



EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
13.07.2022 Bulletin 2022/28

(51) International Patent Classification (IPC):
D06F 33/00 (2020.01) D06F 29/00 (2006.01)

(21) Application number: **20880616.6**

(86) International application number:
PCT/CN2020/122510

(22) Date of filing: **21.10.2020**

(87) International publication number:
WO 2021/083006 (06.05.2021 Gazette 2021/18)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

- **SI, Fumei**
Zhuhai, Guangdong 519070 (CN)
- **ZENG, Han**
Zhuhai, Guangdong 519070 (CN)
- **LIU, Li**
Zhuhai, Guangdong 519070 (CN)
- **QIU, Bin**
Zhuhai, Guangdong 519070 (CN)
- **ZHAO, Dongliang**
Zhuhai, Guangdong 519070 (CN)

(30) Priority: **02.11.2019 CN 201911061730**
09.01.2020 CN 202010023220

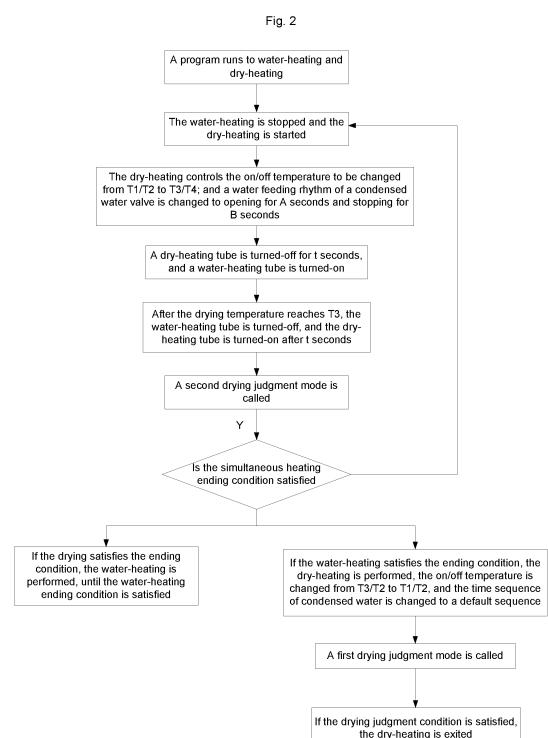
(71) Applicant: **Gree Electric Appliances, Inc. of Zhuhai**
Zhuhai, Guangdong 519070 (CN)

(74) Representative: **Zacco GmbH**
Bayerstrasse 83
80335 München (DE)

(72) Inventors:
• **YAO, Yuzhou**
Zhuhai, Guangdong 519070 (CN)

(54) **CONTROL METHOD FOR MULTI-DRUM WASHING MACHINE**

(57) The present disclosure belongs to the field of washing machines, and specifically discloses a control method for a multi-drum washing machine, including: while a plurality of washing drums needs to be wash-heated and dry-heated at the same time, the washing drum that needs to dry-heated is controlled to be dry-heated preferentially; and the dry-heating is intermittent-type heating, and the wash-heating of other drums is performed between two adjacent dry-heating intervals. The control method of the present invention achieves that while the plurality of the washing drums is operated until the dry-heating and the wash-heating are performed at the same time, under the condition of guaranteeing the wash temperature during heated washing, the washing effect can be satisfied without affecting the drying efficiency.



Description

Cross-Reference to Related Application

[0001] The present application claims priority to patent application No. 201911061730.1, filed to the China National Intellectual Property Administration on November 2, 2019 and entitled "Washing machine", and priority to patent application No. 202010023220.1, filed to the China National Intellectual Property Administration on January 9, 2020 and entitled "Control method for multi-drum washing machine".

Technical Field

[0002] The present disclosure belongs to the field of clothing treatment devices, and specifically relates to a control method for a multi-drum washing machine.

Background

[0003] With the improvement of living standards and the release of a two-child policy, zoned washing and healthy washing become important needs of people, and the pursuit of the healthy washing becomes a consensus. A multi-drum washing machine is one of important formation modes of the healthy washing. In addition to avoiding cross-infection, the benefits of multi-drum washing may also avoid the cross color of clothes. A large amount of water is needed to wash the clothes in different categories, the rinsing water may be reused, and the reuse of relatively clean rinsing water becomes an urgent problem to be solved. The multi-drum washing machine has the functions of water heating and drying. It is necessary to find a better control method to take into account both drying and heated washing while the dry-heating and wash-heating are operated at the same time.

[0004] In view of this, the present invention is proposed.

Summary

[0005] A technical problem to be solved by the present invention is to overcome the deficiencies of an existing technology, and a control method for a multi-drum washing machine and multi-drum washing machine is provided. While a plurality of washing drums is operated until the dry-heating and the wash-heating are performed at the same time, under the condition of guaranteeing the wash temperature during heated washing, the washing effect may be satisfied without affecting the drying efficiency.

