



(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **93102405.3**

(51) Int. Cl.⁵ : **A47L 15/42**

(22) Date of filing : **16.02.93**

(30) Priority : **19.02.92 IT TO920131**

(43) Date of publication of application :
25.08.93 Bulletin 93/34

(84) Designated Contracting States :
DE ES FR GB

(71) Applicant : **MERLONI ELETTRODOMESTICI S.p.A.**
Viale Aristide Merloni, 45
I-60044 Fabriano (AN) (IT)

(72) Inventor : **Frairia, Carlo**
Via Caprilli 15
Pinerolo (TO) (IT)

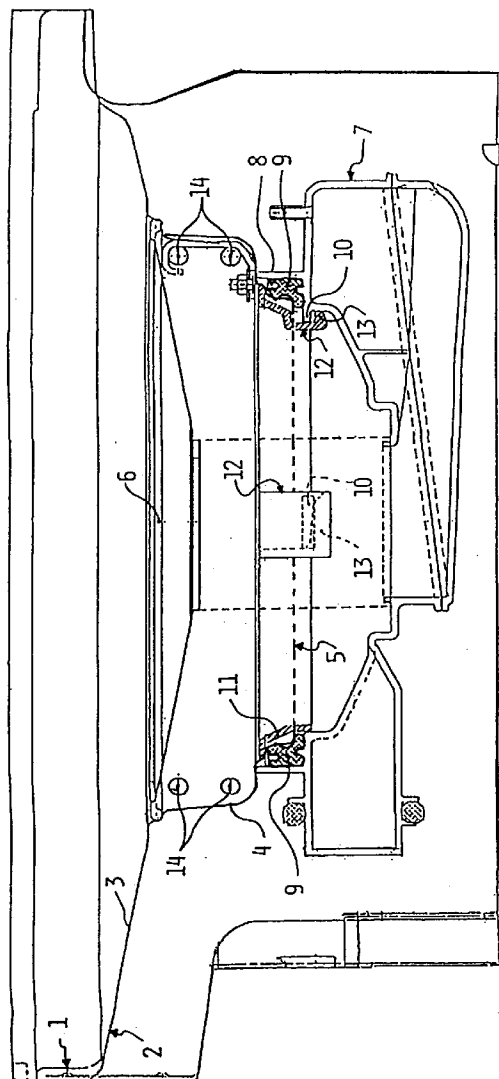
(54) **Dishwashing machine with washing liquid collecting sump.**

(57) A dish-washing machine is described comprising a washing liquid collection sump arranged at the bottom of a washing chamber, said sump being fixed to a mouth defined in said chamber bottom.

The main characteristic of the described dish-washing machine is that the water-tight fixing of said collection sump (7) for the washing liquid to said bottom (2) of the washing chamber is realised with mutual coupling means (10-13), in particular of the bayonet joint type, internally arranged respect said mouth (5) and said sump (7).

The assembly of the sump can be carried out in a simple and rapid manner, with operations being easily automated.

FIG. 1



The present invention relates to a dish-washing machine comprising a washing liquid collection sump arranged at the bottom of a washing chamber, said sump being fixed to a mouth defined in said chamber bottom.

As is known dish-washing machines are supplied with a chamber, generally realised in stainless steel, at the bottom of which a sump for collecting the washing water is fixed.

In the earlier dish-washing machines the collection sump of the washing water was entirely realised in stainless steel, of a single piece with the base of the chamber; in practice the sump, generally of a rectangular section, was obtained by way of a deep drawing of the steel sheet and had two openings for the connection unions to the washing pump and to the drainage pump.

In modern day dish-washing machines the bottom of the washing chamber has on the contrary a slightly drawn form with an opening being generally circular, under which a separate sump is fixed; over said opening, and therefore in correspondence with the superior part of the collection sump, a filter is arranged that provides for detaining the impurities of the washing liquid; consequently the water sprayed by the rotating collectors, after having hit the dishes and removed the residues, falls to the bottom of the washing chamber and reaches the sump subjected to a filtering action; from the sump an appropriate pump then provides for re-conveying the water to the rotating collectors, and so on until termination of the washing phase.

In dish-washing machines currently commercialised, the collection sump of the washing liquid is realised in a plastic material, being of a single piece; the superior portion of the sump, i.e. that arranged immediately under the filter, has a substantially cylindrical form and has the main function of collecting the washing liquid; the lower part of the sump has however a complex structure and has the function of integrating several functional components (for instance the air trap) and the unions for the washing and drainage pumps.

