt, which forms part of the device 4. The reservoir 28 has an outlet opening 29 connected to the first reservoir 22 by a duct 30 provided with a selective shut-off member 32. The second reservoir 28 has an upper filler opening comprising a neck 34 which is surrounded externally by an annular wall 36 so as to define a space 38. The space 38 may also be annular or may merely extend through an arc of a circle. The neck has a vertical axis 40 coinciding with that of the body of the reservoir 28. A removable cap 42 closes the opening of the neck 34 and is arranged over the space 38 without touching the upper edge of the annular wall 36. The details of the construction of the neck 34, of the cap 42, and of the space 38 are described, for example, in the document EP-A-1 025 793, the contents of which are intended to be incorporated in this description by reference.

[0012] A duct 44, into which a further duct 46 which collects leakage water from the air-gap portion 16 may open, connects an outlet opening 48 of the first reservoir 22 to the space 38.

[0013] The sump 6, for its part, (Figures 1 and 2) comprises a tub-shaped lower portion 37 and an upper portion 39 in which a hole 41 is formed. A lower portion of the annular wall 36 is housed in the hole 41 by virtue of fixing means which include a thread 43 formed on an outer circumferential portion of the annular wall 36 and a ring nut 45 which engages the thread 43. Watertightness is ensured by a seal 47 interposed between the upper portion 39 of the sump 6 and the upper wall of the device 4.

[0014] The above-described component is assembled on a dishwasher in a manner such that an upper portion of the annular wall 36 is fitted in an opening 50 formed in a filter 49 disposed in the bottom wall 8 of the washing tank and the water supply and treatment device 4 is supported mechanically between the "air break" ring nut 9 of the element 7, which is assembled with the device 4, and the sump 6 disposed beneath the bottom wall 8.

[0015] During the normal operation of the dishwasher, the water that is supplied through the duct 10 passes (Figure 3) through the first reservoir 22 (arrow 54) where it is decalcified, then enters the duct 44 and is directed (arrow 56) into the space 38 from where it enters the washing tank directly (arrow 58).

[0016] By virtue of its particular structure, the above-described component enables the water to be admitted to the washing tank without requiring the use of a separate connecting tube. Moreover, it prevents the formation of rust on the metal bottom wall 8 of the dishwasher since the neck 34 of the salt reservoir 28, from which spills of corrosive substances such as salt and/or brine may take place during topping-up operations, is surrounded by plastics parts such as the sump 6 and the filter 49.

[0017] Figure 4 shows an alternative embodiment of the invention in which the same reference numerals that were used in the preceding drawings distinguish the same or equivalent parts.

[0018] The sole difference with respect to the previous

embodiment consists of different means for fixing the annular wall 36 to the sump 6. In this embodiment, in fact, fixing means that are formed on the sump 6 are used; in particular, these are resilient snap-fixing means which consist of a plurality of teeth 64 that can be opened out resiliently. The teeth 64 are staggered circumferentially around the hole 41 and have radial end protuberances 66 which can engage beneath a circumferential flange 68 that protrudes from the annular wall 36. A seal 70 ensures watertightness between the upper portion 39 of the sump 6 and the flange 68. In comparison with the above-described embodiment, there is thus the advantage that a constituent part such as the ring nut 45 is eliminated, further simplifying the structure of the component. Operation is similar.

[0019] Figure 5 shows a further embodiment of the invention in which the same reference numerals that were used in the preceding drawings distinguish the same or equivalent parts.

[0020] In this embodiment, the component is similar to that shown in Figures 1 and 2 but the annular wall 36 is located entirely beneath the filter 49 rather than through an opening formed therein. The operation of the component remains unchanged from that described above.

[0021] Correspondingly, Figure 6 shows yet another embodiment of the invention in which a component similar to that shown in Figure 4 is mounted with the annular wall 36 entirely beneath the filter 49 as in the embodiment of Figure 5. The operation of the component remains unchanged from that described above.

