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(54) **A DISHWASHER AND THE CONTROL METHOD**

GESCHIRRSPÜLMASCHINE UND STEUERVERFAHREN

LAVE-VAISSELLE ET PROCEDE DE COMMANDE

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Description

[0001] The present invention relates to a dishwasher in which the dishes kept waiting to be washed are prevented from producing an irritating odor.

[0002] When the daily amount of dishes put into the dishwasher is small, the users do not start the washing program and choose to wait until the dishwasher is full. An odor is produced when the pre-wash waiting period of the dishes in the dishwasher is long, and the odor dissipates to the medium in an irritating manner when the closed door of the dishwasher is opened for the purposes of adding in the daily dishes. Sometimes the users hand wash the dishes according to their degree of dirt and put the dishes in the machine after removing the rough dirt. In state of the art chemical substances which give off pleasant odors are used for preventing the odor of the dishes kept inside the dishwasher without being washed, but these chemical substances can stay on the washed dishes and pose a threat to health.

[0003] In the French Patent no. FR2547733 a plastic disk for improving odors is described which is utilized in a dishwasher, positioned in the basket of the dishwasher, impregnated with an odoriferous chemical substance preventing the irritating odors that develop when dishes are kept waiting prior to washing.

[0004] In the United States of America Patent Application no. US2003221709, an odor eliminating chemical substance is put inside a casing with a shutter, arranged within the dishwasher and the shutter is opened when required by a driving device to release the odor eliminating substance over the dishes.

[0005] In the International Patent Application no. WO03099982, the washing water is electrolyzed by utilizing an electrolysis device situated inside a dishwasher and the washing performance is enhanced.

[0006] The aim of the present invention is the realization of a dishwasher and the control method thereof, in which the dishes kept waiting prior to washing are prevented to produce an irritating odor with a very small amount of energy consumption. This aim can be achieved by a dishwasher according to claim 1.

[0007] The dishwasher and the control method realized in order to attain above mentioned aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of a dishwasher.

[0008] Elements shown in the figures are numbered as follows:

1. Dishwasher
2. Tub
3. Sump
4. Heater
5. Circulation pump
6. Discharge pump
7. Control unit

8. Start button
9. Odor detector
10. Measuring chamber
11. Indicator
12. Odor eliminating substance chamber
13. Clock circuit

[0009] The dishwasher (1) comprises a tub (2) into which dishes to be washed are placed, a sump (3) where wash water is collected, a heater (4) utilized to heat the wash water, a circulation pump (5) which provides the circulation of the wash water, a discharge pump (6) which drains the wash water at the end of the washing process and a control unit (7).

[0010] When the dishwasher (1) operates, the control unit starts the main washing program (A) comprising of cold-hot washing, rinsing and drying steps and a short term odor eliminating washing program (B) starts independent from the main washing program (A) either upon user's demand for preventing the heavy odor produced when dishes are kept waiting for a long time or automatically when the developing odor level rises.

[0011] The odor eliminating washing program (B) is a mini-washing program that performs all or some of the steps of the main washing program (A) for shorter periods and at lower temperatures. The complete odor eliminating washing program (B) is short-term, for example 5 minutes, and only removes the dirt of the dishes kept waiting in the dishwasher that can produce an odor with a minimum amount of energy consumption.

[0012] In the preferred embodiment of the present invention, the dishwasher (1) comprises a starting button (8) to allow the odor eliminating washing program (B) to be started by the user.

[0013] In another preferred embodiment of the present invention, the dishwasher (1) comprises an odor detector (9) that detects the odor spreading from the dishes kept waiting in the tub (2) and an indicator (11) which gives off an audio and/or visual warning if the odor amount detected by the odor detector (9) exceeds a preset limit.

[0014] In the above mentioned embodiments of the present invention, when the odor amount detected by the odor detector (9) exceeds a preset limit, the indicator (11) is enabled by the control unit (7) to give off an audio and/or visual warning. Upon receiving the warning from the indicator (11), the odor eliminating washing program (B) is initiated by the user pressing on the starting button (8).

[0015] In another embodiment of the present invention, the dishwasher (1) comprises a measuring chamber (10) where the odor detector (9) is positioned, convenient for gathering a measurement sample of the medium air inside the tub (2).

[0016] In another embodiment of the present invention, the odor eliminating washing program (B) is automatically started by the control unit (7) when the odor amount detected by the odor detector (9) exceeds a preset limit, warning the user by the indicator (11) or without warning

given via the indicator (11).

