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

(11) EP 0 766 945 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.01.2002 Bulletin 2002/02

(51) Int Cl.[7]: **A47L 15/23**

(21) Application number: **96830502.9**

(22) Date of filing: **01.10.1996**

(54) **Device for washing the ceiling of a dishwasher's tank**

Vorrichtung zum Waschen der Spülbehälterdecke einer Geschirrspülmaschine

Dispositif pour laver le plafond de la cuve d'un lave vaiselle

(84) Designated Contracting States:
DE ES FR GB SE

(30) Priority: **03.10.1995 IT MI952021**

(43) Date of publication of application:
09.04.1997 Bulletin 1997/15

(73) Proprietor: **SMEG S.p.A.**
Guastalla (Reggio Emilia) (IT)

(72) Inventor: **Bertazzoni, Roberto**
Guastalla, (Reggio Emilia) (IT)

(74) Representative: **Adorno, Silvano et al**
c/o SOCIETA' ITALIANA BREVETTI S.p.A. Via Carducci, 8
20123 Milano (IT)

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Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The present invention relates to washing devices utilized in dishwashers and more in particular to a device for washing the ceiling of a dishwasher's tank.

[0002] It is well known that some particles of dirt removed from the dishes during the washing may adhere to the ceiling of the tank, especially when the upper sprinkler is placed underneath the top rack. Thus, it would be appropriate for the ceiling to be also washed during the washing cycle in order to avoid encrustations and bad odors.

[0003] The devices that have been used so far may be divided into two categories, namely fixed nozzles and revolving sprinklers. Clearly, fixed nozzles possess a limited effectiveness because of their fixed position, even though they have the advantage of being very simple and cheap.

[0004] On the other hand, revolving sprinklers are more effective but significantly more expensive, and they also have some drawbacks. In the given case that the dishwasher's upper sprinkler is mounted on the ceiling of the tank, such sprinkler should be provided with a series of nozzles also on the upper surface so as to wash the ceiling. However, these additional nozzles would reduce the effectiveness of the washing jets emanating from the lower nozzles, because the water flow would have to be shared among a greater number of nozzles. Such a device is disclosed in EP-A-524102.

[0005] The case when a thorough washing of the ceiling is most necessary occurs with the upper sprinkler located underneath the top rack, because the dishes are hit by upward jets and hence dirt particles would tend to splash onto the ceiling. A dedicated revolving sprinkler for washing the ceiling and attached to the ceiling itself would imply additional costs, as well as a decrease in the height available to the dishes placed in the top rack.

[0006] A further drawback of revolving sprinklers consists in that the washing nozzles are oriented in such a way as to hit always only certain portions of the ceiling, since they follow circular paths, whereby in some areas the dirt is not washed away.

[0007] Therefore the object of the present invention is to provide a device for washing the tank ceiling suitable to overcome the above-mentioned drawbacks.

[0008] This object is achieved by means of a device having the characteristics disclosed in claim 1.

[0009] A first fundamental advantage of the device according to the invention is that of generating a water film through which substantially the whole surface of the ceiling can be washed.

[0010] A second advantage of the present device is that of being quite simple and cheap, and therefore easy to manufacture and to install inside a dishwasher.

[0011] A third advantage of this device comes from its very small size, which allows a complete exploitation of the space existing between the top rack and the tank ceiling.

[0012] Still another advantage of the device is that the same water flow provides both the rotation of the rotor and the washing jets that emanate from said rotor. Therefore, a smaller and more efficient water consumption is achieved in this way.

[0013] These and other advantages and characteristics of the device according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Figure 1 is a partially sectional schematic front view showing the members that make up the device;
Figure 2 is a cross-sectional view of the rotor along the line A-A of fig. 1;
Figure 3 is an enlargement of the area P of fig.1, showing a first variant of the shape of the vanes;
Figure 4 is a half view similarly to fig.1, showing a second variant of the shape of the vanes; and
Figure 5 is a vertical cross-sectional schematic view of a dishwasher provided with the above-stated device.

