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(54) FABRIC PROCESSING DEVICE, AND METHOD FOR CONTROLLING SPIN-DRYING PROCEDURE AND HEAT-DRYING PROCEDURE THEREOF

STOFFHERSTELLUNGSVORRICHTUNG UND VERFAHREN ZUR STEUERUNG EINES
SCHLEUDERTROCKNUNGSVERFAHRENS SOWIE SCHLEUDERTROCKNUNGSVERFAHREN

DISPOSITIF DE TRAITEMENT DE TISSU ET PROCÉDÉ ASSOCIÉ PERMETTANT DE
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(56) References cited:
EP-A2- 1 526 210 WO-A2-2010/128730

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Description

[0001] The present invention relates to a fabric processing device, and in particular, to a machine having washing and drying functions, comprising a drum driven by an electric motor, a control device used for controlling execution of a spin-drying procedure and a subsequent heat-drying procedure, and a detection device for detecting a rotation speed of the drum or the electric motor.

[0002] The present invention further relates to a method for controlling a spin-drying procedure and a heat-drying procedure of a fabric processing device, comprising selecting and then starting to execute a spin-drying procedure and a subsequent heat-drying procedure.

[0003] Such fabric processing device, and such method, are disclosed in EP 1 526 210 A2.

[0004] In the existing fabric processing devices having a drying function of washing machines, users are allowed to simultaneously select a washing procedure and a heat-drying procedure, where the washing procedure includes a spin-drying procedure. After the procedure starts, the fabric processing devices first wash and spin-dry the fabrics, and then the heat-drying procedure automatically starts to heat the spin-dried fabrics.

[0005] However, the spin-drying procedure of the existing fabric processing devices often fails to be completely executed. For example, excessive high bubble detergent is put in the washing procedure, or serious imbalance is caused due to uneven load distribution in the spin-drying process. In these cases, an actual rotation speed in the spin-drying procedure usually fails to reach a predetermined target value, and thus a lot of water remains in the fabrics after the spin-drying procedure is ended. If the fabric processing devices enter the heat-drying procedure in this case, an established heat-drying goal may often fail to be achieved. For example, the fabrics maintain relatively high water content after the heat-drying procedure is ended. Moreover, for a heat-drying procedure that determines heat-drying temperature and time according to a heat-drying degree of the clothes, more energy is consumed in the heat-drying process, or even the clothes fail to be dried. These cases not only lead to energy waste, but also bring great inconvenience to users.

[0006] An objective of the present invention is to remedy the foregoing defects of the fabric processing devices in the prior art, so that the fabric processing devices can instantly adjust the spin-drying procedure and/or the heat-drying procedure according to operation conditions of the spin-drying procedure.

[0007] In order to fulfil the foregoing objectives, the present invention provides solutions for a fabric processing device and a control method as defined in the attached independent claims. Preferred embodiments of the invention are defined in dependent claims, the subsequent disclosure and the attached drawing. Preferred embodiments of the fabric processing device imply preferred embodiments of the control method and vice versa,

even if not elaborated upon in detail herein.

[0008] Accordingly, the present invention adopts the following technical solution. A fabric processing device includes a drum driven by an electric motor, a control device used for controlling execution of a spin-drying procedure and a subsequent heat-drying procedure, and a detection device for detecting a rotation speed of the drum or the electric motor, where when the spin-drying procedure and the heat-drying procedure are both selected, in the spin-drying procedure, if the detection device detects that the rotation speed of the drum or the electric motor fails to reach or remain stable at a first preset rotation speed S1 during a first preset time T1, the spin-drying procedure is ended, and the subsequent heat-drying procedure is cancelled.

[0009] Therefore, when the spin-drying procedure fails to be executed properly, causing a failure of the rotation speed to reach the first preset rotation speed, the control device ends the spin-drying procedure and cancels the heat-drying procedure, to save unnecessary energy consumption. Meanwhile, users may properly adjust the fabrics, and reselect proper procedures for operation.

[0010] Preferably, when the spin-drying procedure is ended and the heat-drying procedure is cancelled, the spin-drying procedure already completed accounts for less than 60% of an entire process of the spin-drying procedure. Within such a process range, the fabrics contain much water, and thus are not suitable for heat-drying.