[0006] In order to solve the above technical problem, at least some embodiments of the present disclosure provide a control method for a multi-drum washing machine. While a plurality of washing drums needs to be wash-heated and dry-heated at the same time, the washing drum that needs to be dry-heated is controlled to be dry-

heated preferentially; and the dry-heating is intermittent-type dry-heating, and the wash-heating of other drums is performed between two adjacent dry-heating intervals.

[0007] In some disclosed embodiments, while there is the plurality of the washing drums that needs to be dry-heated at the same time, the dry-heating is performed according to a time sequence determined by a user or required for the dry-heating.

[0008] In some disclosed embodiments, while there is the plurality of the washing drums that needs to be wash-heated at the same time, the wash-heating is performed according to a time sequence determined by the user or required for the wash-heating.

[0009] In some disclosed embodiments, while the washing drum for the dry-heating is still in an intermittent heating period, and the washing drum which performs the wash-heating in the dry-heating interval thereof completes the wash-heating, the wash-heating of the next washing drum is started according to the time sequence determined by the user or required for the wash-heating, until all the washing drums complete the dry-heating and the wash-heating; and while the washing drum for the dry-heating completes the intermittent dry-heating, and the washing drum for the wash-heating which is started in the dry-heating interval thereof does not complete the wash-heating, the dry-heating of the next washing drum is started according to the time sequence determined by the user or required for the dry-heating, until all the washing drums complete the dry-heating and the wash-heating.

[0010] In some disclosed embodiments, the multi-drum washing machine includes two washing drums, and while the two washing drums need to be wash-heated and dry-heated at the same time, one of the washing drums needs to be wash-heated, and the other washing drum needs to be dry-heated, the dry-heating and the wash-heating of the two washing drums are performed alternately, until all the two washing drums complete the dry-heating and the wash-heating.

[0011] In some disclosed embodiments, while the plurality of the washing drums needs to be wash-heated and dry-heated at the same time and the dry-heating is performed preferentially, the on/off temperature of the dry-heating is adjusted from an on/off temperature T_1/T_2 while the dry-heating is performed separately to an on/off temperature T_3/T_4 while the dry-heating is performed simultaneously, and $T_1 - T_2 \leq T_3 - T_4$.

[0012] In some disclosed embodiments, while the temperature in a drum of the washing drum for the dry-heating reaches T_4 , the washing drum for the dry-heating is controlled to suspend heating, and the washing drum that needs to be wash-heated is started to be wash-heated, and while the temperature in the drum of the washing drum for the dry-heating is reduced to T_3 due to the stop heating, the wash-heating of the washing drum that needs to be wash-heated is suspended, and the washing drum for the dry-heating is continued to be controlled for dry-heating.

[0013] In some disclosed embodiments, after the dry-heating of the washing drum that performs the dry-heating is suspended for a preset time, the washing drum that performs the wash-heating is controlled to be wash-heated, and/or after the wash-heating of the washing drum that performs the wash-heating is suspended for a preset time, the washing drum that performs the dry-heating is controlled to be dry-heated.

[0014] In some disclosed embodiments, in the dry-heating process of the washing drum that performs the dry-heating, while the on/off temperature of the dry-heating is T_3/T_4 , the water feeding time sequence of condensed water for the dry-heating is adjusted from a water feeding time sequence of the fed condensed water while the dry-heating is performed separately: opening for A_1 seconds and stopping for B_1 seconds, to a water feeding time sequence while the dry-heating is performed simultaneously: opening for A_2 seconds and stopping for B_2 seconds, and $A_1 \geq A_2$, $B_1 \leq B_2$.

[0015] In some disclosed embodiments, while the on/off temperature in the dry-heating process of the washing drum that performs the dry-heating is T_1/T_2 , a first drying judgment mode is used to judge whether the drying is completed; while the on/off temperature in the dry-heating process is T_3/T_4 , a second drying judgment mode is used to judge whether the drying is completed; and the temperature in the washing drum while the drying is completed in the first drying judgment mode is greater than the temperature in the washing drum while the drying is completed in the second drying judgment mode.

[0016] In some disclosed embodiments, while the washing drum that performs the wash-heating completes the wash-heating, and the washing drum that performs the dry-heating is dry-heated separately, the on/off temperature of the dry-heating is adjusted from the on/off temperature T_3/T_4 while the dry-heating is performed simultaneously to the on/off temperature T_1/T_2 while the dry-heating is performed separately, and the first drying judgment mode is used to judge whether clothes is dried.

[0017] And/or, the water feeding time sequence, opening for A_2 seconds and stopping for B_2 seconds, of the condensed water while the dry-heating is performed simultaneously is adjusted to the water feeding time sequence, opening for A_1 seconds and stopping for B_1 seconds, of the condensed water while the dry-heating is performed separately.

[0018] After the above technical scheme is adopted, the present invention has the following beneficial effects compared with the prior art.

[0019] Through at least some of the embodiments of the present disclosure, while the plurality of the washing drums is operated until the dry-heating and the wash-heating are performed at the same time, under the condition of guaranteeing the wash temperature during heated washing, the washing effect may be satisfied without affecting the drying efficiency.

[0020] The specific embodiments of the present invention are further described in detail below with reference

to drawings.

