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(54) **Dish washing method**

Geschirreinigungsverfahren

Procédé de lavage de vaisselle

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Description

[0001] The present invention relates to a dish washing method. The washing method is in particular implemented by a dishwasher equipped preferably with a spraying device of rotating type generally arranged on the top of the dishwasher to dispense a jet falling downwards.

[0002] As is known, sprayers of this type consist of an impeller mounted idly to generate a jet with an umbrella profile which hits a predefined area of a rack containing dishes.

[0003] Besides the action of the impeller, the dishwasher comprises furthermore dispensers on rotating arms, arranged below respective racks to hit the dishes from below.

[0004] Generally, dishwashers are known equipped with three racks, arranged one above the other. Such dishwashers have a lower dispenser arranged below the lowest rack, and an upper dispenser arranged below the middle rack. The dishes contained in the upper rack however are washed principally by the umbrella jet generated by the upper impeller.

[0005] The known dishwashers comprise furthermore a supply pump, generally a centrifugal pump to feed the washing water alternately and sequentially to the dispensers or to the impeller.

[0006] The amplitude of the umbrella jet, and therefore also the corresponding area of the rack which is hit by the jet, is determined by the speed and flow rate of the water fed by the pump. In particular, depending on the revolutions per minute of the centrifugal pump, the dispensers and the impeller are made to rotate at a predetermined speed. In the case of the impeller, this rotation speed determines the respective umbrella jet of water.

[0007] The water supply to the dispensers and to the impeller is effected according to a predefined programme in which washing cycles alternate with loading/unloading the water inside the dishwasher. The washing cycles comprise sequential steps of supplying water to at least one of the dispensers and/or to the impeller, according to predefined periods, in order to be able to wash all the dishes arranged in the racks. Furthermore, the washing cycles are performed at predetermined temperatures such that the water while it is being dispensed can be heated to reach a particular temperature or maintained at a constant temperature. A dishwashing method according to the preamble of claim 1 is also disclosed in document EP 1 277 430 A1.

[0008] The Applicant has found that the washing methods used by the dishwashers described above can be improved from the point of view of efficiency in the washing steps of the upper rack.

[0009] In fact, unlike rotating arm dispensers which during their movement hit the entire area of the respective upper racks, the impeller of the upper sprayer generates an umbrella jet which hits only a predefined circular area of the rack.

[0010] In this context, the most central area of the rack

and the outermost peripheral area are not affected by the jet of water.

[0011] Consequently, some dishes arranged in the areas not affected by the jet of water generated by the impeller are not washed correctly by the aforesaid umbrella jet.

[0012] An object of the present invention is therefore to make available a method of washing dishes which overcomes the drawback of the known art mentioned above.

[0013] In particular, it is an object of the present invention to make available a method of washing dishes which is capable of spraying all the areas of the upper rack so as to completely wash all the dishes positioned in this rack.

[0014] It is furthermore an object of the invention to make available a method of washing dishes which is versatile and capable of being adapted to the various process requirements.

[0015] The objects set forth above, and yet others, are fully achieved by the washing method according to the present invention, which is characterised by what is contained in the claims set forth below.

[0016] The technical characteristics of the invention, according to the aforementioned object, can be clearly seen from the contents of the claims set forth below, and the advantages thereof will more fully emerge from the detailed description which follows, made with reference to the accompanying drawings, which represent a purely exemplary and nonlimiting embodiment, wherein:

- figure 1 shows a schematic side view of a hydraulic circuit of a dishwasher by means of which the method according to the present invention is implemented;
- figure 2 shows a graph which has on the vertical axis a qualitative scale of the temperature and on the horizontal axis the time relating to a washing cycle using the method which is the subject of the present invention.

[0017] Unless explicitly stated to the contrary, reference is made to figures 1 and 2. With reference to figure 1, the dish washing method is preferably implemented by a dishwasher 19 equipped with at least one impeller 29 arranged above a respective upper rack 39 containing dishes. The impeller 29 is mounted idly within the compartment 59 which defines the dishwasher 19, in such a way as to rotate following the supplying of the washing water.

[0018] The method comprises the steps of distributing the washing water to at least the impeller 29 in such a way that a jet 69 of water is generated, directed into a predefined area of the upper rack 39.

