(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 555 663 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
08.01.2014 Bulletin 2014/02

(21) Application number: **11730434.5**

(22) Date of filing: **06.04.2011**

(51) Int Cl.:
A47L 15/42 *(2006.01)*

(86) International application number:
PCT/IB2011/051473

(87) International publication number:
WO 2011/125027 (13.10.2011 Gazette 2011/41)

(54) **DISHWASHING MACHINE**

GESCHIRRSPÜLMASCHINE

LAVE-VAISSELLE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **08.04.2010 IT TO20100267**

(43) Date of publication of application:
13.02.2013 Bulletin 2013/07

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(56) References cited:
EP-A1- 2 233 058
EP-A2- 1 502 535
EP-A2- 1 905 340
WO-A1-03/053210
DE-A1-102007 056 921
US-A1- 2006 054 198
US-A1- 2006 174 923
US-A1- 2008 223 420

EP 2 555 663 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The present invention relates to a dishwashing machine.

[0002] At the bottom of the washing tank of such a machine an element called sump is placed, to which a washing pump, a discharge pump, a heater for the fed water, a system for detecting the amount of water supplied to the washing tank and a channel feeding water to impellers that are placed within the washing tank as well as possible further component are typically associated.

[0003] US-2008/0223420 discloses a dishwashing machine of this type, comprising - as necessarily separated components to be mounted to the sump - a casing of an impeller of the washing pump, a cover for this casing, a sump cover and a filter cover. The axis of the impeller or rotor of the washing pump has a substantially vertical position, matching the one of the sump central axis. Consequently, this rotor has to be mounted from the inside of the sump, whereas the motor thereof from the outside of the latter.

[0004] Generally, the several above-mentioned accessory components for known dishwashing machines are associated to each other and to the sump by the interposition of hydraulic connection means, such as joints, seals and the like. However, in case of an imperfect assembly, these connections may be the cause for leakages spilling out of the dishwashing machine with the risk of flooding and water infiltration.

[0005] More specifically, the present invention relates to a dishwashing machine having the features disclosed in the preamble of claim 1 which follows. A known dishwashing machine of this kind is disclosed in US-2006/174923.

[0006] The object of the present invention is accordingly to overcome the above-mentioned drawbacks of the prior art.

[0007] According to the invention, this object is achieved by means of a dishwashing machine as illustrated in the preamble of the present invention and characterized in that the measuring system is constituted by the main component and the insert.

[0008] The sump of the dishwashing machine of the invention includes two different elements, i.e. the base component and the insert, so that it can take complex shapes and embed the connection members to and among one or more of the other components that are typically associated thereto, as well as parts of the latter. It is thereby possible to reduce the total number of pieces, facilitate the assembly operations and furthermore ensure that any leakage is confined within the sump, so that the potential harmfulness thereof is reduced.

[0009] It should be further understood that the arrangement of the insert above the main component allows an easy disassembling thereof by acting from within the washing tank.

[0010] Advantageously, the washing tank and the motor thereof can be of a standard type, with the rotor of this pump having an axis that lies in a substantially horizontal plane perpendicular to the central axis of the sump. Consequently, the washing tank and the motor thereof can be easily assembled to the sump by acting from the outside of the latter.

[0011] Further characteristics and advantages of the present invention will be better understood from the following detailed description, with reference to the annexed drawings that are given by way of non-limiting examples, in which:

Fig. 1 is a top perspective and partially exploded view of components of a dishwashing machine according to the invention,

Fig. 2 is a top perspective and partially exploded view of the components in Fig. 1 from another point of view, and

Fig.3 is a bottom perspective view of the components in Fig. 1.

[0012] A dishwashing machine comprises a sump consisting of a main component 10 to which an insert 12 is associated.

[0013] The main component 10 has an upper portion thereof which is configured as a basin 14 and a lower portion 16 thereof which has an approximately cylindrical shape and a lower cross-section than that of the basin 14. Within the two portions 14, 16 of the component 10 a cavity 18 that is opened on top extends itself.