Brief Description of the Drawings

[0021] The drawings, as a part of the present invention, are used to provide further understanding of the present invention, and the exemplary embodiments of the present invention and descriptions thereof are used to explain the present invention, but do not constitute improper limitation to the present invention. Apparently, the drawings in the following descriptions are only some embodiments, and for those of ordinary skill in the art, other drawings may also be obtained according to these drawings without creative work. In the drawings:

Fig. 1 is a structure schematic diagram of a washing machine according to one embodiment of the present disclosure.

Fig. 2 is a control flow diagram of one embodiment of the present disclosure.

[0022] 1. First washing drum; 2. Second washing drum; 11. First wash-heating device; 12. First dry-heating device; 13. First temperature sensing bulb; 21. Second wash-heating device, 22. Second dry-heating device; and 23. Second temperature sensing bulb.

[0023] It should be noted that these drawings and text descriptions are not intended to limit a conception scope of the present invention in any way, but to illustrate the concept of the present invention to those skilled in the art by referring to the specific embodiments.

Detailed Description of the Embodiments

[0024] In order to make purposes, technical schemes and advantages of the embodiments of the present invention clearer, the technical schemes in the embodiments are clearly and completely described below with reference to the drawings in the embodiments of the present invention, and the following embodiments are used to illustrate the present invention, but are not intended to limit a scope of the present invention.

[0025] In the description of the present invention, it should be noted that orientation or position relationships indicated by terms "inner", "outer" and the like are based on the orientation or position relationships shown in the drawings, and are only for the convenience of describing the present invention and simplifying the description, but not intended to indicate or imply that a device or element referred must have a particular orientation, and be constructed and operated in the particular orientation, and therefore it should not be construed as limiting the present invention.

[0026] In the description of the present invention, it should be noted that, unless otherwise expressly specified and limited, terms "mounted", "connected", "linked", "contacted" and "communicated" should be understood

in a broad sense, for example, it may be a fixed connection, or may also be a detachable connection, or an integral connection; it may be a mechanical connection, or an electrical connection; and it may be a direct connection, or an indirect connection through an intermediate medium. For those of ordinary skill in the art, the specific meanings of the above terms in the present invention may be understood in specific situations.

[0027] The control method of the present invention is applied to a plurality of washing drums to perform dry-heating and wash-heating at the same time. At this time, the washing drum that needs to be dry-heated is controlled to be preferentially dry-heated; and the dry-heating is intermittent-type dry-heating, and the wash-heating of other drums is performed between two adjacent dry-heating intervals. This control method is applicable to a situation that only one washing drum in the plurality of the washing drums is dry-heated, and one washing drum is wash-heated, and is also applicable to a situation that the plurality of the washing drums is dry-heated at the same time, and/or the plurality of the washing drums is wash-heated at the same time.

[0028] While there is the plurality of the washing drums that needs to be dry-heated at the same time, the dry-heating is performed according to a time sequence determined by a user or required for the dry-heating, and after one washing drum completes the dry-heating, the next washing drum is controlled to be dry-heated; and while there is the plurality of the washing drums that needs to be wash-heated at the same time, the wash-heating is performed according to a time sequence determined by the user or required for the wash-heating, and after one washing drum completes the wash-heating, the next washing drum is controlled to be wash-heated.

[0029] While the plurality of the washing drums needs to be dry-heated, and/or the plurality of the washing drums needs to be wash-heated, and while the washing drum for the dry-heating is still in an intermittent heating period, and the washing drum which performs the wash-heating in the dry-heating interval thereof completes the wash-heating, the wash-heating of the next washing drum is started according to the time sequence determined by the user or required for the wash-heating, until all the washing drums complete the dry-heating and the wash-heating; and while the washing drum for the dry-heating completes the intermittent dry-heating, and the washing drum for the wash-heating which is started in the dry-heating interval thereof does not complete the wash-heating, the dry-heating of the next washing drum is started according to the time sequence determined by the user or required for the dry-heating, until all the washing drums complete the dry-heating and the wash-heating.

[0030] In order to explain the control method of the present invention better, the present invention is described in detail by taking a double-drum washing machine as an example.

[0031] As shown in Fig. 1, a multi-drum washing ma-

chine includes a first washing drum 1 and a second washing drum 2, and the first washing drum 1 is located above the second washing drum 2. The first washing drum 1 includes a first wash-heating device 11, a first dry-heating device 12, and a first temperature sensing bulb 13; the second washing drum 2 includes a second wash-heating device 21, a second dry-heating device 22, and a second temperature sensing bulb 23. The first wash-heating device 11 and the second wash-heating device 12 are used to heat water in the washing drum while the first washing drum 1 and the second washing drum 2 perform heated washing, the first dry-heating device 12 and the second dry-heating device 22 are used to dry-heat while the first washing drum 1 and the second washing drum 2 perform drying, the first temperature sensing bulb 13 and the second temperature sensing bulb 23 are used to detect the temperature in the washing drum while the first washing drum 1 and the second washing drum 2 perform the dry-heating. The multi-drum washing machine of this embodiment further includes a main control board, the first wash-heating device 11, the first dry-heating device 12, the first temperature sensing bulb 13, the second wash-heating device 21, the second dry-heating device 22, and the second temperature sensing bulb 23 are respectively connected with the main control board. The first washing drum 1 washes clothes and performs the wash-heating, and the second washing drum 2 dries the clothes and performs the dry-heating. While the wash-heating and the dry-heating are operated to be performed at the same time, since both the operations of the wash-heating and the dry-heating require a larger power, in order to avoid a current safety problem caused by an excessive high current of the washing machine due to the simultaneous operations, this embodiment controls the wash-heating and the dry-heating to be performed alternately, so that two operating procedures may be taken into account, as to guarantee the smooth progress of washing and drying.

