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(54) **A drying method for dishwashers**

(57) According to the present invention, in the case that the rinse aid in the detergent drawer is used up, the washing program is changed by the control unit of the machine and the heat and durations at drying step are adjusted to values at which drying can be executed without rinse aid. According to the present invention, the data

that the rinse aid is used up are recorded on the control unit by a controller sensing circuitry and then indicated on the display panel of the machine by the unit. Thus, a necessary continuous signal is indicated on the display panel until further rinse aid is supplied.

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Description

Technical Field

[0001] This invention relates to the dishwashers which change the drying program when the rinse aid is used up during the rinsing process.

Prior Art

[0002] As known, the rinse aid used in dishwashers has two basic functions. One of them is to avoid the water spots by ensuring the fast drying of the utensils washed in the dishwasher; the other is to enable the water on utensils washed to drain quickly by reducing the surface tension. Therefore, it is clear that when a washing operation is executed without a rinse aid, more water remains on the utensils than when a rinse aid is used.

[0003] Rinse aid used in dishwashers is added to a special compartment in a detergent drawer. Mixing up with the water during hot-water rinsing, they are sent onto the dishes by the nozzles. At the drying phase, the rinse aid still remaining on the dishes increases the drying performance.

[0004] The water, unable to remain thanks to the rinse aid on the surface of the dishes, evaporates due to heat during drying. Therefore, drying performance can be maintained at a desired level owing to the rinse aid. However, in cases where the rinse aid is used up, a warning signal is generated at the display panel of the current dishwashers but there occurs no change in the drying operation and the machine continues the same program. For this reason, water spots may remain on the utensils washed after drying.

[0005] In most of the currently-used dishwashers, the data that the rinse aid is used up are directly indicated on the display panel of the machine by means of the magnetic float switch circuit (reed switch). Yet, it may generate different signals from time to time as the circuit controlling the amount of the rinse aid is disposed on the door and due to the movement occurring during the opening and closing of the door. This may cause a change of signal on the display panel and may mislead the users.

[0006] According to the state of art, various studies have been conducted to improve the drying performance. For instance, in the published patent application no. JP2007244447, in order to avoid water stains on the utensils washed, a mechanism that purifies the water in the dishwasher, ensuring its use during the rinsing, has been developed.

Brief Description of Invention

[0007] In the drying method according to the present invention, the data that the rinse aid taken in during the rinsing stage is used up are reported to the control unit of the machine and the machine changes the drying heat and duration of the drying phase with a view to maintain-

ing the drying performance at a desired level.

[0008] In the said method of the present invention, the data that the rinse aid is used up are firstly recorded on the control unit of the machine by a controller sensing circuitry, and then indicated on the display panel of the machine by the unit. Thus, the necessary signal is continuously indicated on the display panel until further rinse aid is supplied.

10 Aim of the Invention

[0009] An aim of the invention is to improve the drying performance, changing the drying heat and durations during the drying phase in the case that the rinse aid used in the dishwashers is used up.

[0010] Another aim of this invention is to continuously indicate on the display panel the data that the rinse aid is used up until further rinse aid is supplied.

[0011] A further aim of the invention is to make the created drying method applicable in all the currently-used dishwashers without any change in the structure of the machine.

[0012] Yet another aim of the invention is to enable the machine to execute drying operations by means of an easily applicable, cost-effective and reliable method without using any rinse aid.

Disclosure of Invention

[0013] According to the method of the present invention, in case that the rinse aid in the detergent drawer of a dishwasher is used up, washing program is changed by the control unit of the machine and heat and duration at drying phase are adjusted so as to execute drying without rinse aid.

[0014] At the first stage of the drying method developed to this end, a controller sensing circuitry checks the data that whether the rinse aid is used up or not while the machine continues a program. In case the data that the rinse aid is used up during the program are received during the program, the sensing circuitry records these data on the control unit of the machine.

[0015] At the second stage, the control unit receiving the data that the rinse aid is used up, continuously indicates a warning signal which is noticed by the user on the display panel of the machine and changes drying heat and durations for the related washing program to be executed in the drying phase.

[0016] At the third stage, the drying phase is realized according to the changed heat and duration values. With the program changed, the machine performs the drying phase at a higher heat and duration level when compared to the program using rinse aid.

[0017] The signal on the display panel is continuously indicated until further rinse aid is supplied. When supplied with the rinse aid, the machine transmits to the said sensing circuitry control unit the data that the rinse aid is supplied; the control unit records these data and stops the

warning signal on the display panel. In the case that the rinse aid is supplied after stopping the machine, it continues to operate its standard washing program in which the rinse aid is used. The data whether the rinse aid is used up or not are checked by the reed switches used in the currently used dishwashers. Apart from them; magnetic switches, mechanic and illuminated switches can be used as sensing circuitry.

8. A dishwasher according to any of the preceding claims.

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Claims

1. A method for drying in dishwashers, **characterized by** comprising the following steps respectively,

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- a first step of checking the data whether the rinse aid is used up or not by means of a sensing circuitry while a washing program proceeds and of recording these data on the control unit by the sensing circuitry in the case that rinse aid is used up during the program;
- a second step of changing the drying heat and durations for the related washing program to be executed in the drying phase by the control unit that receives the data that the rinse aid is used up,
- a third step of performing a drying step at a higher heat and duration level according to the program in which the rinse aid is used.

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2. A method according to Claim 1, **characterized in that** the control unit receiving the data that the rinse aid is used up at the second step, starts to indicate a continuous warning signal that can be noticed by the user on the display panel.

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3. A method according to Claim 2, **characterized in that** when the rinse aid is supplied, the said sensing circuitry transmits to the control unit the data that the rinse aid is supplied and the control unit records these data and stops the warning signal on the display panel.

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4. A method according to Claim 1, **characterized in that** reed switches are used as sensing circuitry.

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5. A method according to Claim 1, **characterized in that** magnetic switches are used as sensing circuitry.

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6. A method according to Claim 1, **characterized in that** mechanical switches are used as sensing circuitry.

7. A method according to Claim 1, **characterized in that** illuminated switches are used as sensing circuitry.

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2007244447 B [0006]