[0014] With reference to figs.1 and 2, it can be noticed that the device according to the present invention is essentially made up of three members, namely a case 1, a coupling nut 2 that fixes the case 1 in its seat on the tank ceiling, and a rotor 3 that rotates about a vertical axis. The rotor 3 is composed of a plurality of vertical vanes 4 linked at their internal ends to a blind hollow cylindrical hub 5 provided with a horizontal nozzle 6 in correspondence to each vane 4. The hub 5 has a central vertical conduit 7 passing through nut 2 so as to project into case 1, and blocked therein by an O-ring 8 leaning on a slide ring 9. The tightness achieved by the O-ring 8 and the slide ring 9 allows the rotor 3 to freely rotate, while avoiding water leakage even under operating conditions of high pressure, and therefore providing more effectiveness if compared to traditional systems.

[0015] Each vane is essentially S-shaped and it is provided with an intermediate deflector 10, located in correspondence to the first "curve" of the S, and an end deflector 11, also curved. These deflectors 10 and 11 have the twofold purpose of setting rotor 3 into rotation and of converting the horizontal jet coming out from the relevant nozzle 6 into a vertical water film. A gasket 12 is interposed between case 1 and nut 2 for the tightness between the washing device and its corresponding seat formed in the tank ceiling.

[0016] It should be noted that the intermediate deflector 10 has a concavity which opposes that of the end deflector 11, so as to generate a rotational moment which is opposite to that given by the latter to rotor 3. In this way it is feasible to operate at high pressures and/or use rather long vanes 4 while preventing the resulting rotating moment from causing an excessive revolving speed of rotor 3. In the case depicted in fig.2 the resulting moment produces an anti-clockwise rotation, as in-

dicated by arrow R.

[0017] Of course, the vanes 4 may come in a greater number, arranged along the perimeter of hub 5 in a way of obtaining a balanced rotation, typically in opposite angular positions. By using shorter vanes and/or a lower water pressure it may as well be possible to eliminate the intermediate deflector 10 and thus shape vane 4 substantially as a J.

[0018] Referring also to fig.5, the functioning of the device according to the present invention, which is in itself quite simple, is now explained. The water enters the washing device through an upper connection 13 of case 1, incoming from a branch 14 of the conduit 15 which brings the water to the upper sprinkler 16. Passing through conduit 7, the water falls into the hollow hub 5 of rotor 3 and comes out from nozzles 6. Each jet that hits the corresponding vane 4 undergoes a first deviation and a first widening caused by the intermediate deflector 10, and is then again deviated and widened like a fan by the end deflector 11, thus setting rotor 3 into rotation.

[0019] As illustrated in figs.3 and 4, the end of vane 4 may be particularly shaped so as to favour the opening of the jet and consequently the formation of the water film. Besides having a trapezoidal shape rather than a straight one, the end deflector 11 may be provided with a projecting lug 17 along the edge (fig.3), or with a series of grooves 18 arranged like a fan (fig.4). A portion of the jet may also be deviated downwards in order to wash the convex surface of cups and glasses which are usually placed in the top rack, as indicated in fig.5.

[0020] It is clear that the above-described and illustrated embodiment of the device according to the invention is just an example susceptible of various modifications. In particular, rotor 3 might be made in other manners having different shapes, number and arrangement of vanes 4 and nozzles 6.

Claims

1. A Dishwasher comprising a device for washing the ceiling of a dishwasher's tank, **characterized in that** said device includes a case (1) provided with a water connection (13), a coupling nut (2) for blocking said case (1) into its seat on the tank ceiling, and a rotor (3) that rotates about a vertical axis and consisting of a plurality of vertical vanes (4) linked at their internal ends to a blind hollow cylindrical hub (5) provided with a horizontal nozzle (6) in correspondence to each vane (4), the hub (5) being connected to the case (1) by way of a vertical conduit (7) passing through the nut (2) and rotatably blocked thereon, each vane (4) being shaped and provided with one or more deflectors capable of deviating the horizontal jet coming out from the relevant nozzle (6) and converting it into a vertical water film.