[0032] In some embodiments of the present disclosure, while the plurality of the washing drums performs the wash-heating and dry-heating at the same time, the dry-heating is controlled to be preferentially performed. It is considered that the clothes in a drying state are more in line with the dressing needs of the user than the clothes in a washing state. Therefore, a principle that the dry-heating is performed preferentially, and the wash-heating is also taken into account is adopted, the second washing drum 2 uses the intermittent-type dry-heating while the dry-heating is performed, and the first washing drum 1 is controlled to perform the wash-heating between two dry-heating intervals.

[0033] In some embodiments of the present disclosure, while the plurality of the washing drums is operated until the wash-heating and the dry-heating are performed at the same time, the wash-heating is suspended, the dry-heating is started, the second washing drum 2 is controlled to be in a dry-heating process, and the on/off temperature of the second dry-heating device 22 is adjusted from T_1/T_2 to T_3/T_4 , T_1/T_2 is the on/off temperature of the

second dry-heating device 22 while the washing machine performs the dry-heating separately, and $T_1 - T_2 \leq T_3 - T_4$, the on/off temperature of the second washing drum 2 is detected by the second temperature sensing bulb 23, the second temperature sensing bulb 23 sends a detected temperature to the main control board, and controls on/off of the second dry-heating device 22 while the on/off conditions are satisfied. Namely, while the temperature of the second washing drum 2 is less than or equal to T_3 , the second dry-heating device 22 is started to dry the clothes in the second washing drum 2, and while the temperature in the second washing drum 2 is risen to T_4 , the second dry-heating device 22 stops heating. After the second dry-heating device 22 stops heating, the temperature in the second washing drum 2 may be gradually decreased, and while the temperature is decreased to be less than or equal to T_3 , the second dry-heating device 22 restarts the heating, thus the intermittent-type dry-heating is performed until the clothes is completely dried. For example: the temperature range of T_1 is 75-120 degrees, the temperature range of T_2 is 60-100 degrees, the temperature range of T_3 is 70-110 degrees, and the temperature range of T_4 is 55-95 degrees. By increasing the on/off temperature difference, the present invention increases the interval time between two times of adjacent drying, prolongs the wash-heating time, guarantees the wash temperature of the wash-heating under the premise of guaranteeing the drying efficiency, and satisfies the washing effect.

[0034] Since the wash-heating is performed in the interval of the dry-heating, namely while the temperature in the drum of the washing drum that performs the dry-heating reaches T_4 , the washing drum that performs the dry-heating is controlled to suspend the heating, and the washing drum for the wash-heating is started to be heated. While the temperature in the drum of the washing drum that performs the dry-heating is reduced to T_3 , the washing drum that performs the dry-heating is controlled to start the heating, and the washing drum that performs the wash-heating is suspended for heating. It is alternately performed in this way, until a condition of ending the dry-heating and/or the wash-heating is satisfied. In the process of switching between the dry-heating and the wash-heating, in order to prevent an instantaneous change of the current from impacting an electrical element, it is set to start the wash-heating after the dry-heating is suspended for a preset time, and then start the dry-heating after the wash-heating is suspended for the preset time. For example, the preset time t is set to be 1-3 seconds.

[0035] In some embodiments of the present disclosure, while the on/off temperature of a heating tube for the dry-heating is T_3/T_4 , a water feeding time sequence of condensed water for the dry-heating is adjusted from opening for A_1 seconds and stopping for B_1 seconds to opening for A_2 seconds and stopping for B_2 , the water feeding time sequence, opening for A_1 seconds and stopping for B_1 seconds, of the condensed water is the water

feeding time sequence of the condensed water while the washing machine performs the drying-heating separately, and $A_1 \geq A_2$, $B_1 \leq B_2$. After wet and hot steam generated by the second washing drum 2 for drying the clothes enters a condensing pipe, heat is taken away under the cooling effect of the condensed water and it becomes dry and cold air. In order to guarantee the balance of heat input and output of a whole system, in the case of increasing the on/off temperature difference, the turn-on time of the condensate water may be decreased, and the turn-off time of the condensate water is increased to prolong the time of the condensate water, thereby the drying efficiency is guaranteed. The range of A , is 30-200 seconds, the range of B_1 is 0-200 seconds, the range of A_2 is 10-150 seconds, and the range of B_2 is 30-200 seconds.