[0017] In yet another embodiment of the present invention, the information on time periods of expensive and cheap rates of electric consumption costs is loaded to the control unit (11) as input and when the automatic starting of the odor eliminating program (B) corresponds to the expensive rate period, the odor eliminating program (B) does not start but is postponed until the following cheap rate period. In this embodiment, the control unit (11) comprises a clock circuit (13) having timing information.

[0018] The irritating odors produced by the dishes kept waiting for a long time prior to washing in the dishwasher (1) are detected by the odor detector (9) and a signal is sent to the indicator (11) warning the user in the manually started implementation. The user, when warned by the indicator (11), will start the odor eliminating program (B) by pressing on the starting button (8) if so desired. In the automatically started implementation, the odor eliminating program (B) starts automatically when the odor amount detected by the odor detector (9) is above a preset limit. If the automatic starting time is within the expensive rate time period input in advance in the control unit (7), the odor eliminating program (B) does not start but starts automatically in the next cheap rate time period.

[0019] In another embodiment of the present invention, the dishwasher (1) comprises an odor eliminating substance chamber (12) into which odor eliminating chemical substances are put.

[0020] The odor eliminating washing program (B) comprises the steps of taking in water, preferably into the sump (3), opening the odor eliminating substance chamber (12) to mix the odor eliminating substance with the wash water, heating the wash water to a low temperature by the heater (4), circulating with the circulation pump (5) and draining the wash water with the discharge pump (6).

[0021] When the odor eliminating washing program (B), started by the user or automatically, is completed, the dishwasher (1) again goes into the pause mode; the user has to start the main washing program (A) when the dishes are desired to be washed.

[0022] In cases when the dishwasher (1) is used with long intervals, for example once a week, the odor eliminating washing program (B) is employed to prevent the dishes that are kept waiting from producing a heavy odor.

[0023] A better washing performance is achieved by the main washing program (A) when the odor eliminating washing program (B) is employed since the heavy dirt on the dishes are removed before drying up.

Claims

1. A dishwasher (1) comprising a tub (2) into which dishes to be washed are placed, a sump (3) where wash water is collected, a heater (4) utilized to heat the wash water, a circulation pump (5) which provides the circulation of the wash water, a discharge pump

(6) which drains the wash water at the end of the washing process, an odor detector (9) for detecting the odor spreading from the dishes in the tub (2), and an odor eliminating washing program (B) to be started by the user or automatically when the level of odor increases, preventing the dishes to be washed from producing heavy odors.

2. A dishwasher (1) as in Claim 1 **characterized by** a starting button (8) which allows the user to start the odor eliminating washing program (B).
3. A dishwasher (1) as in Claim 1, **characterized by** an indicator (11) which gives off an audio and/or visual warning when the odor amount detected by the odor detector (9) exceeds a preset limit.
4. A dishwasher (1) as in Claim 1, **characterized by** a measuring chamber (10) where the odor detector (9) is situated, suitable for gathering a measurable amount of sample from the medium air.
5. A dishwasher (1) as in any one of the above claims **characterized by** an odor eliminating substance chamber (12) into which odor eliminating chemical substances are put.
6. A dishwasher (1) as in Claim 3, **characterized by** a control unit (7) which enables the indicator (11) to give off an audio and/or visual warning when the odor amount detected by the odor detector (9) exceeds a preset limit.
7. A dishwasher (1) as in any one of the Claims 1 and 3 to 5, **characterized by** a control unit (7) which automatically starts the odor eliminating washing program (B) when the odor amount detected by the odor detector (9) exceeds a preset limit.
8. A dishwasher (1) as in Claim 7, **characterized by** a control unit (7) which has information on time periods of expensive and cheap rates of electric consumption costs and starts the odor eliminating washing program (B) in the cheap rate time period.
9. A dishwasher (1) as in Claim 8, **characterized by** a control unit (7) which comprises a clock circuit (13) having timing information.
10. A dishwasher (1) as in Claim 5, **characterized by** the employment of an odor eliminating washing program (B) comprising the steps of taking in water into the sump (3), opening the odor eliminating substance chamber (12) to mix the odor eliminating substance into the wash water, heating the wash water to a low temperature by the heater (4), circulating with the circulation pump (5) and draining the wash water with the discharge pump (6).

