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(54) **Control method of laundry drying apparatus**

(57) A control method of a laundry drying apparatus is provided. The laundry drying apparatus includes an outer tub, and a drum rotatably disposed in the outer tub and provided for a user to place laundry therein; the control method includes a laundry drying procedure for drying the laundry placed in the drum by the user, and a control unit for controlling the laundry drying procedure, in which the laundry drying procedure further includes a water pressure detection procedure, and when the user starts the laundry drying procedure, the water pressure detection procedure is performed first, so as to effectively ensure a drying effect, and make the operation more user-friendly at the same time.

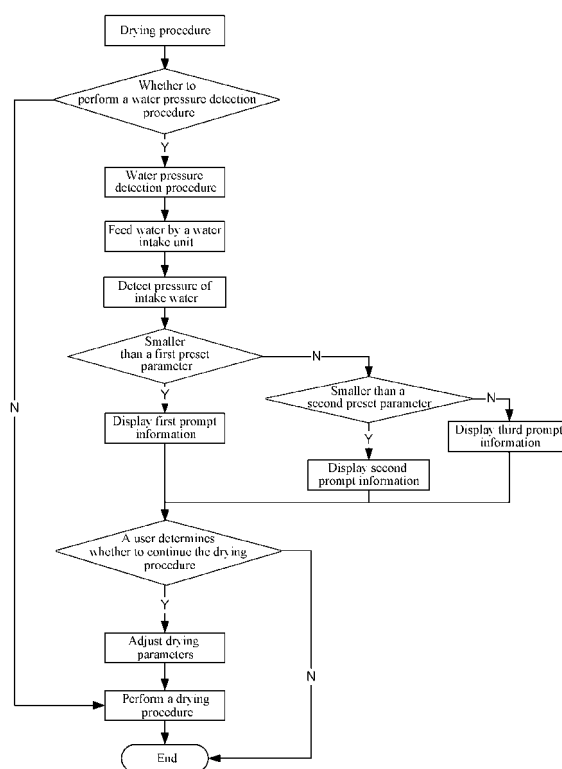


FIG. 1

Description

[0001] The present invention relates to a control method of a laundry drying apparatus, and more particularly to a control method of a condensing-type laundry drying apparatus.

[0002] With the change of pace of work and the improvement of life quality, it becomes more and more common to use a single laundry dryer or a washing and drying machine with a washing function (also known as a washer/dryer combo), in particular in the countries of East Asia. Especially, in cities or regions with cold and wet weather, a laundry washing apparatus with a laundry drying function is very popular.

[0003] Most of the laundry drying apparatus with a laundry drying function heat process air to obtain high-temperature low-humidity process air, and mix the process air with wet clothes placed in the drum by a user thoroughly. The process air exchanges heat with the wet clothes to take away moisture from the wet clothes, and becomes low-temperature high-humidity process air. The process air carrying moisture becomes low-temperature process air after being cooled to condense the humidity, and then is heated again to become high-temperature low-humidity process air which is transported back into the drum for the next circulation, while moisture carried in the process air is condensed into water which is discharged through a drainage system of the laundry drying apparatus. Therefore, moisture contained in the wet clothes gradually decreases with the continuous circulation of the process air until the wet clothes finally become dry clothes, so as to complete a whole drying process. In the whole drying process, thorough condensation of the moisture carried in the process air is an important precondition to ensure a drying effect. Otherwise, it means that the clothes cannot be fully dried, drying time is excessively long or energy consumption may be increased. Common condensation methods include condensation by water cooling, air cooling or mixed cooling using both water and air. The water cooling is more popular because it is economical and can ensure the condensation effect.

[0004] However, current laundry dryers or washing and drying machines do not detect a water pressure of water supply in an area of the user but perform the drying operation directly instead when performing a drying procedure to dry clothes. Such a mode may result in that the drying procedure of the clothes cannot be effectively executed, especially in cases that water pressure in the area of the user is low, for example, in an area that is remote or has a low water pressure, or in high residential buildings, or during water consumption peaks. In these cases, sufficient supply of cooling water used for condensation cannot be guaranteed, so that the effect of the condensation cannot be ensured, and correspondingly resulting in that clothes may still be wet after the drying procedure, thus failing to meet the demand of the user.

[0005] In view of the problems set out above, the

present invention is directed to a control method of a laundry drying apparatus, so as to ensure a drying effect of laundry as much as possible, and make operation of the laundry drying apparatus more user-friendly.