[0036] In some embodiments of the present disclosure, while the on/off temperature in the dry-heating process is T_1/T_2 , a first drying judgment mode is used to judge whether the dry-heating is performed, and while the on/off temperature in the dry-heating process is T_3/T_4 , a second drying judgment mode is used to judge whether the dry-heating is performed. The temperature in the washing drum while the drying is completed in the first drying judgment mode is greater than the temperature in the washing drum while the drying is completed in the second drying judgment mode. Since methods of each drying judgment platform are various, for example a temperature rise method: the platform temperature of a T_1/T_2 platform is controlled at about 60 degrees, if it rises by 5 degrees from 60 degrees, the default is drying; and the platform temperature of a T_3/T_4 platform is controlled at about 55 degrees, if it rises by 4.5 degrees from 55 degrees, the default is drying. While the wash-heating and the dry-heating are performed at the same time, the first drying judgment mode is used to judge whether the clothes in the washing drum is dried.

[0037] While the wash-heating is completed and the dry-heating is performed separately, the on/off temperature of the dry-heating is adjusted from T_3/T_4 to T_1/T_2 , the first drying judgment mode is used to judge whether the clothes is dried, the water feeding time sequence of the condensed water is adjusted from opening for A_2 seconds and stopping for B_2 seconds to opening for A_1 seconds and stopping for B_1 seconds, and if the drying conditions are satisfied, the dry-heating is exited. While the wash-heating satisfies the ending conditions, but the dry-heating does not reach the ending conditions, by restoring the on/off temperature of the dry-heating and the water feeding time sequence of the condensate water to the on/off temperature and the water feeding time sequence while the dry-heating is performed separately, the drying efficiency is improved, and the drying time is reduced.

[0038] A flow diagram of the control method of this embodiment is shown in Fig. 2, specifically including:

S1: A plurality of washing drums is operated until wash-heating and dry-heating are performed at the

same time, the wash-heating is suspended, and the dry-heating is started.

S2: The on/off temperature of a heating tube for the dry-heating is adjusted from T_1/T_2 to T_3/T_4 , and a water feeding time sequence of condensate water is adjusted from opening for A_1 seconds and stopping for B_1 seconds to opening for A_2 seconds and stopping for B_2 seconds, T_1/T_2 is the on/off temperature of the heating tube while the dry-heating is performed separately, $T_1-T_2 \leq T_3-T_4$, and the water feeding time sequence, opening for A_1 seconds and stopping for B_1 , of the condensate water is the water feeding time sequence of the condensate water while a washing machine performs the dry-heating separately, and $A_1 \geq A_2$, $B_1 \leq B_2$.

S3: While the temperature in a drum of the washing drum that performs the dry-heating reaches T_4 , the dry-heating is suspended, and the wash-heating is started after a preset time interval; and while the temperature in the drum of the washing drum that performs the dry-heating is reduced to T_3 , the wash-heating is suspended, and the dry-heating is started after the preset time interval.

S4: It is judged whether the dry-heating or the wash-heating satisfies an ending condition that it is performed at the same time, and a second drying judgment mode is used in this process to judge the dry-heating condition; and if the condition of simultaneous ending is satisfied, it goes to S5, if not, it is returned to S2.

S5: If the drying ending condition is satisfied, the separate wash-heating is performed, until the wash-heating ending condition is satisfied; if the wash-heating ending condition is satisfied, the separate dry-heating is performed, the on/off temperature of the heating tube for the dry-heating is adjusted from T_3/T_4 to T_1/T_2 , the water feeding time sequence of the condensed water is adjusted from opening for A_2 seconds and stopping for B_2 seconds to opening for A_1 seconds and stopping for B_1 seconds, and a first drying judgment mode is called to judge the dry-heating condition, until the drying condition is satisfied, the dry-heating is exited.

[0039] The above are only preferred embodiments of the present invention, and are not intended to limit the present invention in any form. Although the present invention is already disclosed above with the preferred embodiments, it is not intended to limit the present invention. Within a scope without departing from the technical schemes of the present invention, any persons familiar with this patent may make some changes or modifications to equivalent embodiments of equivalent changes by using the above-mentioned technical content, but any

simple modifications, equivalent changes and modifications made to the above embodiments based on the technical essence of the present invention without departing from the content of the technical schemes of the present invention still fall within the scope of the schemes of the present invention.