[0019] In particular, the step of distributing the water to the impeller 29 is actuated by supplying water according to a plurality of predefined values each of which represents a different area 79a-79c subtended by a respective jet 69a-69b dispensed by the impeller 29.

[0020] In particular, the distribution of the water is actuated by means of a pump 49, configured to supply the washing water at the predefined values corresponding to the pressure and the flow rate of the water. Advantageously, the pump 49 is of centrifugal type and the predefined values for supplying the water are therefore defined by a series of values of speed of rotation of the aforementioned pump 49 located upstream of the impeller 29.

[0021] Consequently, for each predefined rotation value of the pump 49 a respective jet 69a-69b is generated having a substantially umbrella profile and capable of affecting a corresponding area 79a-79c.

[0022] With reference to figure 1, only three water jets 69a-69c have been shown by way of example, generated by three respective predefined values, to wash three areas 79a-79c of the dishwasher. It must however be specified that there can be any number of predefined values for washing any area of the rack and therefore all the dishes contained therein.

[0023] The amplitude of the jet 69a-69b of water is therefore linked to the speed of rotation of the pump 49. In other words, the greater the speed of rotation of the pump 49, the greater is the area 79 washed by the jet 69.

[0024] For example, at a speed of rotation of the pump 49 comprised between 1600 and 2000 rpm, the jet of water 6a is generated which hits the most central area 79a of the rack 39.

[0025] At a speed of rotation of the pump 49 comprised between 2100 and 2500 rpm the jet of water 6b is generated which hits the most peripheral area 79b of the rack 39.

[0026] At high rotation speed of the pump 49, for example a speed comprised between 2500 and 2800 rpm, on the other hand, corresponds to the jet 69c which is directed onto the outermost part of the dishwasher 19 and therefore onto the inner walls 89 of the compartment 59.

[0027] It should be noted that the above-mentioned predefined values are determined according to the type of washing and the various method requirements. This setting is actuated by suitable management software (not described and illustrated because it does not form part of the present invention) for the rotation speeds of the pump 49.

[0028] Again, each predefined value for supplying the water to the impeller 29 corresponds to a respective period of time for which that value is maintained. In this way, the individual jets 69a-69c are maintained according to a predefined period of time.

[0029] It should be noted furthermore that the speed of rotation of the pump 49 can accelerate/decelerate progressively in a predefined period, in such a way that during the change between one value and another, a progressive enlargement/contraction is produced of the area subtended by the water jets generated.

[0030] Furthermore, the water dispensing values, as well as the duration of each individual value, can be ac-

tuated at predetermined temperatures. Consequently, the water can be dispensed by the impeller, according to the alternation of the above-mentioned predefined values, heating the water to a predetermined temperature or maintaining the water at a constant temperature.

[0031] Alternating the above-mentioned water dispensing values by means of the umbrella jets 69a-69c defines a unique washing cycle in which the dishes are washed and rinsed for a series of steps in succession.

[0032] Within the washing cycle, one or more steps are alternated of loading and unloading the washing water into the containment compartment 59. Furthermore, the washing cycle comprises one or more steps of dispensing washing water below the rack 39 by means of at least one rotating arm 99 positioned below the rack 39 itself.

[0033] In particular, it should be noted that the dishwasher can be equipped with a plurality of racks, for example three racks 39, arranged one above the other. Below the lower rack 39 a lower arm 99 extends which dispenses water from below towards this rack.

[0034] Below the middle rack 39 an upper arm 99 extends which dispenses water from below towards this rack 39. The upper rack 39, onto which the jet 69a-69b of water is dispensed from the impeller 29, is arranged above the middle rack 39.

[0035] By way of example, a cycle is described below of washing the dishes contained inside the dishwasher 19 summarily described above.

[0036] The washing cycle is described below with reference to the graph shown in figure 2.

[0037] In particular, in the graph of figure 2 the duration of the steps in minutes is shown along the horizontal axis, and the temperature of the water is shown on the vertical axis.

[0038] The reference number 109 indicates an initial step of loading the containment compartment 59 with washing water.

[0039] Subsequently, the washing step indicated with the reference number 119 is shown.