5 In order to achieve the objectives set out above, the present invention provides a control method of a laundry drying apparatus as follows. The laundry drying apparatus includes an outer tub, and a drum rotatably disposed in the outer tub and provided for a user to place laundry therein. The control method includes a laundry drying procedure for drying the laundry placed in the drum by the user, and a control unit controlling the laundry drying procedure. The laundry drying procedure further includes a water pressure detection procedure, and when the user starts the laundry drying procedure, the water pressure detection procedure is performed first.

[0006] In a preferred embodiment of the present invention, the control unit correspondingly adjusts the laundry drying procedure according to a result of the water pressure detection procedure.

[0007] In another preferred embodiment of the present invention, the control unit may determine whether to perform the water pressure detection procedure before the laundry drying procedure according to an instruction input by the user.

[0008] In another preferred embodiment of the present invention, the laundry drying apparatus is a condensing-type laundry drying apparatus.

[0009] In another preferred embodiment of the present invention, the laundry drying apparatus is provided with a sensing device for detecting a water pressure.

[0010] In another preferred embodiment of the present invention, a first preset parameter and a second preset parameter are set in the control unit. The water pressure detection procedure includes: starting a water intake unit connected to the laundry drying apparatus to feed water, and detecting an intake water pressure by using the sensing device when the water is fed in for a preset time period after the water intake unit is started.

[0011] In another preferred embodiment of the present invention, when a detection result of the sensing device is smaller than the first preset parameter, the control unit controls to display first preset prompt information to the user.

[0012] In another preferred embodiment of the present invention, when a detection result of the sensing device is between the first preset parameter and the second preset parameter, the control unit controls to display second preset prompt information to the user.

[0013] In another preferred embodiment of the present invention, when a detection result of the sensing device is greater than the second preset parameter, the control unit controls to display third preset prompt information to the user.

[0014] In another preferred embodiment of the present invention, the control unit may determine whether to display corresponding prompt information to the user according to an instruction input by the user.

[0015] In another preferred embodiment of the present invention, the sensing device is disposed on a bottom of the outer tub of the laundry drying apparatus.

[0016] In another preferred embodiment of the present invention, the sensing device is a pressure sensor.

[0017] Beneficial effects of the present invention include: a pressure sensing device installed on a bottom of an outer tub of a laundry drying apparatus used to detect a water pressure of water supply in an area of a user before a drying procedure, then corresponding prompt information displayed to the user according a detection result, and selection by the user whether to continue to perform the drying procedure, thus making the operation more user-friendly, and at the same time, a control unit also correspondingly adjusting the laundry drying procedure according to the detection result, thus ensuring a drying effect of laundry as much as possible, and effectively avoiding defects when the drying procedure is performed under a low water pressure.

[0018] The present invention will become more fully understood from the detailed description of preferred embodiments shown in the Figures of the attached drawing. These embodiments are given hereinbelow for illustration only, and thus are not limitative of the present invention. In the drawing:

Fig. 1 is a schematic flow chart of a control method of a laundry drying apparatus according to a specific embodiment.

[0019] Fig. 1 is a schematic flow chart of a control method of a laundry drying apparatus according to a specific embodiment. A laundry drying apparatus according to the specific embodiment has a similar structure of a conventional drum-type laundry washing and drying machine or a laundry dryer. For example, a condensing-type laundry dryer includes an outer tub and a drum which is installed inside the outer tub and can rotate at a high speed driven by a motor. A sensing device is disposed on a bottom of the outer tub, and preferably, the sensing device is a pressure sensor. The washing drum unit composed of the outer dtub and the drum is set inside a case body of the laundry drying apparatus through suspension springs set on the top of the outer tub and a support structure set on the bottom of the outer tub. A laundry opening for putting in and taking out laundry by a user is set in the front of the washing drum unit and the case body. An operation panel for the user to operate the apparatus is set on the top of the laundry opening, and different drying procedures are set on the operation panel for the selection by the user. The control unit used to control the running of the laundry drying apparatus is set inside the operation panel, and can control the washer to select and perform a corresponding drying procedure according to an instruction input by the user.