Claims

1. A control method for a multi-drum washing machine, wherein while a plurality of washing drums needs to be wash-heated and dry-heated at a same time, controlling the washing drum that needs to be dry-heated to perform dry-heating preferentially; and the dry-heating is intermittent-type dry-heating, and performing wash-heating of other drums is performed between two adjacent dry-heating intervals.
2. The control method for the multi-drum washing machine according to claim 1, wherein while there is the plurality of the washing drums that needs to be dry-heated at the same time, performing the dry-heating according to a time sequence determined by a user or a time sequence required for the dry-heating.
3. The control method for the multi-drum washing machine according to claim 2, wherein while there is the plurality of the washing drums that needs to be wash-heated at the same time, performing the wash-heating according to a time sequence determined by the user or a time sequence required for the wash-heating.
4. The control method for the multi-drum washing machine according to claim 3, wherein while the washing drum for the dry-heating is still in an intermittent-type dry-heating period, and the washing drum which performs the wash-heating in a dry-heating interval completes the wash-heating, starting the wash-heating of a next washing drum according to a time sequence determined by the user or a time sequence required for the wash-heating, until all the washing drums complete the dry-heating and the wash-heating; and while the washing drum for the dry-heating completes the intermittent-type dry-heating, and the washing drum for the wash-heating which is started in the dry-heating interval does not complete the wash-heating, starting the dry-heating of the next washing drum according to a time sequence determined by the user or a time sequence required for the dry-heating, until all the washing drums complete the dry-heating and the wash-heating.
5. The control method for the multi-drum washing machine according to claim 4, wherein the multi-drum washing machine comprises two washing drums,

and while the two washing drums need to be wash-heated and dry-heated at the same time, controlling one of the two washing drums to perform wash-heating, and controlling an other washing drum of the two washing drums to perform dry-heating, performing the dry-heating and the wash-heating of the two washing drums alternately, until the two washing drums complete the dry-heating and the wash-heating.

6. The control method for the multi-drum washing machine according to any one of claims 1-5, wherein while the plurality of the washing drums needs to be wash-heated and dry-heated at the same time and the dry-heating is performed preferentially, adjusting an on/off temperature of the dry-heating from an on/off temperature T_1/T_2 which is performed separately in a dry-heating process to an on/off temperature T_3/T_4 which is performed simultaneously in the dry-heating process, and $T_1-T_2 \leq T_3-T_4$.
7. The control method for the multi-drum washing machine according to claim 6, wherein while the temperature in a drum of the washing drum for the dry-heating reaches T_4 , the washing drum for the dry-heating is controlled to suspend heating, and the washing drum that needs to be wash-heated to perform wash-heating, and controlling the washing drum that needs to be wash-heated to suspend the wash-heating while the temperature in the washing drum for the dry-heating is reduced to T_3 due to a stop heating, and continually controlling the washing drum for the dry-heating to perform dry-heating.
8. The control method for the multi-drum washing machine according to claim 7, wherein after the dry-heating of the washing drum that performs the dry-heating is suspended for a preset time, controlling the washing drum that performs the wash-heating to perform wash-heating, and/or after the wash-heating of the washing drum that performs the wash-heating is suspended for a preset time, controlling the washing drum that performs the dry-heating to perform dry-heating.
9. The control method for the multi-drum washing machine according to claim 7, wherein in the dry-heating process of the washing drum that performs the dry-heating, while the on/off temperature of the dry-heating is T_3/T_4 , adjusting a water feeding time sequence of condensed water for the dry-heating from a water feeding time sequence while the dry-heating is performed separately to a water feeding time sequence while the dry-heating is performed simultaneously, and the water feeding time sequence while the dry-heating is performed separately is opening for A_1 seconds and stopping for B_1 seconds, the water feeding time sequence while the dry-heating is performed simultaneously is opening for A_2 seconds

and stopping for B_2 seconds, and $A_1 \geq A_2$, $B_1 \leq B_2$.

10. The control method for the multi-drum washing machine according to any one of claims 7-9, wherein while the on/off temperature in the dry-heating process of the washing drum that performs the dry-heating is T_1/T_2 , judging whether a drying process is completed by a first drying judgment mode; while the on/off temperature in the dry-heating process is T_3/T_4 , judging whether the drying process is completed by a second drying judgment mode; and a temperature in the washing drum while the drying process is completed in the first drying judgment mode is greater than a temperature in the washing drum while the drying process is completed in the second drying judgment mode.
11. The control method for the multi-drum washing machine according to claim 10, wherein while the washing drum that performs the wash-heating completes the wash-heating, and the washing drum that performs the dry-heating is dry-heated separately, adjusting the on/off temperature of the dry-heating from the on/off temperature T_3/T_4 while the dry-heating is performed simultaneously to the on/off temperature T_1/T_2 while the dry-heating is performed separately, and judging whether clothes are dried by the first drying judgment mode; and/or, adjusting the water feeding time sequence while the dry-heating is performed simultaneously to the water feeding time sequence while the dry-heating is performed separately, and the water feeding time sequence while the dry-heating is performed simultaneously is opening for A_2 seconds and stopping for B_2 seconds, the water feeding time sequence while the dry-heating is performed separately is opening for A_1 seconds and stopping for B_1 seconds, of the condensed water while the dry-heating is performed separately.
12. A multi-drum washing machine, comprising: a first washing drum and a second washing drum, wherein the first washing drum is located above the second washing drum. The first washing drum comprises a first wash-heating device, a first dry-heating device, and a first temperature sensing bulb; and the second washing drum comprises a second wash-heating device, a second dry-heating device, and a second temperature sensing bulb; wherein, the first wash-heating device and the second wash-heating device are configured to heat water in the washing drum while the first washing drum and the second washing drum perform heated washing, the first dry-heating device and the second dry-heating device are configured to dry-heat while the first washing drum and the second washing drum perform drying, the first temperature sensing bulb and the second temperature sensing bulb are con-

figured to detect a temperature in the washing drum while the first washing drum and the second washing drum perform dry-heating.