According to the known technique the fixing of the collection sump of the water to the bottom of the washing chamber is realised by way of at least one external metallic strap or by way of a series of screws arranged along the circumference of the superior part of the sump, with appropriate water-tight seals.

Such known solutions do however have several drawbacks, above all in line with the possibility of automating the fixing operation of the sump to the base of the chamber and, in several cases, of the possibility of carrying out such fixing if functional components are already preassembled to the sump, such as the washing and drainage pumps.

According to the first two known techniques cited, i.e. that using one or more straps or metallic col-

lars, in the part being slightly drawn on the base of the chamber a lip is realised that defines an engagement seat for fixing the superior portion of the collection sump.

In practice the sump is fitted from below to the drawn part, so as that the base of the chamber and superior portion of the sump are fixed; to the exterior of the joint of the two pieces an appropriate water-tight seal is arranged and a metallic strap is closed around the such seal, so as to form an ensemble between the seal, the drawn bottom of the chamber and the cylindrical wall of the sump. Such type of fixing has the drawback of requiring a complex manual action, at least for the fixing and closing of the metallic strap.

The automation of such operation, even though possible, would evidently require very complex machines, manipulator or robot systems, that would be subject to frequent controls.

In the case of the second known technique cited for fixing the sump, consequently that using screws, the opening present in the part being slightly drawn on the base of the chamber has a substantially L shaped edge, while the superior cylindrical portion of the sump has a series of holes arranged along the circumference for housing the fixing screws.

In this case the sump is mounted by inserting it from above in the opening of the base of the chamber, until the superior portion of the sump rests on the L shaped edge of the base with a seal being interposed.

To the exterior of the sump brackets are therefore arranged that, by way of the screws tightened from the exterior side of the sump in the seats realised along the circumference of the superior portion of the sump allow for obtaining the fixing between the pump and the bottom of the chamber; in this way an ensemble is formed between the steel sheet of the base of the chamber, seal, superior portion of the sump and the external holding brackets.

According to an alternative screw fixing technique, the sump is fixed from below to the slightly drawn part of the base of the chamber; the sump has in its superior edge a series of seats, along its circumference, for screws that are tightened from the external side of the base of the chamber; between the steel sheet of the base of the chamber and the superior edge of the sump a water-tight seal is naturally provided; in this case, however, the screws create an ensemble between the edge of the sump, the seal and the base of the chamber.

The two cited solutions of fixing the sump by way of screws also have several drawbacks.

The fixing must in fact be manually realised, for tightening the various screws arranged along the circumference, even the automation of this kind of fixing, although possible, would be very complex, due to the requirements of precision necessary.

Moreover, especially in the first case (which is

the most common and reliable solution) if components have already been assembled to the sump, the manual fixing is rendered difficult, in that the technician has to carry out particular movements of the sump, for instance inclining it, so as to make the lower part, to which the components have been preassembled, pass the opening of the base of the chamber.

It is clear that this necessity would further complicate the realisation of an eventual fixing by way of a robot and automatic manipulators.

The aim of the present invention is that of solving the mentioned drawbacks and in particular to indicate a dish-washing machine in which the fixing of the collection sump to the bottom of the washing chamber can be realised in a simple and rapid manner and that, even in the presence of preassembled functional components on said sump, it can be completely and easily automated.

A further aim of the invention is that of indicating a dish-washing machine in which the washing liquid collection sump be in part incorporated in the base of the chamber of stainless steel and in part realised in plastic.

Such aims are reached according to the invention by way of a dishwashing machine comprising a washing liquid collection sump arranged at the bottom of a washing chamber, said sump being fixed to a mouth defined in said chamber bottom, characterised in that the fixing of said washing liquid collection sump to said base of the washing chamber is realised with mutual coupling means, in particular of the bayonet joint type.

Further aims and advantages of the present invention will result in being clear from the following description and annexed drawings, supplied as a purely explanatory and non-limiting example, wherein, figure 1 alone represents a partial and schematic section of the lower part of a dish-washing machine according to the invention.

With reference to figure 1, the reference numbers 1 and 2 respectively indicate the skirt (i.e. the lateral and rear walls) and the bottom of the washing chamber in stainless steel of the dishwashing machine according to the invention.

The base 2 of the chamber has a peripheral zone 3 being slightly drawn and a central zone being deeply drawn, i.e. shaped in a way to form a substantially cylindrical portion, indicated with 4; on the bottom of said cylindrical portion a circular opening is obtained, having a lip or edge of the stainless sheet being slightly curved towards the interior of the opening, so as to form a mouth also being cylindrical; such mouth is indicated with reference number 5.