[0040] Within this step water is dispensed to the dishes through at least two rotating arms 99 and through at least the impeller 29 positioned above the upper rack.

[0041] This step is performed alternately to dispense water first from the arm 99 positioned below the lower rack 39, then to the arm 99 positioned below the middle rack 39 and to the impeller 29.

[0042] More particularly, the step of washing 119 comprises the sub-step 129 of keeping cold wherein the rotating arms 99 are supplied with water at a speed of the pump 49 comprised between 2200 and 2800 rpm, while the impeller 29 is supplied with a rotation speed of the pump 49 at a value comprised between 2100 and 2500 rpm. This dispensing is effected by performing an alternation (with a duration of each alternation comprised between 1 and 5 minutes) which affects each arm 99 and the impeller 29. The set of said alternations concerns a period of duration comprised between 10 and 20 minutes. Furthermore, the step of keeping cold 129 is actuated at

the water network temperature.

[0043] Subsequently there begins the sub-step 139 of ramping up the heating wherein the rotating arms 99 are supplied with water at a speed of the pump 49 comprised between 2300 and 2700 rpm, while the impeller 29 is supplied at three predefined speeds corresponding to the aforementioned predefined values. In fact, the impeller 29 is supplied first with water at the speed value of the pump 49 comprised between 2100 and 2500 rpm, subsequently at a speed value of the pump 49 comprised between 1600 and 2000 rpm and subsequently at a speed value of the pump comprised between 2100 and 2500 rpm. This dispensing is effected by performing an alternation (with a duration of each alternation comprised between 1 and 5 minutes) which affects each arm 99 and the impeller 29. The set of said alternations concerns a period of duration comprised between 10 and 20 minutes. For the impeller 29 the predefined values each last for a period comprised between 30 and 55 sec.

[0044] Furthermore, the step 139 is effected by heating the water until it reaches a temperature comprised between 45 °C and 50 °C.

[0045] Subsequently, there is effected the sub-step 149 of keeping hot. In this step the water temperature is kept constant in a range comprised between 45 °C and 50 °C.

[0046] Opportunely during sub-step 149 the rotating arms 99 are supplied with water at a speed of the pump 49 comprised between 2300 and 2700 rpm, while the impeller is supplied by making the pump 49 rotate at a speed comprised between 1700 and 2800 rpm. This dispensing is effected by performing an alternation (with a duration of each alternation comprised between 1 and 5 minutes) which affects each arm 99 and the impeller 29. In this step the water temperature diminishes as a result of thermal dissipation.

[0047] At the end of the step of delivering the water (washing step 119) a step 169 is effected of unloading the water from the containment compartment 59, and subsequently the compartment 59 is loaded for a second time with clean washing water.

[0048] At this point, the water is dispensed for a second time from the arms 99 and from the impeller 29 for a cold rinsing operation. This operation is effected by a maintaining sub-step 179 in which the rotating arms 99 are supplied with water at a speed of the pump 49 comprised between 2300 and 2700 rpm, while the impeller is supplied at a speed of the pump comprised between 2100 and 2500 rpm. This dispensing is effected by performing an alternation (with a duration of each alternation comprised between 1 and 5 minutes) which affects each arm 99 and the impeller 29.

[0049] Subsequently the step 189 is effected of unloading the water for a second time from the containment compartment 59. At this point the compartment 59 is loaded for a third time with clean washing water.

[0050] In this way, the water is dispensed for a third time for a hot rinsing operation 199.

[0051] Advantageously, in the example of the washing cycle described above the impeller is supplied according to a plurality of predefined values, each of which represents a different area subtended by a respective jet dispensed by the impeller. In fact, in the sub-step 139 of ramping up the heating and keeping hot 149, the speed is varied of supplying the pump 49, with the consequent variation in the amplitude of the jets 69a-69c and of the area 79a-79c which is washed.

[0052] All the areas of the upper rack are therefore sprayed to completely wash all the dishes positioned within it. Furthermore, by modifying the water jet 69 it is possible to adapt the washing and rinsing operations to the various operative requirements, in terms both of washing cycle and of positioning the dishes in the rack.