2. A dishwasher according to claim 1, **characterized in that** the rotor (3) includes two essentially S-shaped opposite vanes (4) provided with an intermediate deflector (10) and an end deflector (11) placed respectively in correspondence to the first and to the second curve of the S, said deflectors (10,11) having opposed concavity.

3. A dishwasher according to claim 1, **characterized in that** the rotor (3) includes two essentially J-shaped opposite vanes (4) provided with a single end deflector (11).

4. A dishwasher according to one of the preceding claims, **characterized in that** the end deflector (11) has a projecting lug (17) along its edge.

5. A dishwasher according to one of the claims 1 to 3, **characterized in that** the end deflector (11) has a series of grooves (18) arranged like a fan.

Patentansprüche

1. Geschirrspülmaschine mit einer Vorrichtung zum Waschen der Spülbehälterdecke, **dadurch gekennzeichnet, daß** diese Vorrichtung ein mit einem Wasseranschluß (13) versehenes Gehäuse (1), eine Kupplungsmutter (2) zum Blokkieren dieses Gehäuses (1) in ihrem Sitz an der Behälterdecke und einen Rotor (3) aufweist, der um eine vertikale Achse rotiert und aus mehreren vertikalen Flügeln (4) besteht, die mit ihren inneren Enden an eine mit einer Blindöffnung versehene zylindrische Nabe (5) angeschlossen sind, die für jeden Flügel (4) eine waagerechte Düse (6) aufweist, wobei die Nabe (5) mit dem Gehäuse (1) über eine vertikale Leitung (7) verbunden ist, die durch die Mutter (2) verläuft und drehbar daran gehalten ist, jeder Flügel (4) mit ein oder mehreren Deflektoren geformt und ausgestattet ist, die in der Lage sind, den aus der betreffenden Düse (6) austretenden waagerechten Strahl abzulenken und in einen vertikalen Wasserfilm umzuwandeln.

2. Geschirrspülmaschine nach Anspruch 1, **dadurch gekennzeichnet, daß** der Rotor (3) zwei im wesentlichen S-förmige gegenüberliegende Flügel (4) aufweist, die einen Zwischendeflektor (10) und einen Enddeflektor (11) aufweisen, die entsprechend der ersten bzw. zweiten Kurve des S angeordnet sind und entgegengesetzte Höhlungen haben.

3. Geschirrspülmaschine nach Anspruch 1, **dadurch gekennzeichnet, daß** der Rotor (3) zwei im wesentlichen J-förmige gegenüberliegende Flügel (4) aufweist, die mit einem einzigen Enddeflektor (11) versehen sind.

4. Geschirrspülmaschine nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, daß** der Enddeflektor (11) längs seines Randes einen vorspringenden Ansatz (17) aufweist.

5. Geschirrspülmaschine nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, daß** der Enddeflektor (11) eine Serie von fächerförmig angeordneten Nuten (18) aufweist.

Revendications

1. Lave-vaisselle comportant un dispositif pour laver le plafond d'un réservoir de lave-vaisselle, **caractérisé en ce que** ledit dispositif comporte un carter (1) muni d'un raccord d'eau (13), d'un écrou d'accouplement (22) destiné à bloquer ledit carter (1) dans son siège sur le plafond du réservoir, et un rotor (3) qui tourne autour d'un axe vertical et constitué d'une pluralité d'aubes verticales (4) reliées à leurs extrémités intérieures à un moyeu cylindrique formant trou borgne (5) muni d'une buse horizontale (6) en correspondance avec chaque aube (4), le moyeu (5) étant relié au carter (1) par l'intermédiaire d'un conduit vertical (7) passant à travers l'écrou (2) et bloqué de manière rotative sur celui-ci, chaque aube (4) étant mise en forme et munie d'un ou plusieurs déflecteurs pouvant dévier le jet horizontal sortant de la buse concernée (6) et le transformer en un film d'eau vertical.