[0022] Naturally, the principle of the invention remaining the same, the details of construction and forms of embodiment may be varied widely with respect to those described purely by way of example, without thereby departing from the scope claimed. In particular the filler opening of the second reservoir may comprise a simple neck without a further outer annular wall which delimits an annular space. In this case also, the filler opening may be fixed to the sump by fixing means which include a thread formed on an outer circumferential portion of the simple neck with which a threaded ring nut is engaged, or by fixing means formed on the sump, for example, resilient snap-fixing means such as a plurality of teeth which can be opened out resiliently, are staggered circumferentially around the hole, and have respective radial end protuberances which can engage beneath a circumferential flange that protrudes radially from the neck.

Claims

1. A dishwasher component formed at least by a water supply and treatment device (4) and a sump (6) made of plastics material, the device comprising:

- a first reservoir (22) for holding substances with decalcifying properties, the first reservoir (22) being provided with at least one inlet opening

(20) for water to be decalcified and one outlet opening (48) for decalcified water, and
 - a second reservoir (28) for holding salt, the second reservoir (28) being provided with at least one inlet opening (27) for water and one outlet opening (29) for regenerating brine that is formed as a result of the dissolving of the salt in the water, and the second reservoir (28) having a filler opening at the top,

and the sump (6) comprising a lower, tub-shaped portion (37) and an upper portion (39) in which there is a hole (41) in which a lower portion of the filler opening is housed in a leaktight manner.

2. A component according to Claim 1 in which the filler opening comprises a neck (34) and an annular wall (36) which externally surrounds at least a lower portion of the neck (34), forming a space (38), a duct (44) connecting the outlet opening (20) of the first reservoir (22) to the space (38), and a lower portion of the annular wall (36) being housed in the hole (41) in a leaktight manner.
3. A component according to Claim 2 in which the annular wall (36) is housed in the hole (41) in a leaktight manner by fixing means which include a thread (43) formed on an outer circumferential portion of the annular wall (36) and a ring nut (45) which engages the thread (43).
4. A component according to Claim 2 in which the annular wall (36) is housed in the hole (41) in a leaktight manner by fixing means formed on the sump (6).
5. A component according to Claim 4 in which the fixing means formed on the sump (6) are resilient snap-fixing means.
6. A component according to Claim 5 in which the resilient snap-fixing means consist of a plurality of teeth (64) which can be opened out resiliently, are staggered circumferentially around the hole (41), and have respective radial end protuberances (66) which can engage beneath a circumferential flange (68) that protrudes radially from the annular wall (36).
7. A dishwasher comprising a component according to any one of the preceding claims, in which an upper portion of the filler opening is inserted in an opening (50) formed in a filter (49) arranged in a bottom wall (8) of the washing tank.
8. A dishwasher comprising a component according to any one of preceding Claims 2 to 6 in which an upper portion of the annular wall (36) is inserted in an opening (50) formed in a filter (49) arranged in a bottom wall (8) of the washing tank.

9. A dishwasher comprising a component according to any one of preceding Claims 2 to 6 in which the annular wall (36) is disposed beneath a filter (49) disposed in a bottom wall (8) of the washing tank.

10. A dishwasher comprising a component according to any one of preceding Claims 1 to 6 in which the water supply and treatment device (4) is supported mechanically between a fixing ring nut (9) located in a hole formed in a side wall (11) of the washing tank and the sump (6) disposed beneath the bottom wall (8) of the washing tank.