[0053] It should be noted furthermore that at high speeds of rotation of the pump 49 (for example for a speed of rotation comprised between 2500 and 2800 rpm), the impeller 29 generates a jet of water 69c directed against the internal walls 89 with the consequent advantageous operation of washing the walls of the compartment 59.

Claims

1. A dish washing method implemented by a dishwasher, comprising the steps of:
 - distributing washing water to at least one impeller (29) arranged above a dish containment rack (39); and
 - generating through the impeller (29) a jet of water (69a-69c) directed towards a predefined area (79a-79c) of the rack (39) to hit the dishes with said water; said impeller being mounted idly to generate a jet with an umbrella profile which hits a predefined area of a rack containing dishes; **characterised in that** said step of distributing the water is actuated by supplying water to the impeller (29) according to a plurality of predefined values each of which represents a different area (79a-79c) subtended by a respective jet (69a-69c) dispensed by the impeller (29).
2. The method according to the preceding claim, **characterised in that** each predefined value of water supply to the impeller (29) corresponds to a respective period of time for that value.
3. The method according to any of the preceding claims, **characterised in that** the supply of the water to the impeller (29) according to a plurality of predefined values determines a progressive enlargement/contraction of the area (79a-79c) subtended by the jets (69a-69c) of water.
4. The method according to any one of the preceding

claims, **characterised in that** said step of distributing water to the impeller (29) is actuated by a pump (49); said predefined water supply values corresponding to water pressure and flow rate values at the outlet from said pump (49).

5. The method according to any of the preceding claims, **characterised in that** said predefined water supply values are defined by the speed of rotation of a centrifugal pump (49) positioned upstream of the impeller (29).

6. The method according to the preceding claim, **characterised in that** said water supply values correspond at least to:

a speed of rotation of the pump (49) comprised between 1600 and 2000 rpm to generate a jet of water (69a) that hits a substantially central area (79a) of the rack (39);

a speed of rotation of the pump (49) comprised between 2100 and 2500 rpm to generate a jet of water (69b) that hits a substantially peripheral area (79b) of the rack (39); and

a speed of rotation of the pump (49) comprised between 1400 and 2800 rpm to generate a jet of water (69c) that hits the lateral walls (89) of a containment compartment (59) of the rack (39).

7. The method according to claim 5 or 6, **characterised in that** within a washing cycle said predefined water supply values are alternated corresponding to the different speeds of rotation of the centrifugal pump (49).

8. A dish washing cycle, comprising the steps of:

- loading with washing water a containment compartment (59) of at least three dish housing racks (39) positioned one on top of the other; then
- dispensing water to the dishes through at least two rotating arms (99) positioned below a lower rack (39) and a middle rack (39) respectively; and

- dispensing water to the dishes through at least one impeller (29) positioned above the upper rack (39);

- said steps of dispensing the water being actuated alternately to dispense water from the arm (99) positioned below the lower rack (39), from the arm (99) positioned below the middle rack (39) and from the impeller (29);

- said steps of dispensing the water being actuated for a determined period in which the water is initially dispensed at the water network temperature, then dispensed by heating it until a temperature comprised between 45 and 50 °C is reached, and then it is dispensed at a constant

temperature in an interval comprised between 45 and 50 °C. **characterised in that** said steps of dispensing the water through the impeller comprise the operating steps described in any one of the preceding claims.

9. The cycle according to the preceding claim, **characterised in that** during the dispensing of the water, heating it from the network temperature to a temperature comprised between 45 and 50 °C, and during at least a part of the dispensing of the water at a constant temperature comprised between 45 and 50 °C, the predefined water supply values to the impeller (2) are alternated.

10. The cycle according to claim 8 or 9, **characterised in that** it further comprises, following the water dispensing step, the further steps of:

- unloading the water from the containment compartment (59);
- loading the containment compartment (59) with clean washing water a second time; then
- dispensing the water a second time alternately through the rotating arms (99) and through the impeller (29); then
- unloading the water from the containment compartment (59) a second time; then
- loading the containment compartment (59) with clean washing water a third time; and then
- dispensing the water to the dishes a third time.