[0011] Preferably, if the rotation speed of the drum or the electric motor reaches the first preset rotation speed S1 and maintains the first preset rotation speed S1 during a first set time T1, the rotation speed is then increased; if the detection device detects that the rotation speed of the drum or the electric motor fails to reach or remain stable at a second preset rotation speed S2 during a second preset time T2, the spin-drying procedure is ended, and execution of the heat-drying procedure is directly started. In this case, according to a procedure setting, the spin-drying procedure has run sufficient time to enable the fabrics to be suitable for heat-drying. Ending the abnormal spin-drying procedure may save electrical energy and time.

[0012] Preferably, when the spin-drying procedure is ended and execution of the heat-drying procedure is started, the spin-drying procedure already completed accounts for at least 60% of the entire process of the spin-drying procedure. In such a process range, most water contained in the fabrics is removed, and thus the fabrics are suitable for heat-drying.

[0013] Preferably, the fabric processing device includes a display device; where when the spin-drying procedure is ended, the display device displays a ratio of the spin-drying procedure already completed to the entire process of the spin-drying procedure. Users may understand operation conditions of the procedure according to displayed information.

[0014] Preferably, the spin-drying procedure includes a plurality of incremental rotation speed steps; on these

rotation speed steps, the electric motor and the drum maintain a corresponding rotation speed during set times T1 to T5; when the spin-drying procedure proceeds to start points of each of the rotation speed steps, detection of whether the rotation speed of the drum or the electric motor reaches or remains stable at the corresponding rotation speed during preset times T1 to T5 is started, and it is determined whether to end the spin-drying procedure and whether to cancel the heat-drying procedure according to a detection result.

[0015] Another objective of the present invention is to provide a control method, so that the fabric processing device can instantly adjust the spin-drying procedure and/or the heat-drying procedure according to the operation conditions of the spin-drying procedure.

[0016] The foregoing objective is fulfilled through the following technical solution. A method for controlling a spin-drying procedure and a heat-drying procedure of a fabric processing device includes: selecting and then starting to execute a spin-drying procedure and a subsequent heat-drying procedure, where in the spin-drying procedure, a detection device detects a rotation speed of a drum or an electric motor; and if the rotation speed fails to reach or remain stable at a first preset rotation speed S1 during a first preset time T1, the spin-drying procedure is ended, and the subsequent heat-drying procedure is cancelled.

[0017] Preferably, when the spin-drying procedure is ended and the heat-drying procedure is cancelled, the spin-drying procedure already completed accounts for less than 60% of an entire process of the spin-drying procedure.

[0018] Preferably, if the rotation speed of the drum or the electric motor reaches the first preset rotation speed S1 and maintains the first preset rotation speed S1 during the first set time T1, the rotation speed is then increased; if the detection device detects that the rotation speed of the drum or the electric motor fails to reach or remain stable at a second preset rotation speed S2 during a second preset time T2, the spin-drying procedure is ended and execution of the heat-drying procedure is directly started.

[0019] Preferably, when the spin-drying procedure is ended and execution of the heat-drying procedure is started, the spin-drying procedure already completed accounts for at least 60% of the entire process of the spin-drying procedure.

[0020] Preferably, the spin-drying procedure includes a plurality of incremental rotation speed steps; on these rotation speed steps, the electric motor and the drum maintain a corresponding rotation speed during set times T1 to T5; when the spin-drying procedure proceeds to start points of each of the rotation speed steps, detection of whether the rotation speed of the drum or the electric motor reaches or remains stable at the corresponding rotation speed during preset times T1 to T5 is started, and it is determined whether to end the spin-drying procedure and whether to cancel the heat-drying procedure

according to a detection result.

[0021] By adopting the foregoing method, the fabric processing device can judge whether the spin-drying procedure is abnormal according to the rotation speed of the drum or the electric motor in the spin-drying procedure, and control the spin-drying procedure and/or the heat-drying procedure according to a detection result of the rotation speed, thereby avoiding heat-drying on fabrics with a high water content, saving energy and time, and simultaneously avoiding a heat-drying failure due to an excessive water content of fabrics.

[0022] The present disclosure will become more fully understood from the detailed description of preferred embodiments given herein below but for illustration only, and thus are not limitative of the present disclosure, and wherein:

FIG. 1 is a schematic diagram of a washer-dryer;

FIG. 2 is a flowchart of an ultimate spin-drying procedure and a heat-drying procedure of a washer-dryer; and

FIG. 3 is a coordinate graph of rotation speeds and times in an ultimate spin-drying procedure of a washer-dryer.