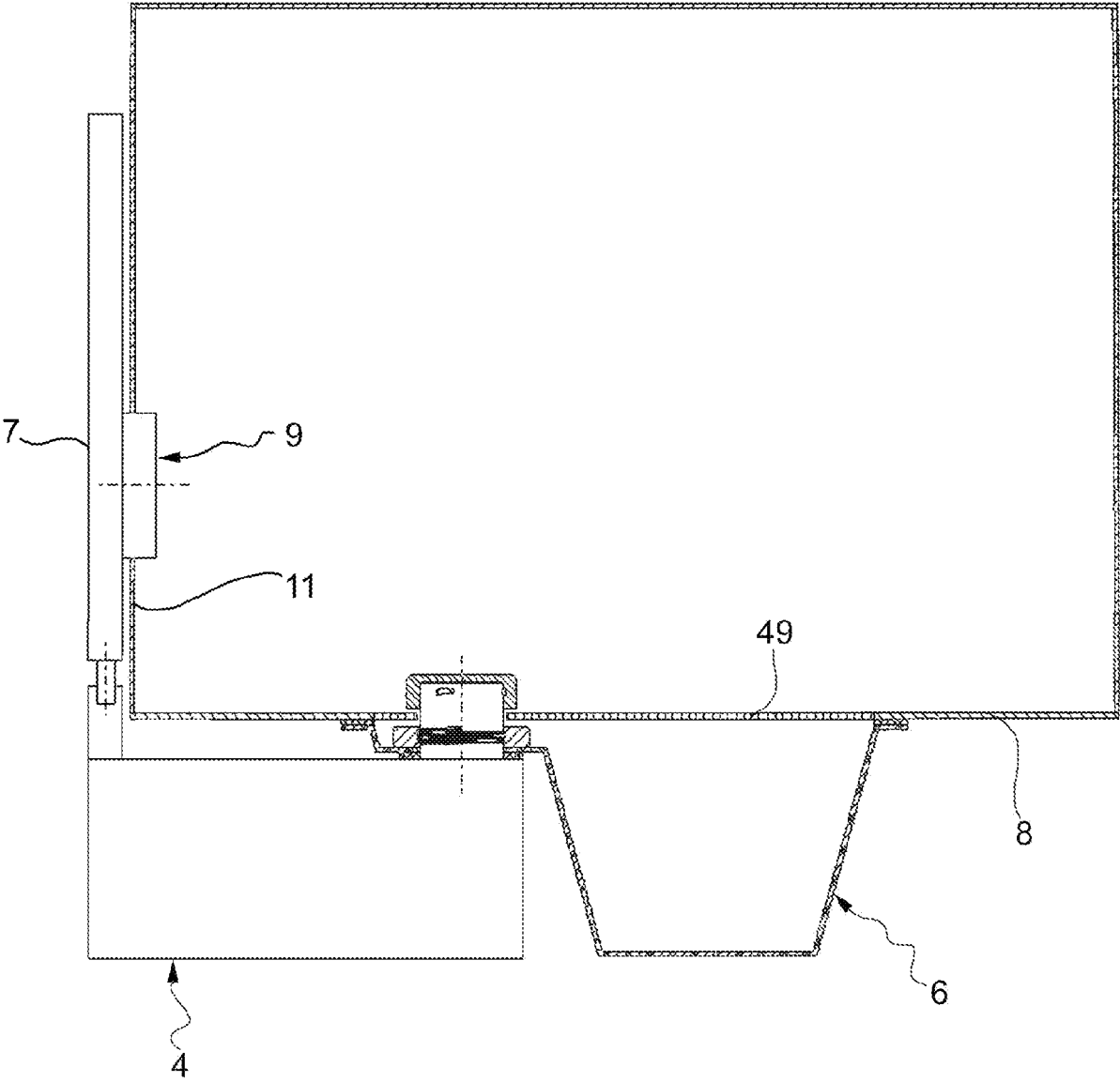