Patentansprüche

1. Geschirrrreinigungsverfahren, das durch einen Geschirrspüler implementiert ist, umfassend die Schritte:

- Verteilen von Reinigungswasser an mindestens ein Laufrad (29), das über einem Geschirrlagerungsgestell (39) angeordnet ist; und
- Erzeugen durch das Laufrad (29) eines Wasserstrahls (69a-69c), der zu einem vorgegebenen Bereich (79a-79c) des Gestells (39) gerichtet ist, um das Geschirr mit dem Wasser zu treffen; wobei das Laufrad ruhend befestigt ist, um einen Strahl mit einem Schirmprofil zu erzeugen, der einen vorgegebenen Bereich eines Gestells trifft, das Geschirr enthält;

dadurch gekennzeichnet, dass der Schritt zum Verteilen des Wassers durch Zuführen von Wasser zu dem Laufrad (29) gemäß einer Vielzahl von vorgegebenen Werten betätigt ist, von welchen jeder einen unterschiedlichen Bereich (79a-79c) darstellt, der von einem jeweiligen Strahl (69a-69c) getroffen wird, der von dem Laufrad (29) ausgegeben wird.

2. Verfahren nach dem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** jeder vorgegebene Wert von Wasserzufuhr zu dem Laufrad (29) einer jeweiligen Zeitdauer für diesen Wert entspricht. 5
3. Verfahren nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Wasserzufuhr zu dem Laufrad (29) gemäß einer Vielzahl von vorgegebenen Werten eine progressive Erweiterung/Verkleinerung des Bereichs (79a-79c) bestimmt, der von den Wasserstrahlen (69a-69c) getroffen wird. 10
4. Verfahren nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der Schritt zum Verteilen von Wasser an das Laufrad (29) durch eine Pumpe (49) betätigt ist; wobei die vorgegebenen Wasserzufuhrwerte Wasserdruck und Flussratenwerten bei dem Auslass der Pumpe (49) entsprechen. 15 20
5. Verfahren nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die vorgegebenen Wasserzufuhrwerte durch die Drehzahl einer Zentrifugalpumpe (49) definiert sind, die stromaufwärts des Laufrads (29) positioniert ist. 25
6. Verfahren nach dem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** die Wasserzufuhrwerte mindestens entsprechen: 30
- einer Drehzahl der Pumpe (49), die zwischen 1600 und 2000 U/min umfasst ist, um einen Wasserstrahl (69a) zu erzeugen, der im Wesentlichen einen Mittelbereich (79a) des Gestells (39) trifft; 35
- einer Geschwindigkeit der Pumpe (49), die zwischen 2100 und 2500 U/min umfasst ist, um einen Wasserstrahl (69b) zu erzeugen, der im Wesentlichen einen Umfangsbereich (79b) des Gestells (39) trifft; und 40
- einer Drehzahl der Pumpe (49), die zwischen 1400 und 2800 U/min umfasst ist, um einen Wasserstrahl (69c) zu erzeugen, der die Seitenwände (89) eines Lagerungsabteils (59) des Gestells (39) trifft. 45
7. Verfahren nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** in einem Waschzyklus die vorgegebenen Wasserzufuhrwerte entsprechend den unterschiedlichen Drehzahlen der Zentrifugalpumpe (49) abgewechselt werden. 50
8. Geschirrrreinigungszyklus, umfassend die Schritte: 55
- Befüllen eines Lagerungsabteils (59) von mindestens drei Geschirraufnahmegestellen (39), die übereinander positioniert sind, mit Reinigungswasser; dann
- Ausgeben von Wasser an das Geschirr durch mindestens zwei Dreharme (99), die unter einem unteren Gestell (39) beziehungsweise einem mittleren Gestell (39) positioniert sind; und
- Ausgeben von Wasser an das Geschirr durch mindestens ein Laufrad (29), das über dem oberen Gestell (39) positioniert ist;
- wobei die Schritte zum Ausgeben von Wasser abwechselnd betätigt sind, um Wasser von dem Arm (99), der unter dem unteren Gestell (39) positioniert ist, von dem Arm (99), der unter dem mittleren Gestell (39) positioniert ist, und von dem Laufrad (29) auszugeben;
- wobei die Schritte zum Ausgeben des Wassers für eine bestimmte Dauer betätigt sind, in der das Wasser anfangs bei der Wassertemperatur ausgegeben wird, dann durch Erwärmen, bis eine Temperatur die zwischen 45 und 50°C umfasst ist, erreicht ist, ausgegeben wird, und dann bei einer konstanten Temperatur in einem Intervall, das zwischen 45 und 50°C umfasst ist, ausgegeben wird;
- dadurch gekennzeichnet, dass** die Schritte zum Ausgeben des Wassers durch das Laufrad die Betriebsschritte umfassen, die in einem beliebigen der vorstehenden Ansprüche beschrieben sind.
9. Zyklus nach dem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** während des Ausgebens des Wassers dieses von der Netztemperatur zu einer Temperatur erwärmt wird, die zwischen 45 und 50°C umfasst ist, und während mindestens eines Teils des Ausgebens des Wassers bei einer konstanten Temperatur, die zwischen 45 und 50°C umfasst ist, die vorgegebenen Wasserzufuhrwerte zu dem Laufrad (2) abgewechselt werden.
10. Zyklus nach Anspruch 8 oder 9, **dadurch gekennzeichnet, dass** er dem Wasserausgabeschritt folgend weiter die weiteren Schritte umfasst:
- Entleeren des Wassers aus dem Lagerungsabteil (59);
- Befüllen des Lagerungsabteils (59) ein zweites Mal mit sauberem Reinigungswasser; dann
- Ausgeben des Wassers ein zweites Mal, abwechselnd durch die Dreharme (99) und durch das Laufrad (29); dann
- Entleeren des Wassers aus dem Lagerungsabteil (59) ein zweites Mal; dann
- Befüllen des Lagerungsabteils (59) ein drittes Mal mit sauberem Reinigungswasser; und dann
- Ausgeben des Wassers zu dem Geschirr ein drittes Mal.