2. Lave-vaisselle selon la revendication 1, **caractérisé en ce que** le rotor (3) comporte deux aubes opposées pratiquement en forme de S (4) munies d'un déflecteur intermédiaire (10) et d'un déflecteur d'extrémité (11) placés respectivement en correspondance avec la première et la seconde courbe du S, lesdits déflecteurs (10, 11) ayant des concavités opposées.

3. Lave-vaisselle selon la revendication 1, **caractérisé en ce que** le rotor (3) comporte deux aubes opposées ayant pratiquement une forme de J (4) munies d'un seul déflecteur d'extrémité (11).

4. Lave-vaisselle selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le déflecteur d'extrémité (11) a une patte en saillie (17) le long de son bord.

5. Lave-vaisselle selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le déflecteur d'extrémité (11) a une série de gorges (18) agencée comme un ventilateur.

Fig.1

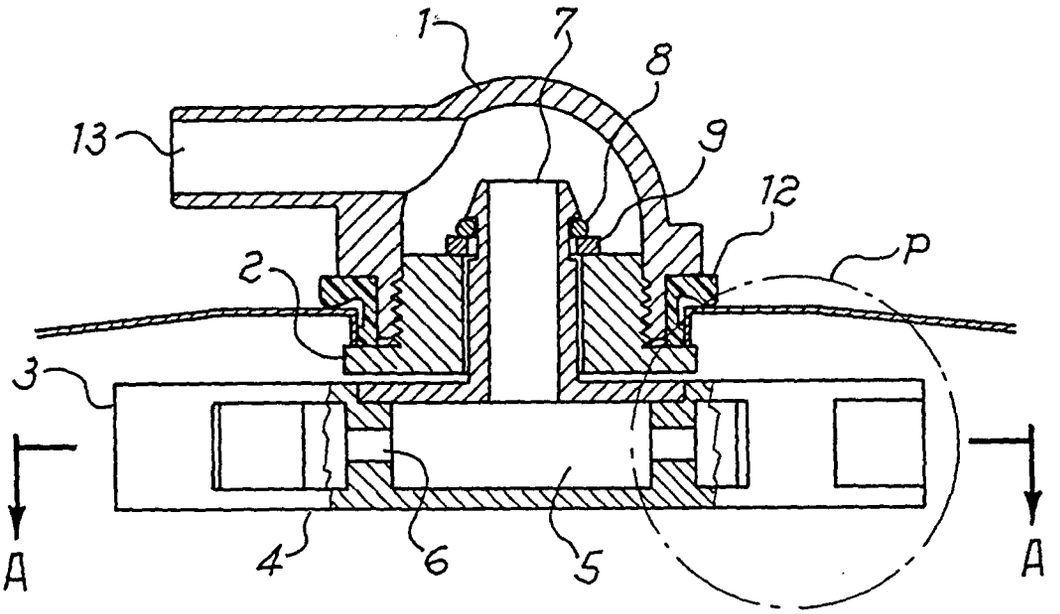

Fig.2

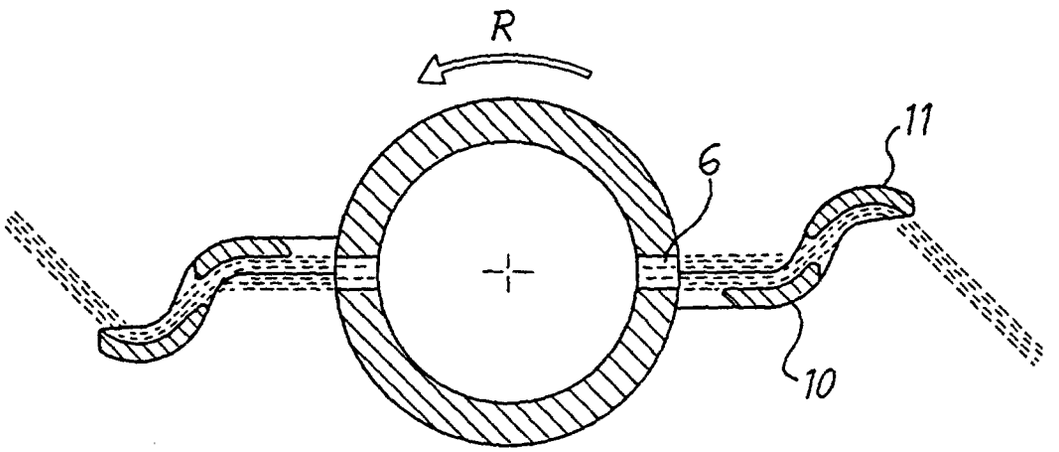

Fig.3

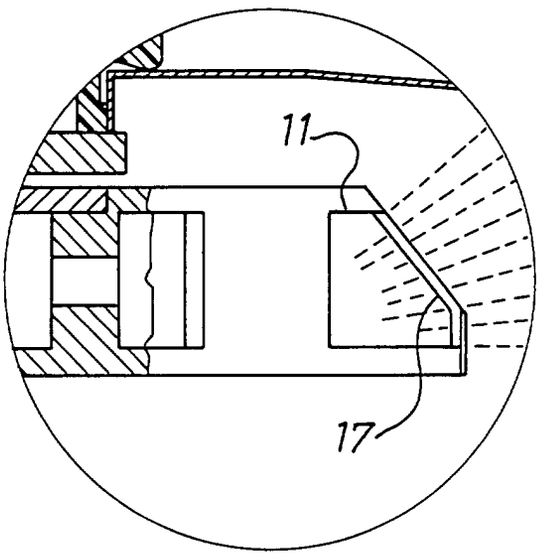

Fig.4

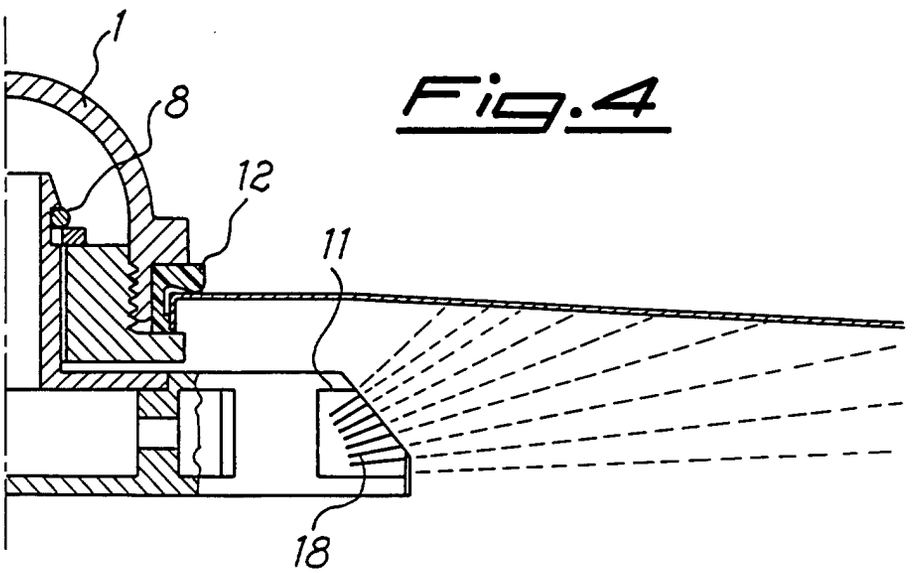

Fig.5