FIG.1

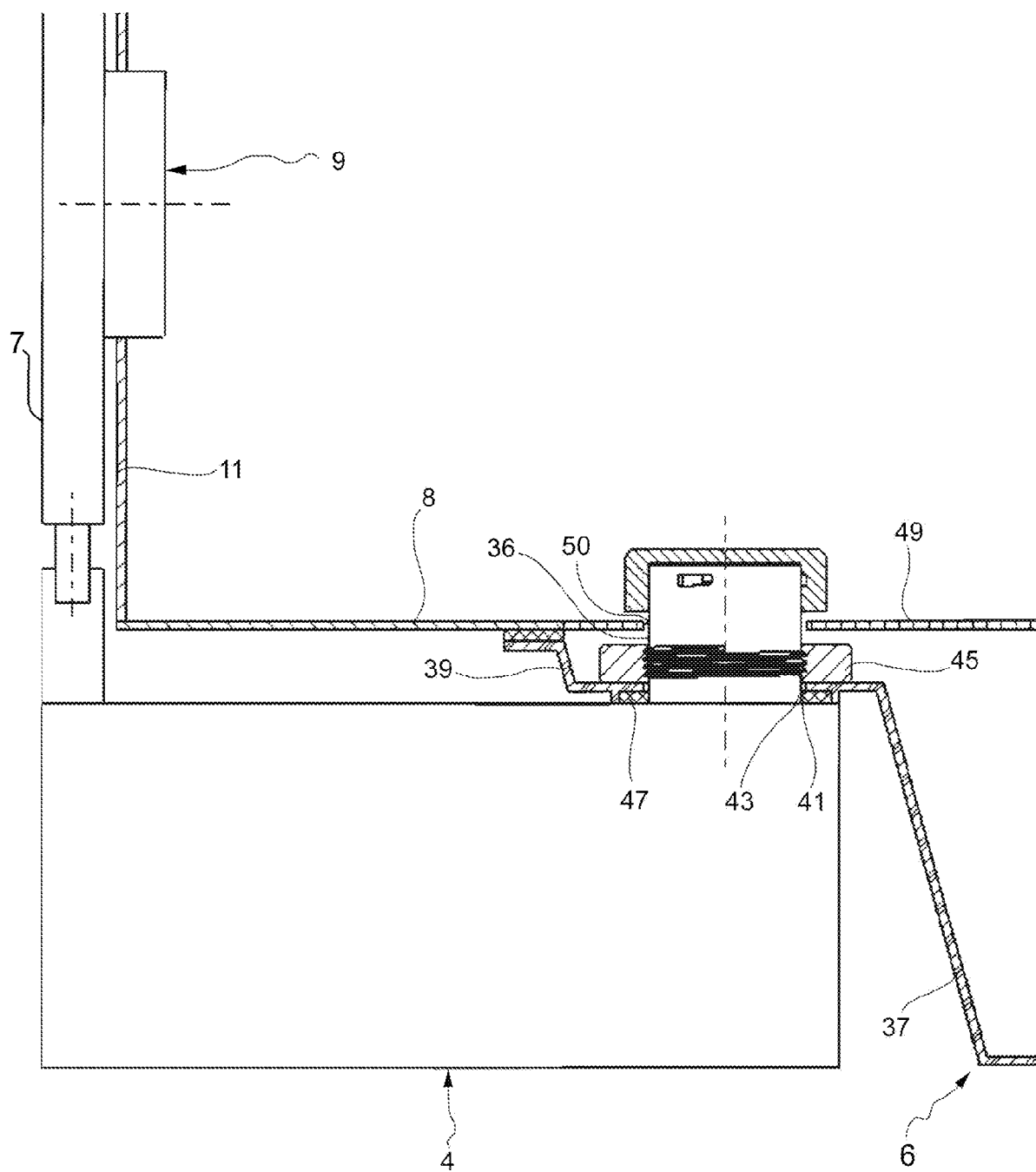