[0020] When using the apparatus, the user puts clothes to be dried in the drum, and inputs a corresponding instruction through the operation panel. The control

unit determines a drying procedure selected by the user according to the instruction input by the user to perform a corresponding drying procedure. After the user selects the corresponding drying procedure, the system enters an operating stage, in which the control unit controls to start a water intake unit connected to the dryer for feeding water into the outer tub. After the water is fed for a certain time period, for example, after two minutes, the control unit controls the pressure sensor to detect the pressure of the water fed in the outer tub, that is, to perform a water pressure detection procedure. Based on a detection result, it can be determined whether the water pressure of water supply in the area of the user is sufficient. Of course, in order to make the operation more user-friendly, the control unit may also determine whether to perform the water pressure detection procedure before the drying procedure according to the instruction input by the user. It is set by default to perform the water pressure detection procedure first after the user starts the drying procedure. If a detection result is smaller than a first preset parameter preset by the system, in which the first preset parameter is 120 Pa in the present specific embodiment, it means that the water tap of the user is closed, or the pressure of the water supply in the area of the user is seriously insufficient, that is, the pressure of water supply is not enough for the needed cooling water in the drying procedure. The control unit controls a display system to constantly display the information, namely the first preset prompt information, to the user until the user terminates the drying procedure manually. If a detection result of the water pressure detection procedure is between the first preset parameter and a second preset parameter preset by the system, in which the second preset parameter is 160 Pa according to a specific embodiment of the present invention, it means that the pressure of the water supply that the user is using is low. Although the water supply can be used in the drying procedure, the drying effect as expected by the user possibly cannot be satisfied. Thus, the control unit controls the display system to constantly display the prompt information, namely the second preset prompt information, to the user, and the user may select to continue the drying procedure, or select to terminate the drying procedure. If the user selects to continue the drying procedure, the control unit correspondingly adjusts relevant parameters of the drying procedure according to the result of the water pressure detection procedure, for example, drying time may be extended, or a drying temperature may be increased, so as to satisfy a desirable drying effect even in the case of water supply having a relatively low pressure. If a detection result of the water pressure detection procedure is greater than the second preset parameter preset by the system, it means that the pressure of the water supply that the user is using is sufficient for the drying procedure. In this case, the control unit may control the display system to constantly display the prompt information, namely the third preset prompt information, to the user to make the operations of the apparatus more user-friendly. Of course, it

is also possible to enter a drying procedure stage directly. At the same time, the control unit may also correspondingly adjust relevant parameters of the drying procedure according to the result of the water pressure detection procedure, so as to achieve a drying effect satisfactory to the user.

[0021] The embodiments described above are only preferred embodiments of the present invention, and the present invention may also have many other embodiments. Equivalent changes made to the present invention by persons of ordinary skills in the art under the instruction of the present invention shall still fall within the scope of the present invention as defined by the claims.

Claims

1. A control method of a laundry drying apparatus, wherein the laundry drying apparatus comprises an outer tub and a drum rotatably disposed in the outer tub and provided for a user to place laundry therein, the control method comprising: a laundry drying procedure for drying the laundry placed in the drum by the user; and a control unit for controlling the laundry drying procedure, wherein the laundry drying procedure further comprises a water pressure detection procedure, and when the user starts the laundry drying procedure, the water pressure detection procedure is performed first. 20
2. The control method of a laundry drying apparatus according to claim 1, wherein the control unit correspondingly adjusts the laundry drying procedure according to a result of the water pressure detection procedure. 25
3. The control method of a laundry drying apparatus according to claim 1, wherein the control unit determines whether the water pressure detection procedure is performed before the laundry drying procedure according to an instruction input by the user. 30
4. The control method of a laundry drying apparatus according to claim 1, wherein the laundry drying apparatus is a condensing-type laundry drying apparatus. 35
5. The control method of a laundry drying apparatus according to any preceding claim, wherein the laundry drying apparatus is provided with a sensing device for detecting a water pressure. 40
6. The control method of a laundry drying apparatus according to claim 5, wherein a first preset parameter and a second preset parameter are set in the control unit, and the water pressure detection procedure comprises: starting a water intake unit connected to the laundry drying apparatus for feeding water, and 45
- detecting a water pressure by the sensing device when the water is fed in for a preset time period after the water intake unit is started. 50
7. The control method of a laundry drying apparatus according to claim 5, wherein when a detection result of the sensing device is smaller than the first preset parameter, the control unit controls to display first preset prompt information to the user. 55
8. The control method of a laundry drying apparatus according to claim 5, wherein when a detection result of the sensing device is between the first preset parameter and the second preset parameter, the control unit controls to display second preset prompt information to the user.
9. The control method of a laundry drying apparatus according to claim 5, wherein when a detection result of the sensing device is greater than the second preset parameter, the control unit controls to display third preset prompt information to the user.
10. The control method of a laundry drying apparatus according to any one of claims 7 to 9, wherein the control unit determines whether to display corresponding prompt information to the user or not according to an instruction input by the user.
11. The control method of a laundry drying apparatus according to claim 5, wherein the sensing device is disposed on a bottom of the outer tub of the laundry drying apparatus.
12. The control method of a laundry drying apparatus according to claim 11, wherein the sensing device is a pressure sensor.