Revendications

1. Procédé de lavage de vaisselle implémenté par un lave-vaisselle, comprenant les étapes consistant à :

- distribuer de l'eau de lavage à au moins une hélice (29) disposée au-dessus d'un panier de confinement de vaisselle (39) ; et
- générer à travers l'hélice (29) un jet d'eau (69a à 69c) dirigé vers une zone prédéfinie (79a à 79c) du panier (39) pour que l'eau heurte la vaisselle ; ladite hélice étant montée folle pour générer un jet avec un profil de parapluie qui heurte une zone prédéfinie d'un panier de la vaisselle ;

caractérisé en ce que ladite étape de distribution de l'eau est actionnée en fournissant de l'eau à l'hélice (29) selon une pluralité de valeurs prédéfinies dont chacune représente une zone différente (79a à 79c) sous-tendue par un jet respectif (69a à 69c) distribué par l'hélice (29).

2. Procédé selon la revendication précédente, **caractérisé en ce que** chaque valeur prédéfinie d'alimentation en eau vers l'hélice (29) correspond à une période de temps respective pour cette valeur.

3. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'alimentation en eau vers l'hélice (29) selon une pluralité de valeurs prédéfinies détermine un agrandissement progressif/une contraction progressive de la zone (79a à 79c) sous-tendue par les jets (69a à 69c) d'eau.

4. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite étape de distribution d'eau vers l'hélice (29) est actionnée par une pompe (49) ; lesdites valeurs d'alimentation en eau prédéfinies correspondant aux valeurs de pression et de débit d'écoulement d'eau à la sortie de ladite pompe (49).

5. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdites valeurs d'alimentation en eau prédéfinies sont définies par la vitesse de rotation d'une pompe centrifuge (49) positionnée en amont de l'hélice (29).

6. Procédé selon la revendication précédente, **caractérisé en ce que** lesdites valeurs d'alimentation en eau correspondent au moins à :

une vitesse de rotation de la pompe (49) comprise entre 1 600 et 2 000 tr/min pour générer un jet d'eau (69a) qui heurte une zone sensiblement centrale (79a) du panier (39) ;
une vitesse de rotation de la pompe (49) com-

prise entre 2 100 et 2 500 tr/min pour générer un jet d'eau (69b) qui heurte une zone sensiblement périphérique (79b) du panier (39) ; et
une vitesse de rotation de la pompe (49) comprise entre 1 400 et 2 800 tr/min pour générer un jet d'eau (69c) qui heurte les parois latérales (89) d'un compartiment de confinement (59) du panier (39).