Over the cylindrical portion 4, the base of - the chamber 2 further defines a seat for a filter of the washing liquid 6, schematically represented and in part with a dotted line.

Reference number 7 indicates a piece of plastic

material being resistant to high temperatures, for example moulded polypropylene, that is fixed, as will be described in the following, to the mouth 5 defined by the opening of portion 4.

In practice the piece 7 constitutes only the lower section of a sump of the known type, i.e. the part that incorporates the functional elements, such as the air trap and the attachments for the pumps and the water mains; in the case illustrated in figure 1 the superior part of the sump is in fact constituted by the cylindrical portion 4 of the base of the chamber 2, that accomplishes therefore the collecting of the washing liquid.

The terminal part 8 of the piece 7, destined to be fixed to the mouth 5 of the base of the chamber 2, has a substantially cylindrical form; in the superior edge of the terminal part 8 a seat for the seal watertight is obtained, indicated with 9.

With reference number 10 prominent teeth obtained during the moulding operation of piece 7 are indicated (one of which being indicated with a dotted line); such prominent teeth 10, that can be for example four, are arranged along the circumference of the internal wall of piece 7, at a lower level respect the seat of seal 9.

With reference number 11 a ring is indicated, also being realised in a plastic material resistant to high temperatures.

Such ring 11 is circular, and has a diameter and a form that allows it to be inserted from above in the cylindrical portion 4 of the base of the chamber 2, up to the mouth 5 realised in the lower part of the chamber

The ring 11 comprises hooks 12 on its lateral external surface, being of a number corresponding to the teeth 10, in which seats 13 are defined destined to be coupled with teeth 10.

Both the teeth 10 and the seats 13 of the hooks 12 have a raisers, so as to favour the mutual coupling (note the centre of the figure); furthermore, in the illustrated case, the lower surface of the teeth 10, i.e. that which comes into contact with the seats 13, is at least in part inclined, so as that the more the ring 11 is rotated the more the clamping and the assembly force of the group is increased.

For fixing the piece 7 to the base of the chamber 2, the terminal part 8, in which the seal 9 is preassembled, is fitted from below on the mouth 5 realised in the extreme part of the portion 4 of the base of the chamber 2; the ring 11 is however inserted from above in such portion 4.

The actual fixing is obtained by imparting a rotation (in the specific case anti-clockwise) of the ring 11, so as that the teeth 10 become engaged in the seats 13 defined by the hooks 12, realising therefore a coupling of the bayonet joint type, of a progressive closing force.

It is clear that during the rotating movement the

teeth 10 become fixed in the hooks 12 with an increasing friction, due to the inclined surface of the teeth 10 respect the seats 13 of the hooks 12, and thus creating a traversal clamping force for the whole mouth 5, ring 11, terminal part 8.

As can be noted from the figure, the seal 9 results in being interposed and pressed between the terminal part 8 and the sheet of the mouth 5; the sheet of the mouth 5 is in turn pressed towards the exterior of the ring 11.

The fixing operation therefore results in being very simple, even from the possible automation point of view.

With such aim it is in fact sufficient to provide a manipulator arm that fits the piece 7 to the base of the chamber, even in the presence of preassembled components, and another arm, equipped with similar implements, that inserts the ring 11 from the opposite side and carries out the necessary rotation.

It is also to be noted that in the case of the dishwashing machine described with reference to figure 1, the cylindrical portion 4 of the base of the chamber 2 can advantageously be utilised for housing a heating resistance of the washing liquid, for instance of two circular turns, arranged under the filter 6.

Such resistance, the section of which being indicated in the figure with reference number 14, thus results in being out of view and does not have any risks of over heating, being always immersed in the washing liquid and however distanced from the part realised in plastic of the sump, i.e. from piece 7.

From the given description the characteristics of the dishwashing machine subject of the present invention result in being clear; as do its advantages, mainly represented in that the water-tight fixing of the sump to the base of the chamber can be achieved in a very simple and rapid manner, even in the presence of preassembled components to the sump; the singular fixing operations are actually elementary and reduce to a minimum the possibility of errors; the assembly of the sump can therefore be completely and easily automated.

Moreover the particular realisation of the sump described, a substantial part of which is directly incorporated in the base of the chamber, allows for a reduction in costs of valuable materials (the plastic necessary for the realisation of sumps that resist high temperatures), and allows for housing the heating resistance directly in the sump, below the filter, with an improved aesthetic and functional appearance.