[0014] The insert 12 has a substantially flat upper portion 20 from which lower protuberances 22a, 22b protrude. The substantially flat upper portion 20 is placed within a part of the cavity 18 provided within the upper portion 14 of the main component 10, whereas the lower protuberances 22a, 22b penetrate within parts of the cavity 18 that are provided within the lower portion 16 of the main component 10.

[0015] The flat portion 20 and the protuberance 22b of the insert 12 define together with the facing parts of the main component 10 an initial length 23 of a water-supplying channel to impellers placed within the washing tank (not illustrated in the drawings). This supply channel then extends to a device 24 known per se, which selectively directs the fed water to the impellers, which device allows water to be sent to the washing tank through either one or both impellers being provided therein, such that the cleaning action of the water jets is increased. The flat portion 20 of the insert 12 further integrates protruding sleeves 25 being part of the end length of the impellers water supply channel.

[0016] Advantageously, the insert 12 is connected to the main component 10 by means of quick coupling means such as to be capable of being easily disassembled by acting from the washing tank.

[0017] The lower protuberance 22a of the insert 12 cooperates with an element 26 that is present in that part of the cavity 18 being provided in the lower portion 16 of the main component 10 so that a detection system for

the amount of water supplied within the washing tank is constituted.

[0018] The main component 10 has a monolith structure and also integrates a channel 28 for connection to a washing pump 30, a worm feeder or casing 32 of the rotor of the washing pump 30, a channel 34 for connection to a discharge pump 36, a worm feeder or casing 38 of the rotor of the discharge pump 36 and a container 40 of a heater 42 of the fed water. The rotor of the washing pump has an axis lying on a plane substantially horizontal and perpendicular to the axis of the lower cylindrical portion 16 of the main component 10. The channel 28 with the worm feeder 32 and the channel 34 with the worm feeder 38 laterally project from the outer portion of the lower cylindrical portion 16 of the main component 10, whereas the container 40 projects below from the bottom of the upper portion 14. It should be noted that the water supply channel of the impellers, of which said length 23 is part originates from the washing pump 30 and then it extends through the heater 42 before it reaches the addressing device 24.

[0019] The part of cavity 18 which is provided in the lower portion 16 of the main component 10 is connected by means of a passageway 44 to the washing pump 30. In the upper portion 14 of the main component 10 a hole 46 is further made to allow a plug for the tank of the salt used to regenerate the ion-exchange resins of the decalcifier (not illustrated in the figures) to pass therethrough.

[0020] The insert 12 together with those parts facing the main component 10 also defines a length of a channel 48 leading to the drain outlet and in particular is closed on top thereof by an appendix 50 of the insert 12.

[0021] Of course, the principle of the invention remaining unchanged, the embodiments and the implementation details may be widely changed as compared with what has been described above by way of example only, without however departing from the scope of the present claims.

Claims

1. Dishwashing machine comprising a sump to which at least a washing pump (30), a discharge pump (36), an heater (42) of the fed water, a measuring system of the amount of water fed into the washing tank and a channel feeding water to impellers placed in the washing tank are associated, wherein said sump is formed by a main component (10) having monolithic structure (10) and an opened cavity at the top (18) which is partially closed by an insert (12) which defines together with the facing parts of the main component (10) at least a length (23) of said water feeding channel,
said dishwashing machine being **characterized in that** said measuring system is constituted by said main component (12) and said insert (10).

2. Dishwashing machine according to claim 1, **characterized in that** said main component (10) has an upper portion shaped as a basin (14) and an hollow lower portion (16) whose transverse cross-section is smaller than the one of the basin, said cavity (18) extending within the upper portion (14) and the lower portion (16) of the main component (10) and said insert (12) having a substantially flat upper portion (20) placed within a part of the cavity (18) done within the upper portion (14) of the main component (10), and at least one lower protuberance (22a, 22b) which penetrates within a part of the cavity (18) done within the lower portion (16) of the main component (10).