[0023] As shown in FIG. 1, a washer-dryer 1 includes a cabinet 2; a tub 3 is installed in the cabinet 2; a drum 5 driven by an electric motor 4 is rotatably installed in the tub 3, to accommodate fabrics to be washed and dried; the tub 3 is connected to an air circulation channel 6, where the air circulation channel 6 includes a condensation device 7 for condensing hot and humid air from the tub 3 and the drum 5, a heating device 8 for heating condensed air, and a blowing device 9 for enabling air to circulate in the air circulation channel 6 and the tub 3. The washing machine 1 further includes a control device 10, for controlling operation of procedures; a display device 11, connected to the control device 10, for displaying information of various kinds of the washing machine 1 in characters, symbols and/or patterns; and a detection device 12, for detecting a rotation speed of the drum 5 or the electric motor 4.

[0024] The washer-dryer 1 has a washing procedure and a heat-drying procedure, and the washing procedure and the heat-drying procedure may be both selected. After the washing procedure is ended, the heat-drying procedure automatically starts, where a last stage of the washing procedure includes an ultimate spin-drying procedure. The drum 5 rotates at a high speed in the ultimate spin-drying procedure to remove most of water out of fabrics.

[0025] FIG. 2 is a flowchart illustrating the ultimate spin-drying procedure and the heat-drying procedure after a user simultaneously selects the washing procedure and the heat-drying procedure. FIG. 3 is a coordinate graph of rotation speeds and times in the ultimate spin-

drying procedure. As shown in the figures, the spin-drying procedure includes a plurality of incremental rotation speed steps P1 to P5. After the ultimate spin-drying procedure starts, the rotation speed of the drum is gradually increased. First, step 1 S1 is performed, where when the procedure proceeds to a point where the rotation speed of the drum is 450 rpm, that is, around a start point ST1 of a first rotation speed step P1, the detection device 12 judges the rotation speed of the drum; if the rotation speed of the drum fails to remain stable at 450 rpm during a first preset time T1, the control device 10 determines that the spin-drying procedure already completed accounts for 10% of an entire process of the spin-drying procedure, which is not suitable for heat-drying; therefore, the control device 10 ends the ultimate spin-drying procedure, cancels the subsequent heat-drying procedure, and then displays information indicating that 10% of the spin-drying procedure is completed on the display device 11.

[0026] If the rotation speed of the drum remains stable at 450 rpm during the first preset time T1, the rotation speed is maintained for a first set time T1; that is, the rotation speed is maintained on the first rotation speed step P1, and then the rotation speed is increased; step 2 S2 is performed, where when the procedure proceeds to a point where the rotation speed of the drum is 700 rpm, that is, around a start point ST2 of a second rotation speed step P2, the detection device 12 judges the rotation speed of the drum; if the rotation speed of the drum fails to remain stable at 700 rpm during a second preset time T2, the control device 10 determines that the spin-drying procedure already completed accounts for 25% of the entire process of the spin-drying procedure, which is not suitable for heat-drying; therefore, the control device 10 ends the ultimate spin-drying procedure, cancels the subsequent heat-drying procedure, and displays information indicating that 25% of the spin-drying procedure is completed on the display device 11.

[0027] If the rotation speed of the drum remains stable at 700 rpm during the second preset time T2, the rotation speed is maintained for a second set time T2; that is, the rotation speed is maintained on the second rotation speed step P2, and then the rotation speed is increased; step 3 S3 is performed, where when the procedure proceeds to a point where the rotation speed of the drum is 1000 rpm, that is, around a start point ST3 of a third rotation speed step P3, the detection device 12 judges the rotation speed of the drum; if the rotation speed of the drum fails to remain stable at 1000 rpm during a third preset time T3, the control device 10 determines that the spin-drying procedure already completed accounts for 45% of the entire process of the spin-drying procedure, which is not suitable for heat-drying; therefore, the control device 10 ends the ultimate spin-drying procedure, cancels the subsequent heat-drying procedure, and displays information indicating that 45% of the spin-drying procedure is completed on the display device 11.