It is however to be considered that the type of fixing of the sump of the described dishwashing machine subject of the present invention can without any problems be employed also for the fixing of sumps of the known type, i.e. realised in a single piece of plastic material; for such aims it is in fact sufficient that the bottom of the washing chamber defines a mouth (as is normally the case in all actual dishwashing ma-

chines): to the exterior of said mouth the sump will be fixed from below, equipped with appropriate prominent teeth, while to the interior of the same mouth the fixing ring equipped with coupling seats for said teeth shall be inserted.

It is clear that numerous variants can be supplied to the dishwashing machine subject of the invention, without however departing from the novelty principles inherent in the inventive idea, as it is clear that in the practical actuation of the invention the materials and the forms of the illustrated details could be different, and could be substituted with elements being technically equivalent.

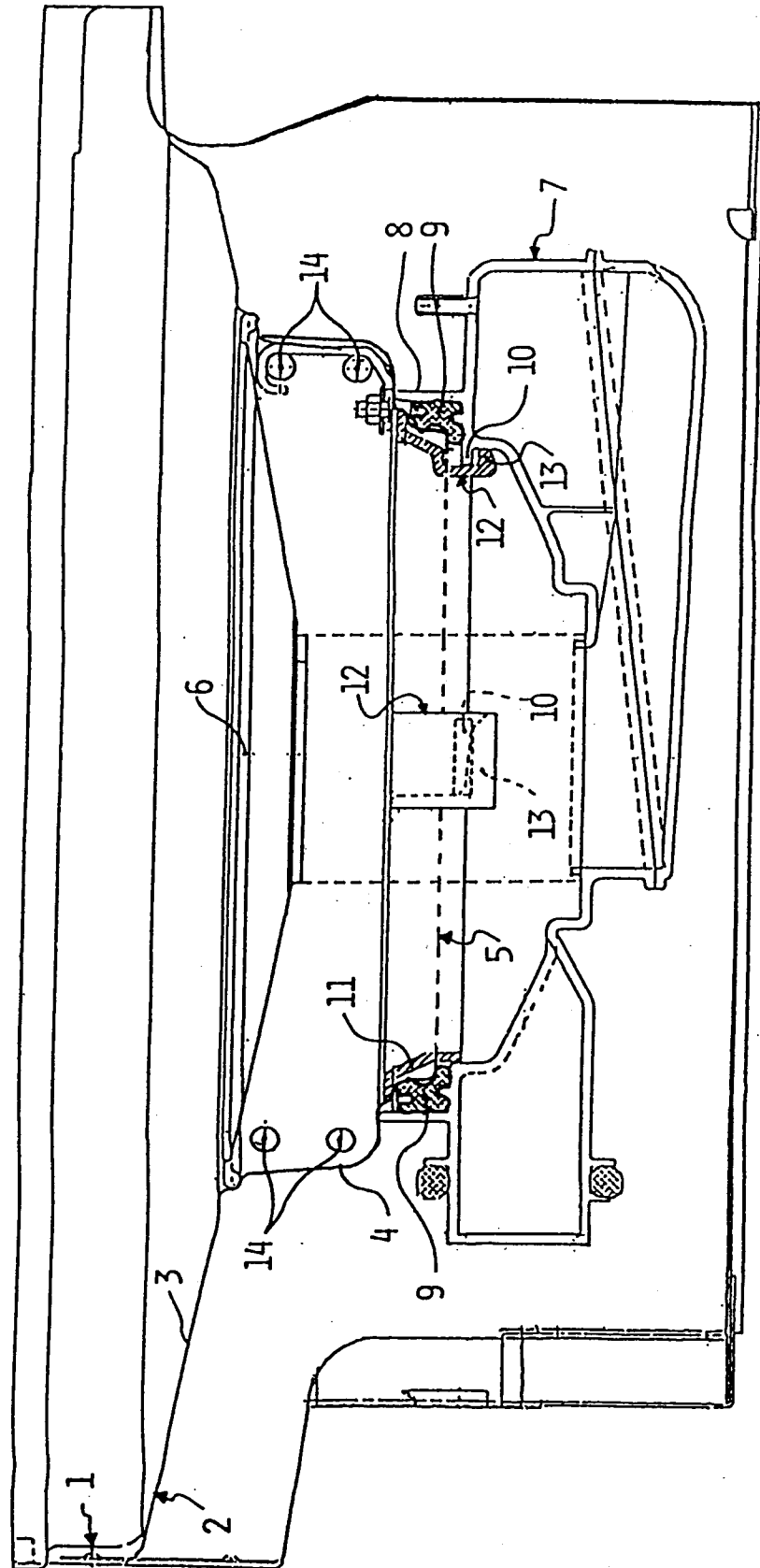
Claims

1. Dish-washing machine comprising a washing liquid collection sump arranged at the bottom of a washing chamber, said sump being fixed to a mouth defined in said chamber bottom, characterised in that the fixing of said collection sump (7) for the washing liquid to said base (2) of the washing chamber is realised with mutual coupling means (10-13), in particular of the bayonet joint type.
2. Dish-washing machine, according to claim 1, characterised in that said mutual coupling means (10-13) comprise at least one connection element (11-13) that is arranged inside said mouth (5) and at least one coupling element (10) obtained inside said sump (7).
3. Dish-washing machine, according to claims 1 or 2, characterised in that said mutual coupling means (10-13) are shaped in such a way that allows for a progressive closing force.
4. Dish-washing machine, according to claim 1, characterised in that said mouth (5) defined in said chamber bottom (2) is of a substantially cylindrical form and that said sump (7) presents an attachment portion (8) of a substantially cylindrical form.
5. Dish-washing machine, according to at least one of the previous claims, characterised in that said mutual coupling means comprise two or more prominent teeth (10) on the internal wall of said sump (7), in particular on the internal wall of said attachment portion (8) along its circumference.
6. Dish-washing machine, according to the previous claim, characterised in that a surface of said teeth (10) in particular the lower surface, is at least in part inclined.

7. Dish-washing machine, according to claim 1, characterised in that said mutual coupling means comprise a ring (11) defining coupling seats (12,13) for said prominent teeth (10).
5
8. Dish-washing machine, according to claim 7, characterised in that said coupling seats (12,13) are of a number corresponding to said prominent teeth (10) and are arranged on the external side of said ring (11), along its circumference.
10