3. Dishwashing machine according to any one of the previous claims **characterized in that** said washing pump (30) has a rotor whose axis lies in a substantially horizontal plan.

4. Dishwashing machine according to any one of the previous claims **characterized in that** said main component (10) integrates a connection conduit (28) to the washing pump (30) and, preferably, a casing (32) of the rotor of the washing pump (30).

5. Dishwashing machine according to any one of the previous claims **characterized in that** said main component (10) integrates a connection conduit (34) to the discharge pump (36) and, preferably, a casing (38) of the rotor of the discharge pump (36).

6. Dishwashing machine according to any one of the previous claims **characterized in that** said main component (10) integrates a casing (40) of the heater (42).

7. Dishwashing machine according to any one of the previous claims **characterized in that** one of the lower protuberances (22a) of the insert (12) cooperates with an element (26) present in said cavity (18) of the main component (10) so as to constitute said measuring system of the amount of water fed into the washing tank.

8. Dishwashing machine according to any one of the previous claims, **characterized in that** said insert (12) is connected to the main component (10) by quick connection means so as it can be disassembled by operating from the washing tank.

9. Dishwashing machine according to any one of the previous claims, **characterized in that** said insert (12) defines together with the facing parts of the main component (10) at least a length of a conduit (48) which leads to the drain outlet, preferably said conduit (48) being superiorly closed by an appendix (50) of the insert (12).

10. Dishwashing machine according to any one of the previous claims, **characterized in that** said insert (12) integrates protruding sleeves (25) which are part of the channel feeding water to impellers placed in the washing tank.

Patentansprüche

1. Geschirrspülmaschine, die einen Sumpf umfasst, zu dem wenigstens eine Spülpumpe (30), eine Abförderpumpe (36), eine Heizung (42) für das zugeführte Wasser, ein Messsystem für die Menge des in den Spülbehälter zugeführten Wassers und ein Kanal, der Wasser an Flügelräder zuführt, die in dem Spülbehälter angeordnet sind, gehören, wobei der Sumpf durch eine Hauptkomponente (10) mit einer monolithischen Struktur (10) und einem geöffneten Hohlraum an der Oberseite (18), der von einem Einsatz (12), der zusammen mit den gegenüberliegenden Teilen der Hauptkomponente (10) wenigstens eine Länge (23) des Wasserzuführungskanals bildet, teilweise geschlossen wird,
wobei die Spülmaschine **dadurch gekennzeichnet ist, dass** das Messsystem durch die Hauptkomponente (12) und den Einsatz (10) gebildet wird.

2. Spülmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Hauptkomponente (10) hat: einen oberen Abschnitt, der als ein Becken (14) geformt ist, und einen hohlen unteren Abschnitt (16), dessen transversaler Querschnitt kleiner als der des Beckens ist, wobei der Hohlraum (18) sich innerhalb des oberen Abschnitts (14) und des unteren Abschnitts (16) der Hauptkomponente (10) erstreckt, und wobei der Einsatz (12) mit einem im Wesentlichen flachen oberen Abschnitt (20) innerhalb eines Teils des Hohlraums (18) angeordnet ist, der innerhalb des oberen Abschnitts (14) der Hauptkomponente (10) gefertigt ist und wenigstens einen unteren Vorsprung (22a, 22b) hat, der innerhalb eines Teils des Hohlraums (18), der innerhalb des unteren Abschnitts (16) der Hauptkomponente (10) gefertigt ist, eindringt.

3. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Spülpumpe (30) einen Rotor hat, dessen Achse in einer im Wesentlichen horizontalen Ebene liegt.

4. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Hauptkomponente (10) eine Verbindungsleitung (28) zu der Spülpumpe (30) und vorzugsweise ein Gehäuse (32) des Rotors der Spülpumpe (30) integriert.

5. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Hauptkomponente (10) eine Verbindungsleitung (34) zu der Abförderpumpe (36) und vorzugsweise ein Gehäuse (38) des Rotors der Abförderpumpe (36) integriert.

6. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Hauptkomponente (10) ein Gehäuse (40) der Heizung (42) integriert.

7. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** einer der unteren Vorsprünge (22a) des Einsatzes (12) mit einem Element (26) zusammenwirkt, das in dem Hohlraum (18) der Hauptkomponente (10) vorhanden ist, um das Messsystem für die Menge des in den Spülbehälter zugeführten Wassers zu bilden.

8. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Einsatz (12) durch Schnellverbindungsmittel mit der Hauptkomponente (10) verbunden ist, so dass er gehandhabt werden kann, um von dem Spülbehälter abmontiert zu werden.

9. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Einsatz (12) zusammen mit den gegenüberliegenden Teilen der Hauptkomponente (10) wenigstens eine Länge einer Leitung (48), die zu dem Ableitauslass führt, definiert, wobei die Leitung (48) vorzugsweise besser durch einen Anhang (50) des Einsatzes (12) geschlossen ist.

10. Spülmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Einsatz (12) vorstehende Hülsen (25), die Teil des Kanals sind, der Wasser an die in dem Spülbehälter angeordneten Flügelräder zuführt, integriert.

Revendications

1. Machine à laver la vaisselle comprenant un puisard auquel au moins une pompe de lavage (30), une pompe de décharge (36), un dispositif de chauffage (42) de l'eau alimentée, un système de mesure de la quantité d'eau alimentée dans le réservoir de lavage et un canal alimentant de l'eau vers des impulseurs placés dans le réservoir de lavage sont associés, dans lequel ledit puisard est formé par un composant principal (10) ayant une structure d'un seul bloc (10) et une cavité (18) ouverte en haut qui est partiellement fermée par un insert (12) qui définit avec les parties lui faisant face du composant principal (10) au moins une longueur (23) dudit canal d'alimentation d'eau,

ladite machine à laver la vaisselle étant **caractérisée en ce que** ledit système de mesure est constitué par ledit composant principal (12) et ledit insert (10).

2. Machine à laver la vaisselle selon la revendication 1, **caractérisée en ce que** ledit composant principal (10) comporte une partie supérieure formée comme une cuvette (14) et une partie inférieure (16) creuse dont la section transversale est plus petite que celle de la cuvette, ladite cavité (18) s'étendant dans la partie supérieure (14) et la partie inférieure (16) du composant principal (10) et ledit insert (12) comportant une partie supérieure sensiblement plate (20) placée dans une partie de la cavité (18) faite dans la partie supérieure (14) du composant principal (10), et au moins une protubérance inférieure (22a, 22b) qui pénètre dans une partie de la cavité (18) faite dans la partie inférieure (16) du composant principal (10).

3. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ladite pompe de lavage (30) comporte un rotor dont l'axe repose dans un plan sensiblement horizontal.

4. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit composant principal (10) intègre un conduit de liaison (28) avec la pompe de lavage (30) et, de préférence, un carter (32) du rotor de la pompe de lavage (30).

5. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit composant principal (10) intègre un conduit de liaison (34) avec la pompe de décharge (36) et, de préférence, un carter (38) du rotor de la pompe de décharge (36).

6. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit composant principal (10) intègre un carter (40) du dispositif de chauffage (42).

7. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** l'une des protubérances inférieures (22a) de l'insert (12) coopère avec un élément (26) présent dans ladite cavité (18) du composant principal (10) de façon à constituer ledit système de mesure de ladite quantité d'eau alimentée dans le réservoir de lavage.

8. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit insert (12) est relié au composant principal (10) par des moyens de liaison rapide de façon à ce qu'il peut être désassemblé en opérant depuis le réservoir de lavage.

9. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit insert (12) définit conjointement avec les parties lui faisant face du composant principal (10) au moins un tronçon d'un conduit (48) qui mène à l'orifice de sortie de drain, de préférence ledit conduit (48) étant fermé supérieurement par un appendice (50) de l'insert (12).