Patentansprüche

1. Geschirrspüler (1), umfassend einen Spülbehälter (2), in den Geschirr gegeben wird, das gespült werden soll, einen Sumpf (3), in dem Spülwasser aufgefangen wird, eine Heizeinrichtung (4), die dazu dient, das Spülwasser zu erwärmen, eine Zirkulationspumpe (5), die für die Zirkulation des Spülwassers sorgt, eine Ablasspumpe (6), die das Spülwasser am Ende des Spülvorgangs ablässt, einen Geruchsdetektor (9) zum Detektieren des Geruchs, der sich von dem Geschirr im Spülbehälter (2) verbreitet, und ein Geruchsbesitzungsspülprogramm (B), das vom Benutzer oder automatisch gestartet wird, wenn der Geruchspegel ansteigt, um zu verhindern, dass das zu spülende Geschirr starke Gerüche erzeugt. 5
2. Geschirrspüler (1) nach Anspruch 1, **gekennzeichnet durch** eine Starttaste (8), die es dem Benutzer erlaubt, das Geruchsbesitzungsspülprogramm (B) zu starten. 20
3. Geschirrspüler (1) nach Anspruch 1, **gekennzeichnet durch** eine Anzeige (11), die eine akustische und/oder visuelle Warnung ausgibt, wenn die vom Geruchsdetektor (9) detektierte Geruchsstärke einen voreingestellten Grenzwert übersteigt. 25
4. Geschirrspüler (1) nach Anspruch 1, **gekennzeichnet durch** eine Messkammer (10), in der der Geruchsdetektor (9) angeordnet ist und die dazu geeignet ist, eine messbare Probenmenge vom Luftmedium aufzunehmen. 30
5. Geschirrspüler (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** eine Geruchsbesitzungssubstanzkammer (12), in die chemische Geruchsbesitzungssubstanzen gegeben werden. 35
6. Geschirrspüler (1) nach Anspruch 3, **gekennzeichnet durch** eine Steuereinheit (7), die es der Anzeige (11) ermöglicht, eine akustische und/oder visuelle Warnung auszugeben, wenn die vom Geruchsdetektor (9) detektierte Geruchsstärke einen voreingestellten Grenzwert übersteigt. 45
7. Geschirrspüler (1) nach einem der Ansprüche 1 und 3 bis 5, **gekennzeichnet durch** eine Steuereinheit (7), die das Geruchsbesitzungsspülprogramm (B) automatisch startet, wenn die vom Geruchsdetektor (9) detektierte Geruchsstärke einen voreingestellten Grenzwert übersteigt. 50
8. Geschirrspüler (1) nach Anspruch 7, **gekennzeichnet durch** eine Steuereinheit (7), die Informationen zu Zeitperioden mit teuren und günstigen Tarifen für Elektrizitätsverbrauchskosten aufweist und das Ge-

ruchsbesitzungsspülprogramm (B) während der günstigen Tarifperiode startet.

9. Geschirrspüler (1) nach Anspruch 8, **gekennzeichnet durch** eine Steuereinheit (7), die einen Taktungsschaltkreis (13) mit Taktungsinformationen umfasst. 5
10. Geschirrspüler (1) nach Anspruch 5, **gekennzeichnet durch** das verwenden eines Geruchsbesitzungsspülprogramms (B), das folgende Schritte umfasst: Wasser in den Sumpf (3) aufnehmen, Öffnen der Geruchsbesitzungssubstanzkammer (12), um die Geruchsbesitzungssubstanz in das Spülwasser zu mischen, Erwärmen des Spülwassers auf eine niedrige Temperatur **durch** die Heizeinrichtung (4), Zirkulieren mit der Zirkulationspumpe (5) und Ablassen des Spülwassers mit der Ablasspumpe (6). 10

Revendications

1. Un lave-vaisselle (1) comprenant une cuve (2) dans laquelle la vaisselle à laver sont placée, un carter (3) où l'eau de lavage est collectée, un dispositif de chauffage (4) utilisé pour le chauffage de l'eau de lavage, une pompe de circulation (5) qui permet la circulation de l'eau de lavage, une pompe d'évacuation (6) qui évacue l'eau de lavage à la fin du processus de lavage, un capteur d'odeur (9) pour détecter l'odeur se répandant de la vaisselle dans la cuve (2) et un programme de lavage pour l'élimination d'odeurs (B) d'être démarré par l'utilisateur ou automatiquement lorsque le niveau d'odeur augmente, empêchant la vaisselle à laver de produire des odeurs puissantes. 25
2. Un lave-vaisselle (1) selon la Revendication 1, **caractérisé par** un bouton de démarrage (8) qui permet à l'utilisateur de démarrer le programme de lavage pour l'élimination d'odeurs (B). 40
3. Un lave-vaisselle (1) selon la Revendication 1, **caractérisé par** un indicateur (11) qui émet un signal sonore et/ou visuel lorsque la quantité de l'odeur détectée par le capteur d'odeur (9) dépasse une limite prédéfinie. 45
4. Un lave-vaisselle (1) selon la Revendication 1, **caractérisé par** une chambre de mesure (10) où le capteur d'odeur (9) est situé, adapté pour recueillir un échantillon en quantité mesurable de l'air ambiant. 50
5. Un lave-vaisselle (1) selon l'une quelconque des revendications précédentes, **caractérisé par** une chambre de substance d'élimination d'odeur (12) dans laquelle des substances chimiques d'élimina-

tion d'odeur sont mises.