13. The multi-drum washing machine according to claim 12, wherein the multi-drum washing machine further comprises: a main control board, wherein the first wash-heating device, the first dry-heating device, the first temperature sensing bulb, the second wash-heating device, the second dry-heating device, and the second temperature sensing bulb are respectively connected with the main control board.

5

10

15

20

25

30

35

40

45

50

55

Fig. 1

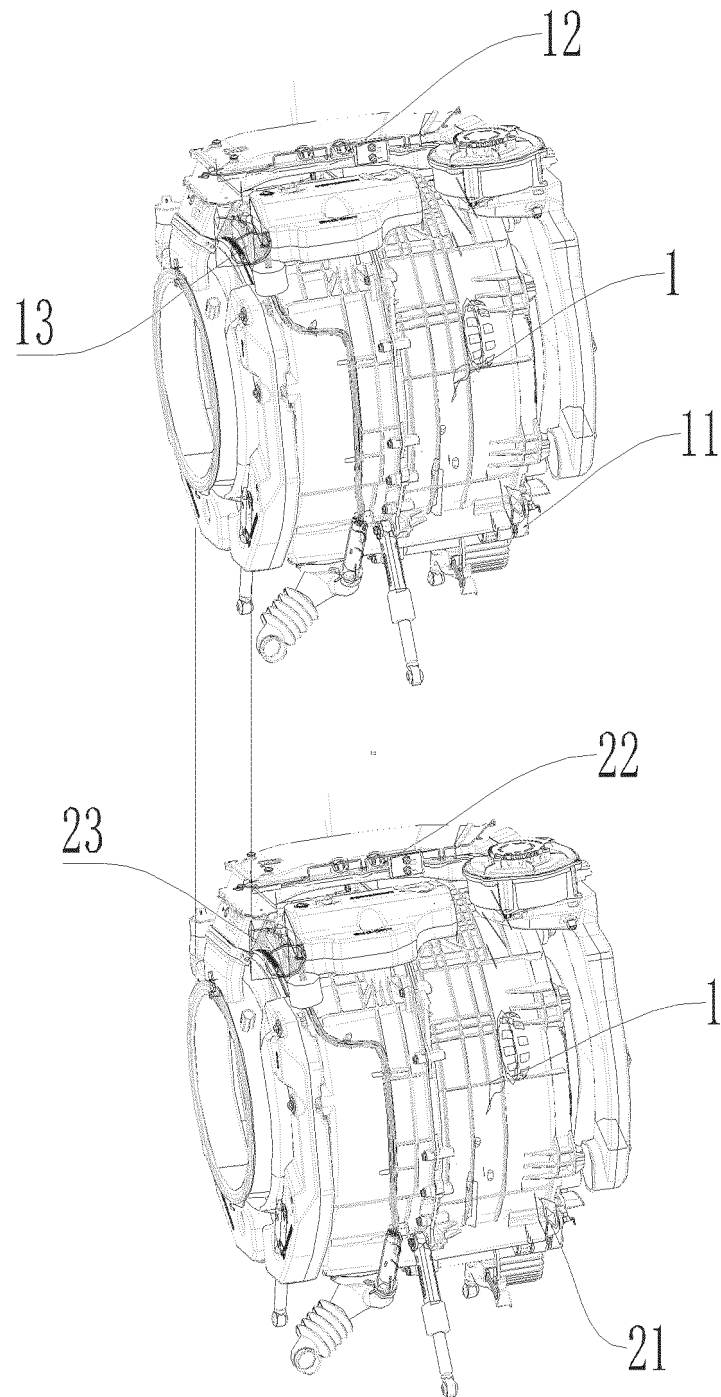
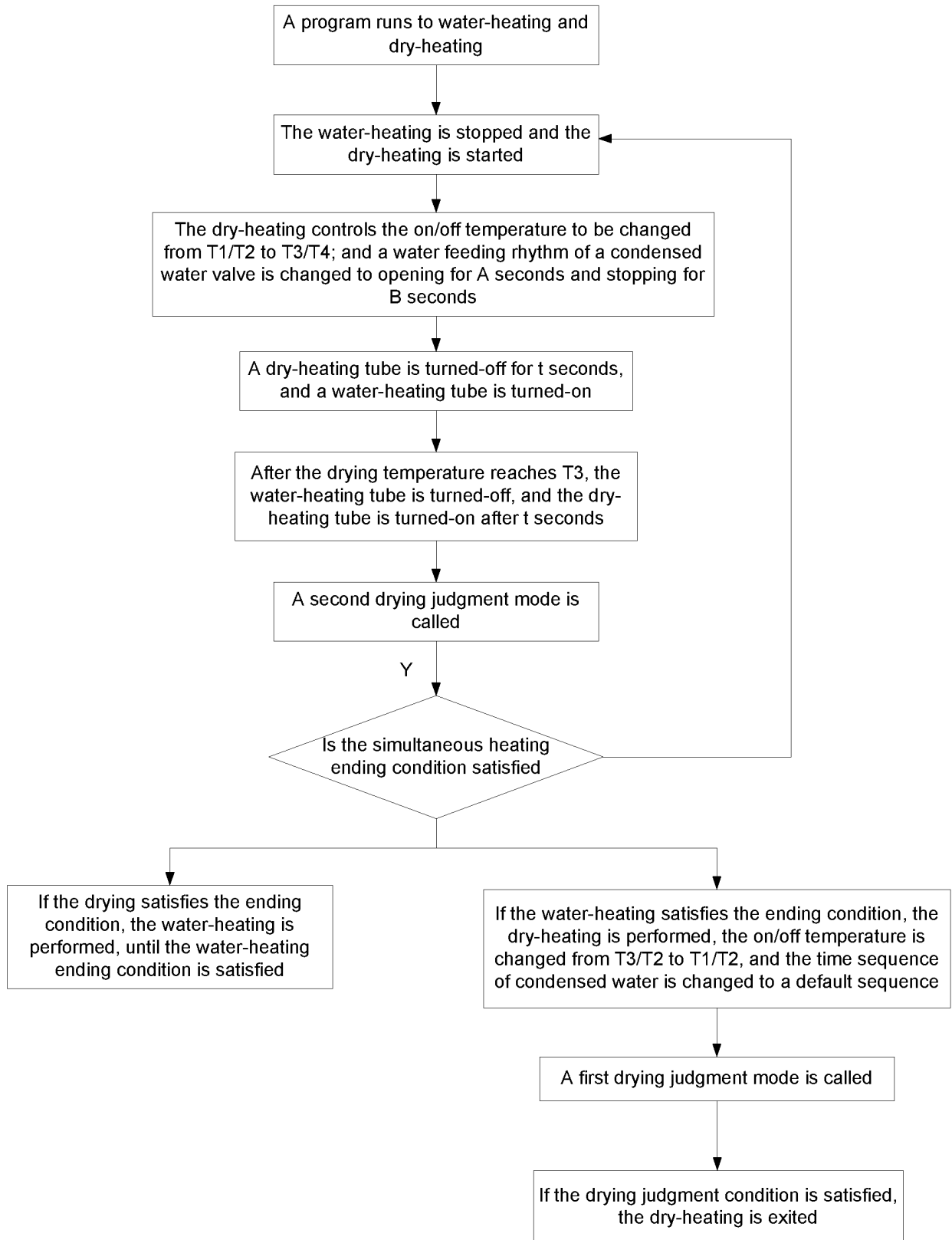