9. Dish-washing machine, according to claim 4, characterised in that said attachment portion (8) defines a seat for the water-tight seal (9), inside said sump (7).
15
10. Dish-washing machine, according to at least one of the previous claims, characterised in that for the fixing of said sump (7) to said chamber bottom (2), said sump (7) is fixed from below on said mouth (5) and that said ring (11) is inserted from above in said mouth (5).
20
11. Dish-washing machine, according to at least one of the previous claims, characterised in that said fixing is obtained by imparting to said ring (11) a rotary movement, so as that said seats (12,13) of said ring (11) and said prominent teeth (10) become mutually engaged, said seats (12,13) and said teeth (10) being in particular provided with raisers for favouring the mutual engagement.
25
30
12. Dish-washing machine, according to claims 10 or 11, characterised in that said fixing, in particular water-tight, is formed as an ensemble between said ring (11), the sheet of said mouth (5), said water-tight seal (9) and said sump (7).
35
13. Dish-washing machine, according to at least one of the previous claims, characterised in that said sump (7) is fitted from below on said mouth (5) by way of an automatic machine, appropriately equipped and/or said ring (11) is inserted from above in said mouth (5) and/or rotated by way of an automatic machine appropriately equipped.
40
45
14. Dish-washing machine, according to claim 1, characterised in that the lower part (7) of said sump (4,7) is realised in a plastic material and that the superior part (4) of said sump (4,7) is realised in a metallic material, said superior part (4) in metallic material being realised by a deep drawing of said bottom (2) of the washing chamber.
50
55
15. Dish-washing machine, according to the previous claim, characterised in that in the zone above said superior part (4) of said sump (4,7), said bot-

tom (2) of the washing chamber defines a housing seat for a filter (6) of the washing liquid that is collected in said sump and that in said superior part (4) of said sump (4,7) a heating resistance (14) of the washing liquid is housed, said heating resistance (14) being in particular arranged immediately under said filter (6).

FIG. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 10 2405

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
P,X P,A	US-A-5 118 254 (D.I. ELLINGSON ET AL.) * the whole document *	1-6,9 7,8,11, 12	A47L15/42
X	FR-A-2 505 642 (SMEG ELETTRODOMESTICI SPA) * claims 1-9 *	1-4	
A	US-A-4 221 547 (R.E. HOFFMAN ET AL.) * the whole document *	1,4,7, 10,13,14	
A	DE-A-2 543 822 (LICENTIA PATENT - VERWALTUNGS - GMBH) * the whole document *	1	
A	DE-A-3 229 731 (LICENTIA PATENT - VERWALTUNGS - GMBH) * the whole document *	1	
A	DE-U-8 500 663 (LICENTIA PATENT - VERWALTUNGS - GMBH) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A47L D06F F04D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 MAY 1993	Examiner KELLNER M.
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			

EPO FORM 1503 03.82 (P0401)