6. Un lave-vaisselle (1) selon la Revendication 3, **caractérisé par** une unité de commande (7) qui permet à l'indicateur (11) d'émettre une alarme sonore et/ou visuelle lorsque la quantité de l'odeur détectée par le capteur d'odeur (9) dépasse une limite prédéfinie. 5
7. Un lave-vaisselle (1) selon l'une quelconque de Revendication 1 et des revendications de 3 à 5, **caractérisé par** une unité de commande (7) qui démarre automatiquement le programme de lavage pour l'élimination d'odeurs (B) lorsque la quantité de l'odeur détectée par le capteur d'odeur (9) dépasse une limite prédéfinie. 10
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8. Un lave-vaisselle (1) selon la Revendication 7, **caractérisé par** une unité de commande (7) qui contient des informations sur les périodes de temps pour des tarifs élevés et à bas prix des coûts de consommation électrique et démarre le programme de lavage pour l'élimination d'odeurs (B) dans la période de temps de tarif à bas prix. 20
9. Un lave-vaisselle (1) selon la Revendication 8, **caractérisé par** une unité de commande (7) qui comprend un circuit d'horloge (13) contenant des informations de synchronisation. 25
10. Un lave-vaisselle (1) selon la Revendication 5, **caractérisé par** l'emploi d'un programme de lavage pour l'élimination d'odeurs (B) comprenant les étapes : prendre de l'eau dans le carter (3), ouvrir la chambre de substance d'élimination d'odeur (12) afin de mélanger la substance d'élimination d'odeur avec l'eau de lavage, chauffer l'eau de lavage à une température basse par le dispositif de chauffage (4), circuler avec la pompe de circulation (5) et évacuer l'eau de lavage avec la pompe d'évacuation (6). 30
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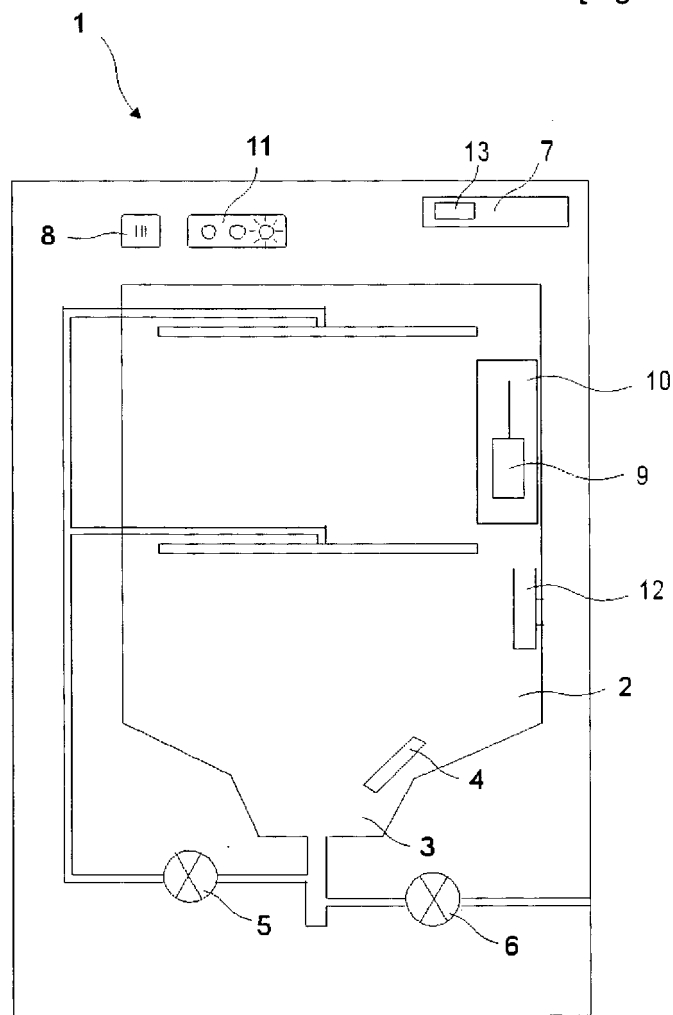
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[Fig. 001]



REFERENCES CITED IN THE DESCRIPTION

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