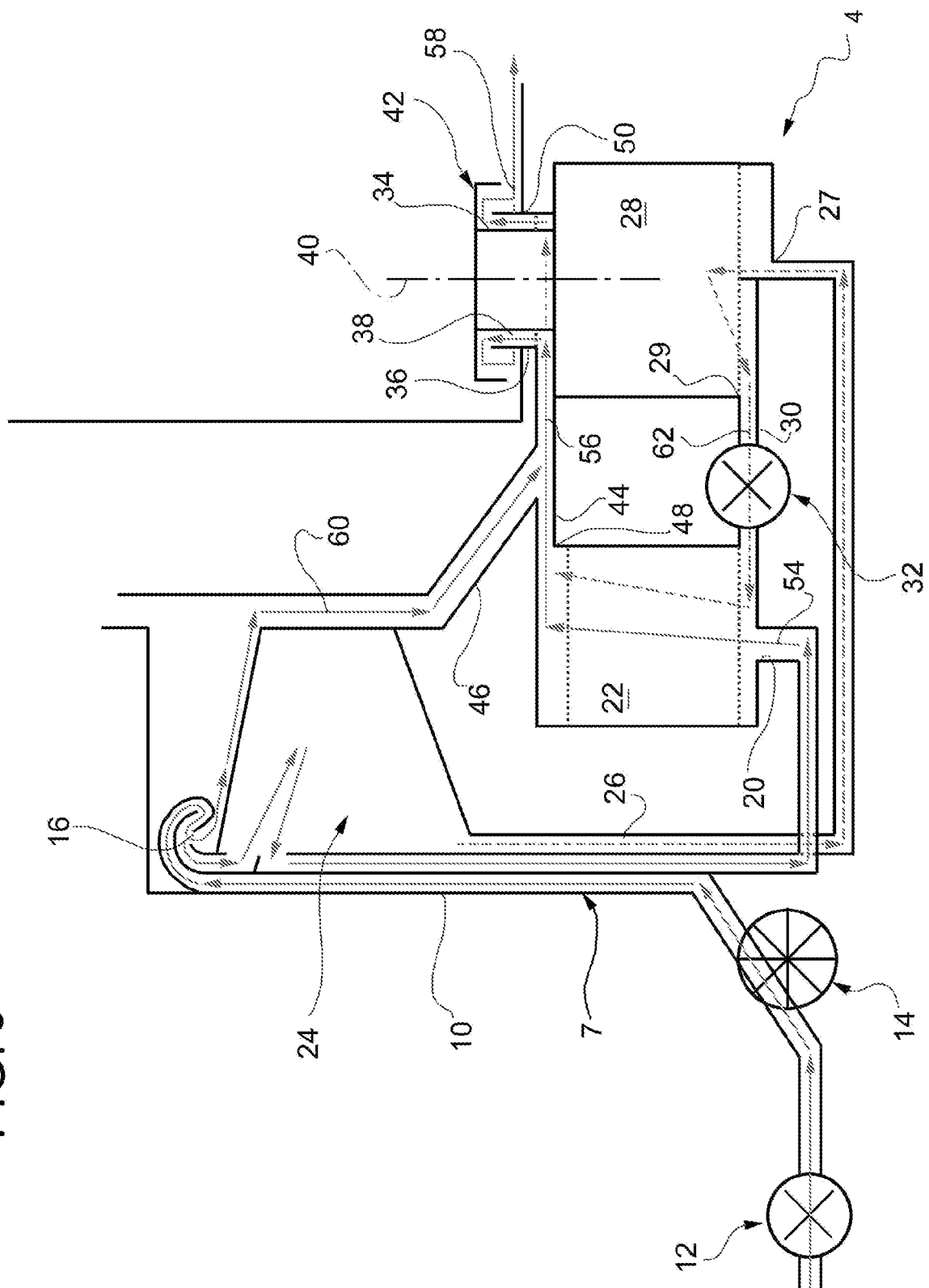