10. Machine à laver la vaisselle selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit insert (12) intègre des manchons saillants (25) qui font partie du canal alimentant l'eau vers les impulseurs placés dans le réservoir de lavage.

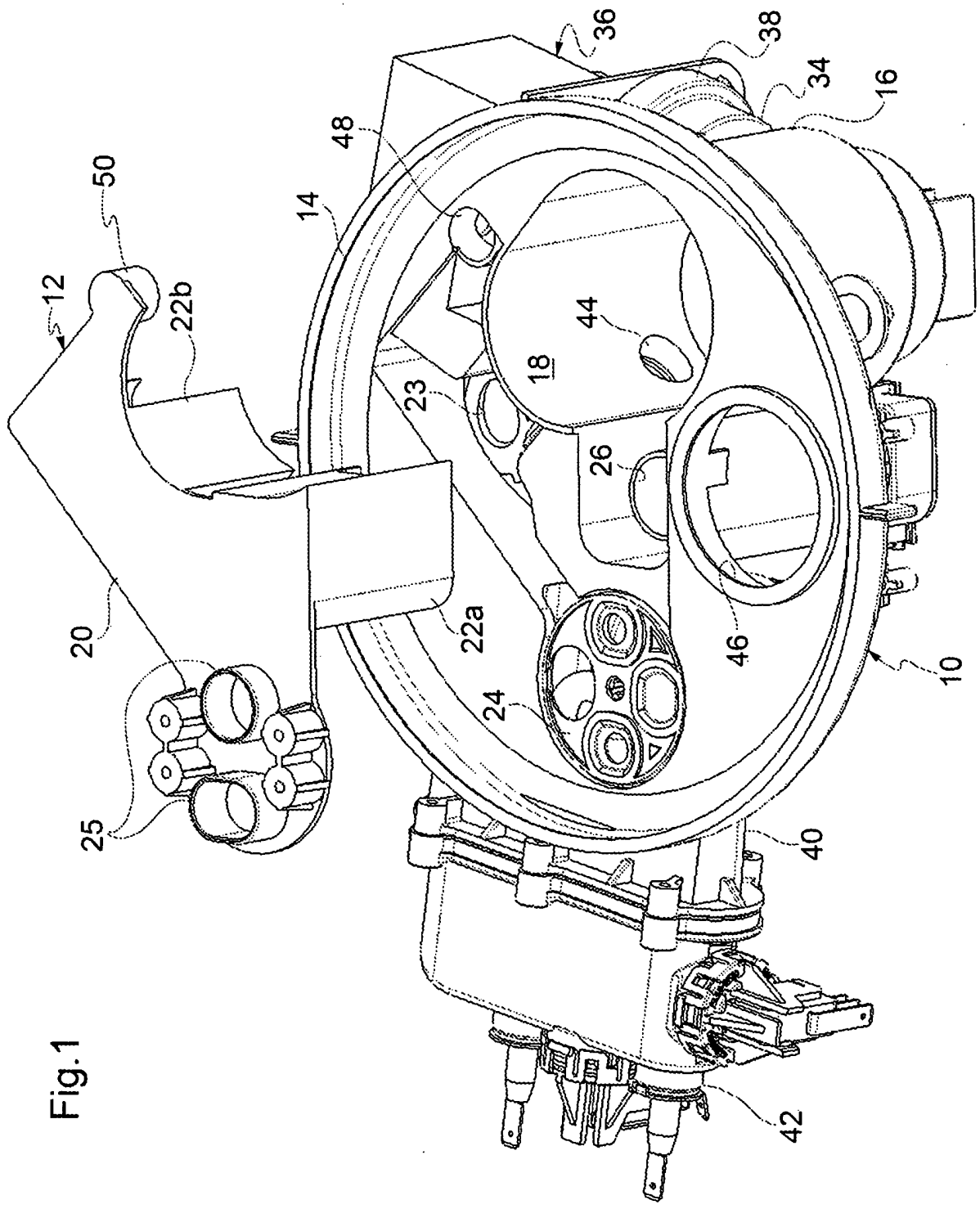


Fig.1

Fig.2

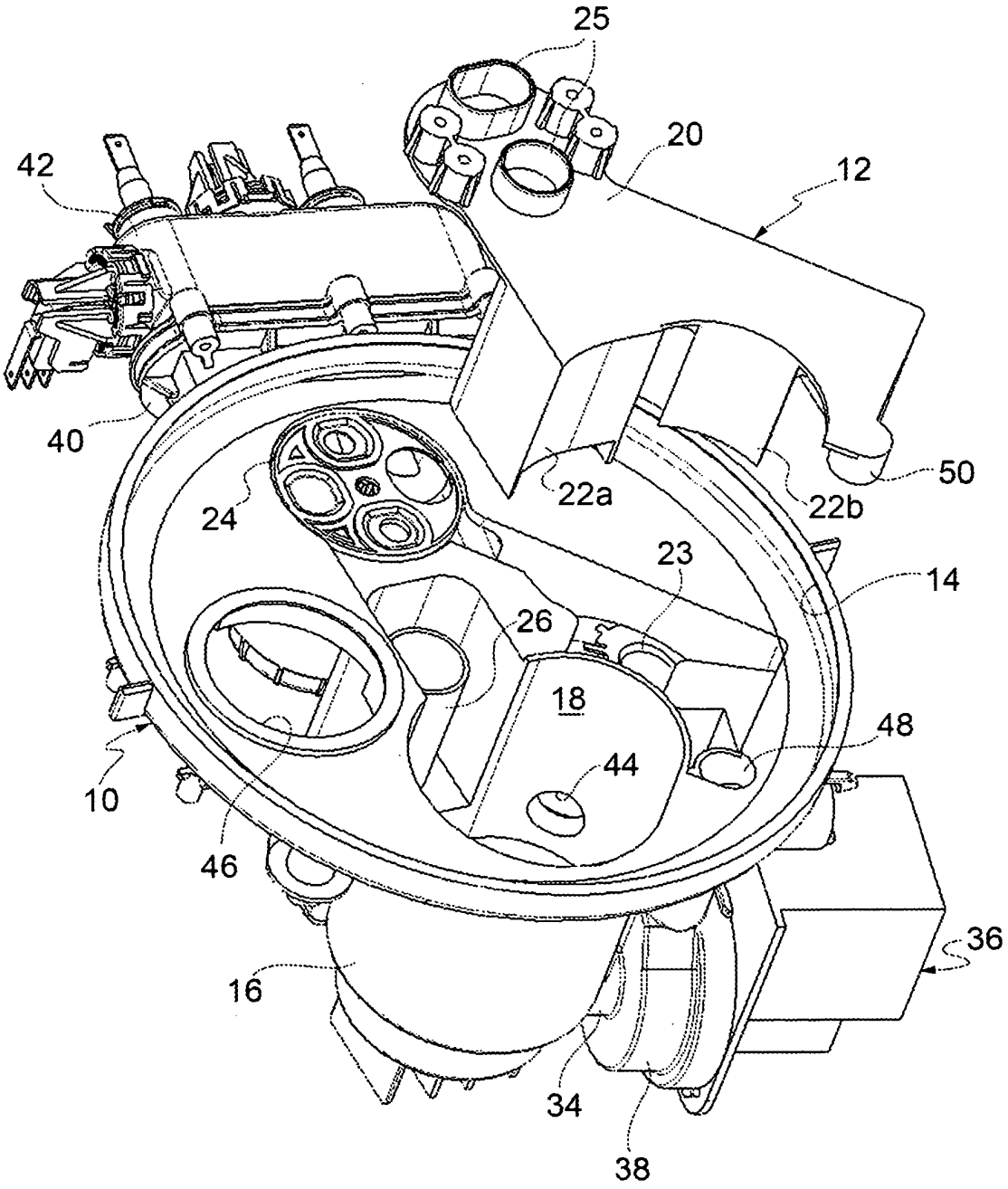