[0028] If the rotation speed of the drum remains stable

at 1000 rpm during the third preset time T3, the rotation speed is maintained for a third set time T3; that is, the rotation speed is maintained on the third rotation speed step P3, and then the rotation speed is increased; step 4 S4 is performed, where when the procedure proceeds to a point where the rotation speed of the drum is 1200 rpm, that is, around a start point ST4 of a fourth rotation speed step P4, the detection device 12 judges the rotation speed of the drum; if the rotation speed of the drum fails to remain stable at 1200 rpm during a fourth preset time T4, the control device 10 determines that the spin-drying procedure already completed accounts for 60% of the entire process of the spin-drying procedure, which is suitable for heat-drying; therefore, the control device 10 ends the ultimate spin-drying procedure, directly starts the subsequent heat-drying procedure, and displays information indicating that 60% of the spin-drying procedure is completed on the display device 11.

[0029] If the rotation speed of the drum remains stable at 1200 rpm during the fourth preset time T4, the rotation speed is maintained for a fourth set time T4, and then the rotation speed is increased; step 5 S5 is performed, where when the procedure proceeds to a point where the rotation speed of the drum is 1500 rpm, that is, around a start point ST5 of a fifth rotation speed step P5, the detection device 12 judges the rotation speed of the drum; if the rotation speed of the drum fails to remain stable at 1500 rpm during a fifth preset time T5, the control device 10 determines that the spin-drying procedure already completed accounts for 90% of the entire process of the spin-drying procedure, which is suitable for heat-drying; therefore, the control device 10 ends the ultimate spin-drying procedure, directly starts the subsequent heat-drying procedure, and displays information indicating that 90% of the spin-drying procedure is completed on the display device 11.

[0030] If the rotation speed of the drum remains stable at 1500 rpm during the fifth preset time T5, the rotation speed is maintained for a fifth set time T5, until the ultimate spin-drying procedure is finally ended according to a procedure setting. The device 10 determines that the entire process of the spin-drying procedure is completed, displays information indicating that 100% of the spin-drying procedure is completed on the display device 11, and starts the subsequent heat-drying procedure simultaneously.

[0031] In this embodiment, the preset times T1 to T5 for determining whether the rotation speed of the drum remains stable are the same. In other embodiments, the present times T1 to T5 may be different.

Claims

1. A fabric processing device, comprising a drum (5) driven by an electric motor (4), a control device (10) used for controlling execution of a spin-drying procedure and a subsequent heat-drying procedure,

- and a detection device (12) for detecting a rotation speed of the drum or the electric motor, **characterized in that:** when the spin-drying procedure and the heat-drying procedure are both selected, in the spin-drying procedure, if the detection device (12) detects that the drum (5) or the electric motor (4) fails to reach or remain stable at a first preset rotation speed (S1) during a first preset time (T1), the spin-drying procedure is ended and the subsequent heat-drying procedure is canceled.
2. The fabric processing device according to claim 1, **characterized in that:** when the spin-drying procedure is ended and the heat-drying procedure is canceled, the spin-drying procedure already completed accounts for less than 60% of an entire process of the spin-drying procedure.
 3. The fabric processing device according to any of claims 1 and 2, **characterized in that:** if the rotation speed of the drum (5) or the electric motor (4) reaches the first preset rotation speed (S1) and maintains the first preset rotation speed (S1) during a first set time (T1), the rotation speed is then increased; if the detection device (12) detects that the rotation speed of the drum (5) or the electric motor (4) fails to reach or remain stable at a second preset rotation speed (S2) during a second preset time (T2), the spin-drying procedure is ended, and execution of the heat-drying procedure is started directly.
 4. The fabric processing device according to claim 2, **characterized in that:** when the spin-drying procedure is ended and execution of the heat-drying procedure is started, the spin-drying procedure already completed accounts for at least 60% of the entire process of the spin-drying procedure.
 5. The fabric processing device according to any one of claims 1 to 4, **characterized by:** comprising a display device (11), wherein when the spin-drying procedure is ended, the display device (11) displays a ratio of the spin-drying procedure already completed to the entire process of the spin-drying procedure.
 6. The fabric processing device according to any one of claims 1 to 4, **characterized in that,** the spin-drying procedure comprises a plurality of incremental rotation speed steps (P1 to P5); on these rotation speed steps, the electric motor (4) and the drum (5) maintain a corresponding rotation speed during set times (T1 to T5); when the spin-drying procedure proceeds to start points (ST1 to ST5) of each of the rotation speed steps (P1 to P5), detection of whether the rotation speed of the drum (5) or the electric motor (4) reaches or remains stable at the corresponding rotation speed during preset times (T1 to T5) is started, and it is determined whether to end the spin-drying procedure and whether to cancel the heat-drying procedure according to a detection result.
 7. A method for controlling a spin-drying procedure and a heat-drying procedure of a fabric processing device, comprising selecting and then starting to execute a spin-drying procedure and a subsequent heat-drying procedure, **characterized in that:** during the spin-drying procedure, a detection device (12) detects a rotation speed of a drum (5) or of an electric motor (4); if the rotation speed fails to reach or remain stable at a first preset rotation speed (S1) during a first preset time (T1), the spin-drying procedure is ended, and the subsequent heat-drying procedure is canceled.
 8. The method according to claim 7, **characterized in that:** when the spin-drying procedure is ended and the heat-drying procedure is canceled, the spin-drying procedure already completed accounts for less than 60% of an entire process of the spin-drying procedure.
 9. The method according to claim 7 or 8, **characterized in that:** if the rotation speed of the drum (5) or the electric motor (4) reaches the first preset rotation speed (S1) and maintains the first preset rotation speed (S1) during a first set time (T1), the rotation speed is then increased; if the detection device (12) detects that the rotation speed of the drum (5) or the electric motor (4) fails to reach or remain stable at a second preset rotation speed (S2) during a second preset time (T2), the spin-drying procedure is ended and execution of the heat-drying procedure is started directly.
 10. The method according to claim 9, **characterized in that:** when the spin-drying procedure is ended and execution of the heat-drying procedure is started, the spin-drying procedure already completed accounts for at least 60% of the entire process of the spin-drying procedure.
 11. The method according to any one of claims 7 to 10, **characterized in that:**