FIG.2

3
G.
F.



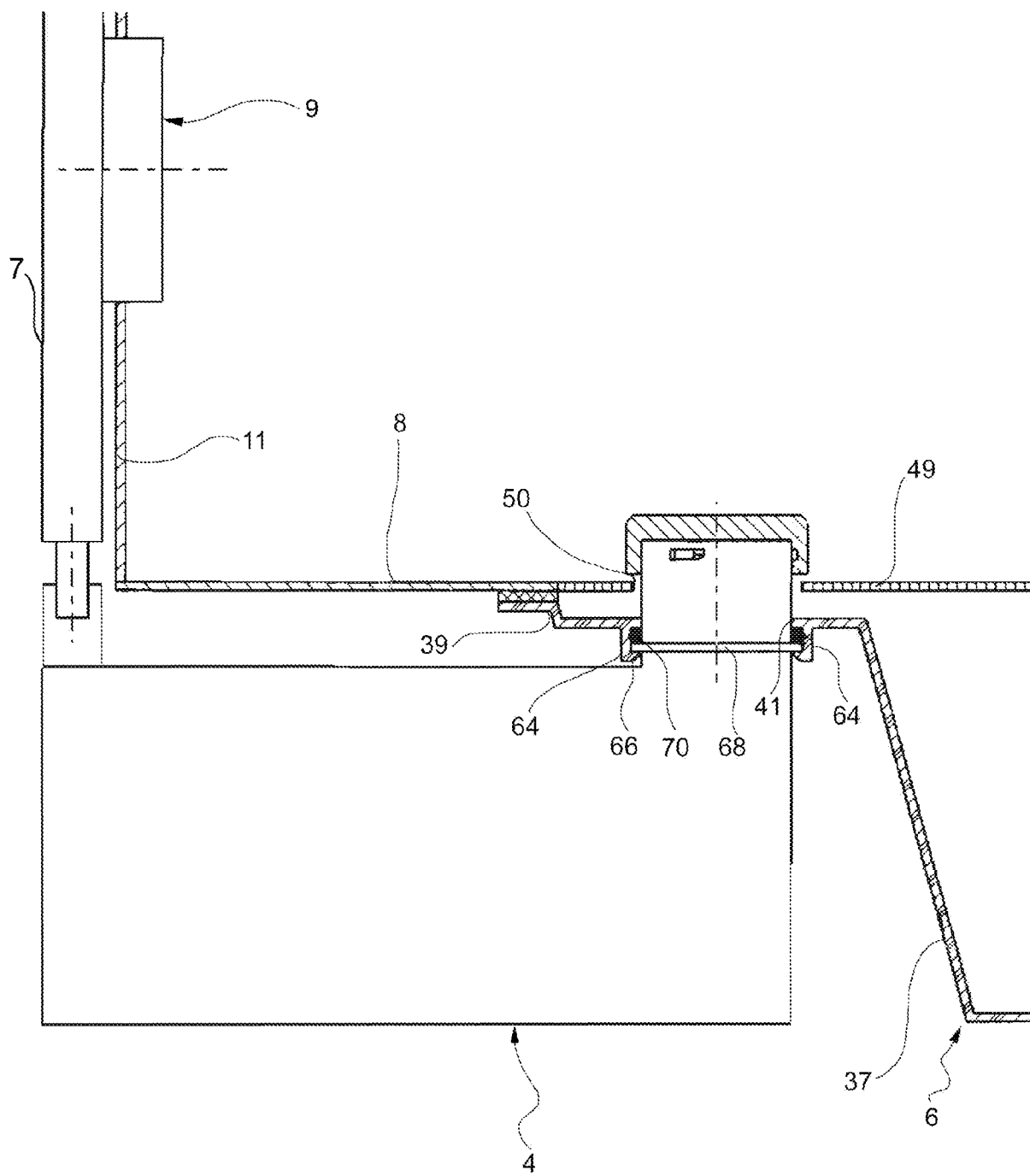


FIG.4

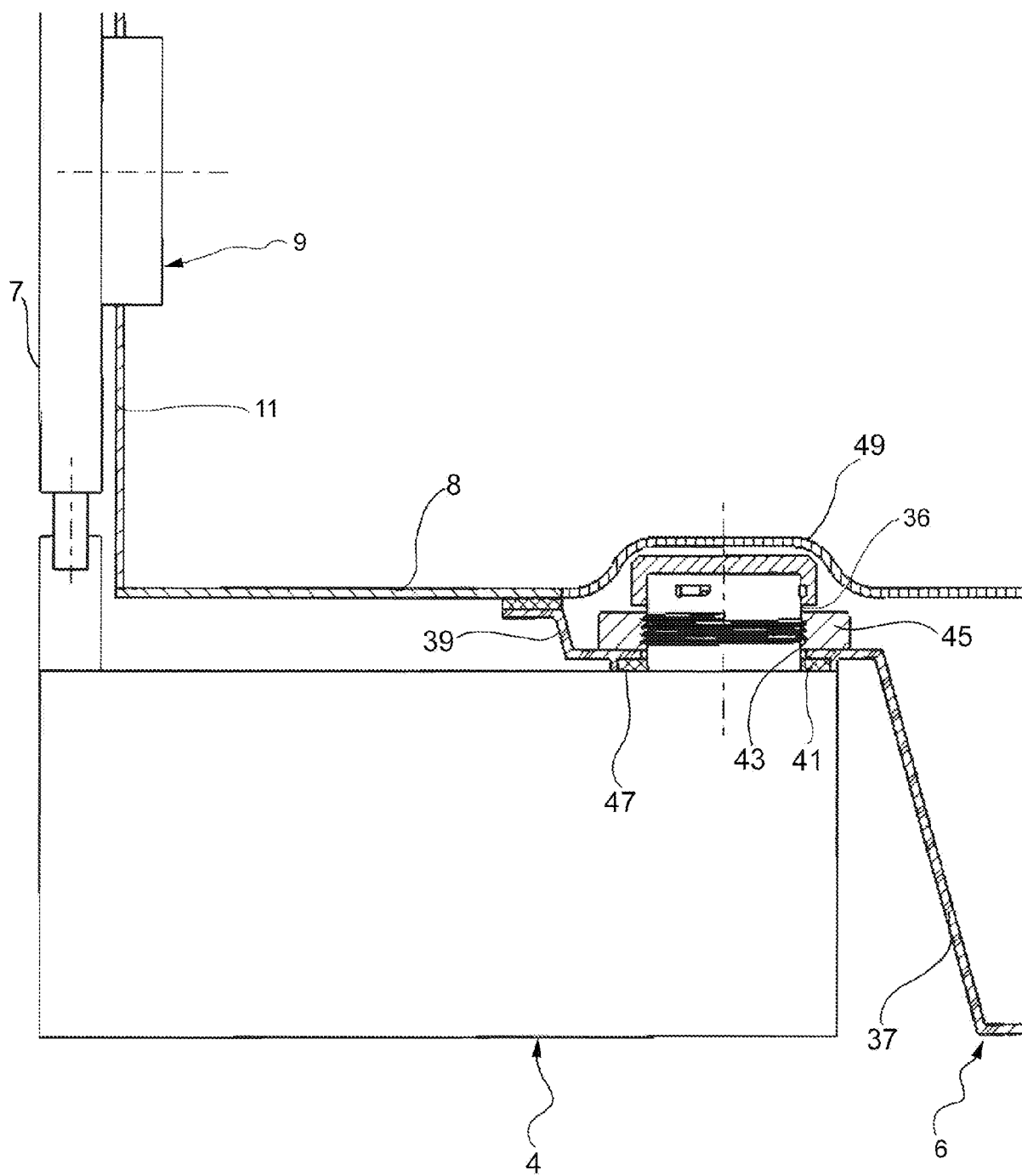


FIG.5

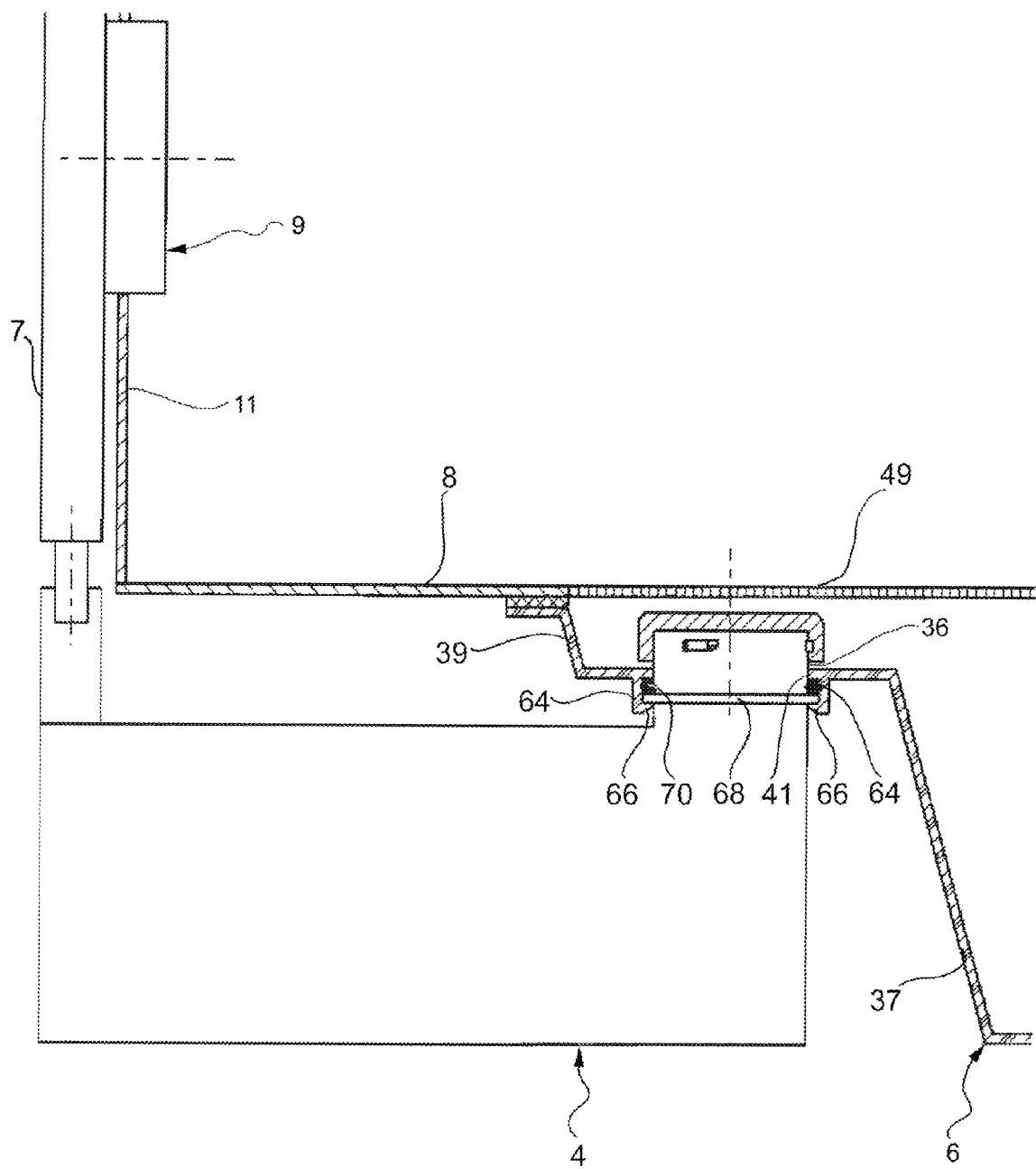


FIG.6



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 3706

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 January 2009	Examiner Hannam, Martin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 16 3706

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