7. Procédé selon la revendication 5 ou 6, **caractérisé en ce que** dans un cycle de lavage, lesdites valeurs prédéfinies d'alimentation en eau sont alternées en correspondant aux différentes vitesses de rotation de la pompe centrifuge (49).

8. Cycle de lavage de vaisselle, comprenant les étapes consistant à :

- charger avec de l'eau de lavage un compartiment de confinement (59) d'au moins trois paniers de logement de vaisselle (39) positionnés les uns au-dessus des autres ; ensuite
- distribuer de l'eau à la vaisselle par l'intermédiaire d'au moins deux bras rotatifs (99) positionnés respectivement sous un panier inférieur (39) et un panier médian (39) ; et
- distribuer de l'eau à la vaisselle à travers au moins une hélice (29) positionnée au-dessus du panier supérieur (39) ;
- lesdites étapes de distribution de l'eau étant actionnées alternativement pour distribuer de l'eau à partir du bras (99) positionné sous le panier inférieur (39), à partir du bras (99) positionné sous le panier médian (39) et à partir de l'hélice (29) ;
- lesdites étapes de distribution de l'eau étant actionnées pendant une période déterminée au cours de laquelle l'eau est initialement distribuée à la température de réseau d'eau, puis distribuée en la chauffant jusqu'à ce qu'une température comprise entre 45 et 50°C soit atteinte, puis elle est distribuée à une température constante dans un intervalle compris entre 45 et 50°C ;

caractérisé en ce que lesdites étapes de distribution de l'eau à travers l'hélice comprennent les étapes de fonctionnement décrites dans l'une quelconque des revendications précédentes.

9. Cycle selon la revendication précédente, **caractérisé en ce que** lors de la distribution de l'eau, elle est chauffée de la température de réseau à une température comprise entre 45 et 50°C, et pendant au moins une partie de la distribution de l'eau à une constante température comprise entre 45 et 50°C, les valeurs d'alimentation en eau prédéfinies de l'hélice (2) sont alternées.

10. Cycle selon la revendication 8 ou 9, **caractérisé en ce qu'il** comprend en outre, à la suite de l'étape de distribution d'eau, les étapes supplémentaires consistant à :

- décharger l'eau à partir du compartiment de confinement (59) ; 5
- charger une deuxième fois le compartiment de confinement (59) avec de l'eau de lavage propre ; puis 10
- distribuer l'eau une deuxième fois alternativement à travers les bras rotatifs (99) et à travers l'hélice (29) ; puis
- décharger l'eau à partir du compartiment de confinement (59) une deuxième fois ; puis 15
- charger une troisième fois le compartiment de confinement (59) avec de l'eau de lavage propre ; puis
- distribuer l'eau à la vaisselle une troisième fois. 20