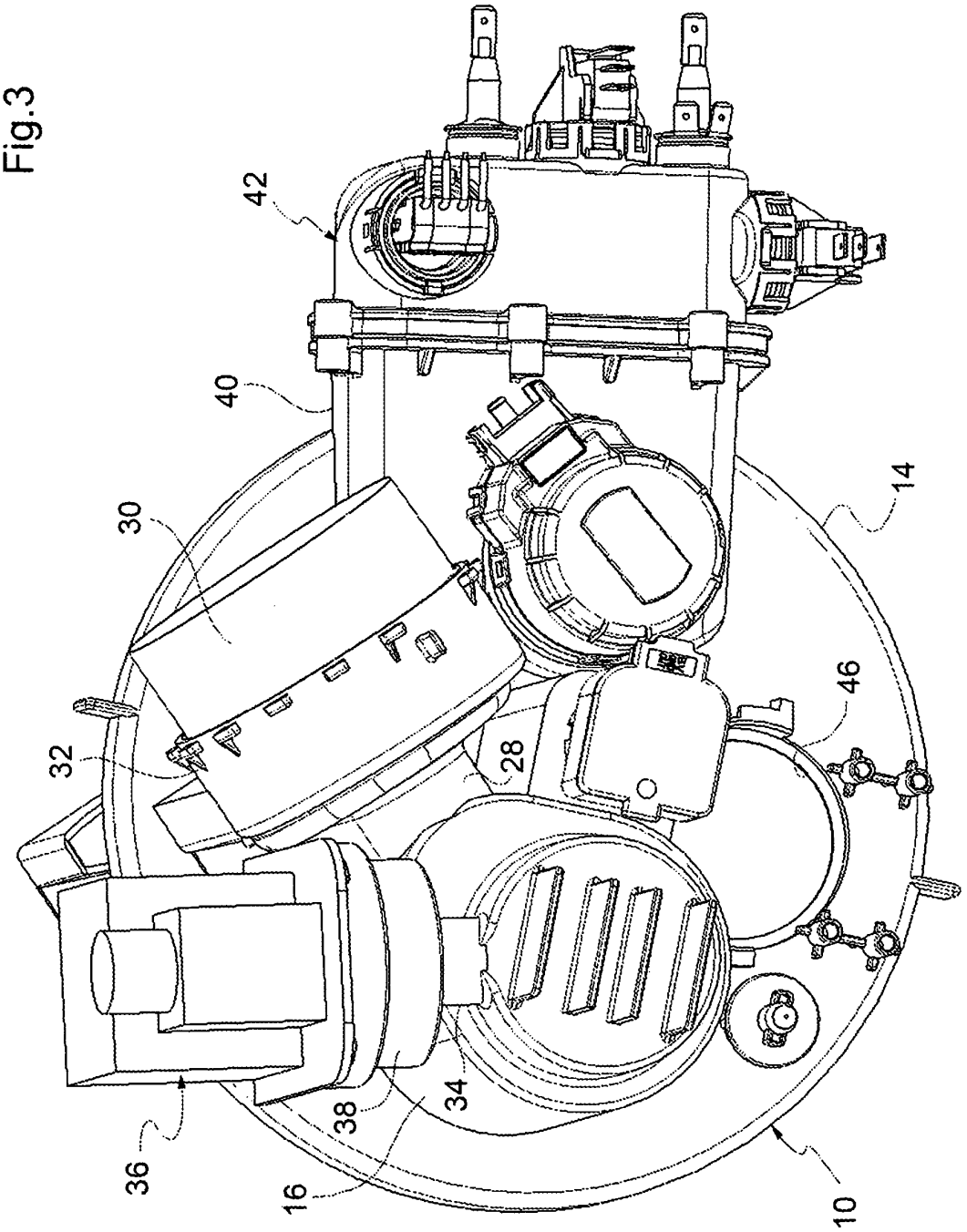


Fig.3



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20080223420 A **[0003]**
- US 2006174923 A **[0005]**