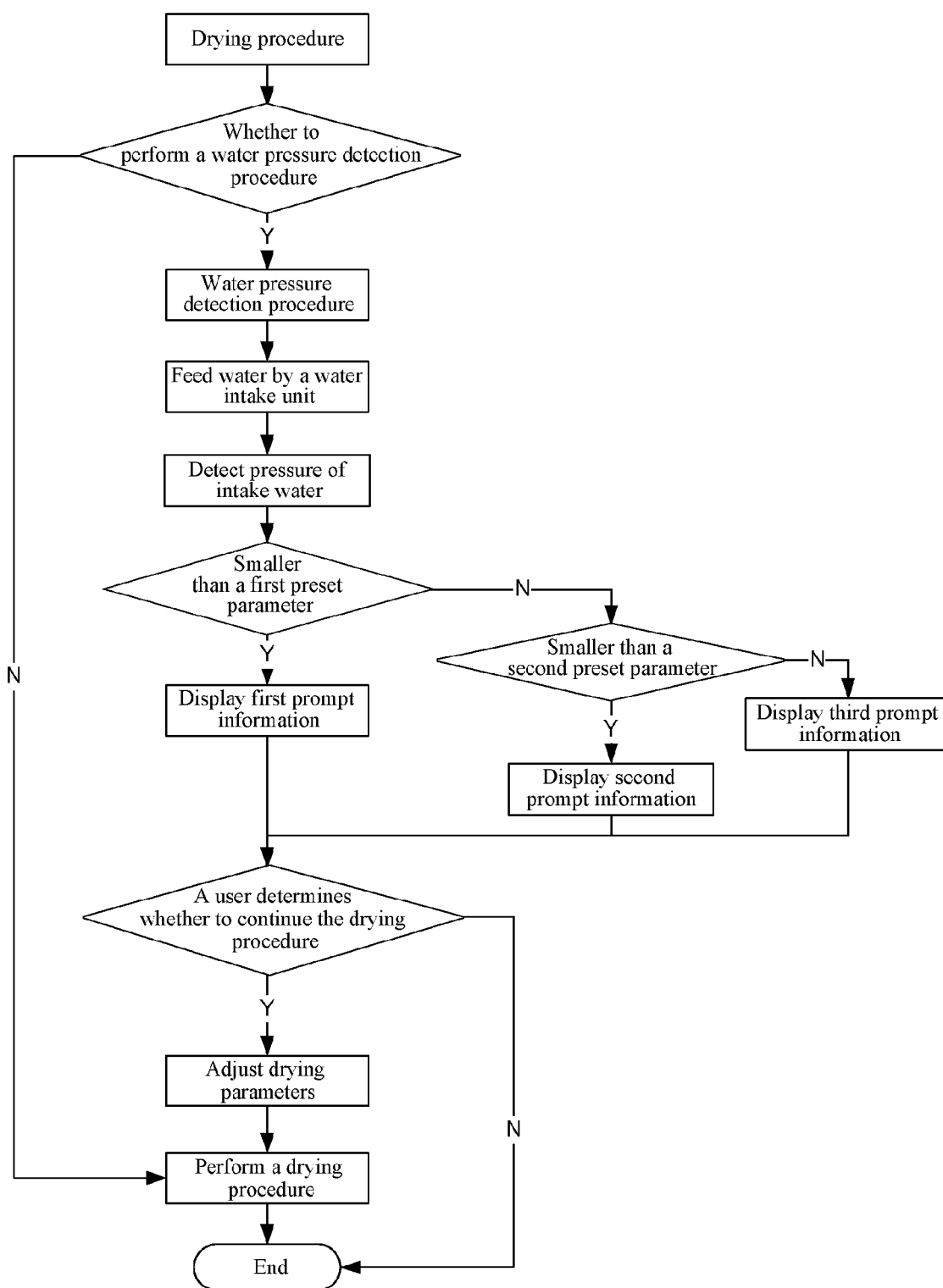


FIG. 1



EUROPEAN SEARCH REPORT

Application Number
EP 10 17 0362

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 743 389 A1 (ELECTROLUX ZANUSSI ELETTRODOME [IT]) 20 November 1996 (1996-11-20) * column 3, line 5 - column 4, line 52 *	1-12	INV. D06F58/24 D06F58/28
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			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 October 2010	Examiner Hannam, Martin
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 17 0362

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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