Fig. 2



INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/122510

A. CLASSIFICATION OF SUBJECT MATTER

D06F 33/00(2020.01)i; D06F 29/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, CNPAT, CNKI; 格力, 姚宇洲, 司富美, 曾汉, 刘立, 邱斌, 赵栋良, 多桶, 多筒, 双筒, 双桶, 烘干, 加热, 间歇, 交替, 优先, 洗, 干, 过载, 超载, 负载, dry+, wash+, heat+, drum???, first, second, intermittent, priority, overload+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 109306593 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 05 February 2019 (2019-02-05) description, paragraph 7 to paragraph 24, figures 1-2	1-13
PX	CN 111235818 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 05 June 2020 (2020-06-05) claims 1-11, description, paragraph 31 to paragraph 32	1-13
A	CN 109518411 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 26 March 2019 (2019-03-26) entire document	1-13
A	CN 102061590 A (BSH ELECTRICAL APPLIANCES (JIANGSU) CO., LTD.) 18 May 2011 (2011-05-18) entire document	1-13
A	US 2011252835 A1 (WHIRLPOOL CO.) 20 October 2011 (2011-10-20) entire document	1-13
A	US 10087572 B2 (WHIRLPOOL CO.) 02 October 2018 (2018-10-02) entire document	1-13

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

05 January 2021

Date of mailing of the international search report

22 January 2021

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing
100088
China

Facsimile No. (86-10)62019451

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/122510

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4663948 A (WHITE CONSOLIDATED IND. INC.) 12 May 1987 (1987-05-12) entire document	1-13

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/122510

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 109306593 A	05 February 2019	WO 2019020097 A1	31 January 2019
CN 111235818 A	05 June 2020	None	
CN 109518411 A	26 March 2019	WO 2019052410 A1	21 March 2019
		EP 3686338 A1	29 July 2020
CN 102061590 A	18 May 2011	WO 2011057955 A1	19 May 2011
US 2011252835 A1	20 October 2011	EP 2540895 A1	02 January 2013
US 10087572 B2	02 October 2018	US 10689792 B2	23 June 2020
US 4663948 A	12 May 1987	CA 1244117 A	01 November 1988

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201911061730 [0001]
- CN 202010023220 [0001]