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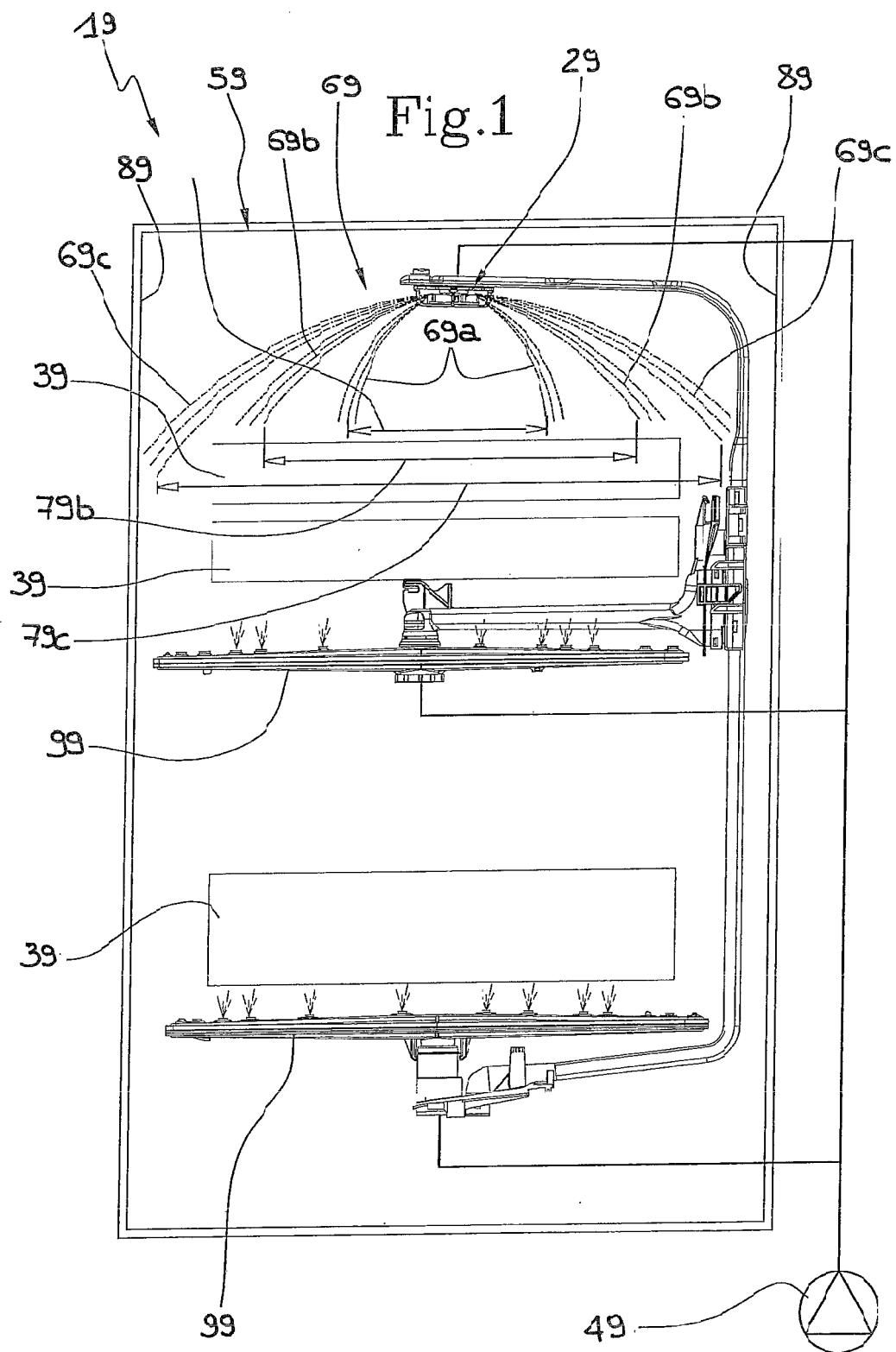
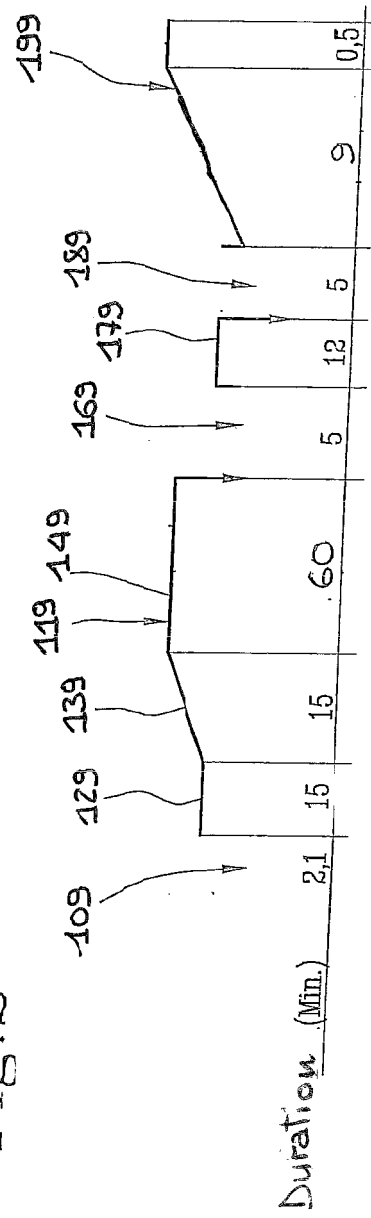


Fig. 2



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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