the spin-drying procedure comprises a plurality of incremental rotation speed steps (P1 to P5); on these rotation speed steps, the electric motor (4) and the drum (5) maintain a corresponding rotation speed during set times (T1 to T5); when the spin-drying procedure proceeds to start points (ST1 to ST5) of each of the rotation speed steps (P1 to P5), detection of whether the rotation speed of the drum (5) or the electric motor (4) reaches or remains stable at the corresponding rotation speed during preset times (T1 to T5) is started, and it is determined whether to end

the spin-drying procedure and whether to cancel the heat-drying procedure according to a detection result.

Patentansprüche

1. Textilaufbereitungsvorrichtung mit einer von einem Elektromotor (4) angetriebenen Trommel (5), einer zum Steuern des Ausführens eines Schleudertrocknungsvorgangs und eines darauf folgenden Heißlufttrocknungsvorgangs benutzte Steuervorrichtung (10) und einer Erfassungsvorrichtung (12) zum Erfassen einer Drehzahl der Trommel oder des Elektromotors, **dadurch gekennzeichnet, dass:** wenn sowohl der Schleudertrocknungsvorgang als auch der Heißlufttrocknungsvorgang ausgewählt ist, der Schleudertrocknungsvorgang, wenn die Erfassungsvorrichtung (12) bei dem Schleudertrocknungsvorgang erfasst, dass die Trommel (5) oder der Elektromotor (4) im Verlauf eines ersten vorbestimmten Zeitraums (T1) eine erste vorbestimmte Drehzahl (S1) nicht erreicht oder diese nicht stabil einhält, beendet und der darauf folgende Heißlufttrocknungsvorgang storniert wird.
2. Textilaufbereitungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass:** der bereits abgeschlossene Schleudertrocknungsvorgang, wenn er beendet und der Heißlufttrocknungsvorgang storniert wird, weniger als 60 % eines gesamten Prozesses des Schleudertrocknungsvorgangs ausmacht.
3. Textilaufbereitungsvorrichtung nach einem der Ansprüche 1 und 2, **dadurch gekennzeichnet, dass:** wenn die Drehzahl der Trommel (5) oder des Elektromotors (4) die erste vorbestimmte Drehzahl (S1) erreicht und diese im Verlauf eines ersten bestimmten Zeitraums (T1) einhält, die Drehzahl dann erhöht wird; der Schleudertrocknungsvorgang, wenn die Erfassungsvorrichtung (12) erfasst, dass die Drehzahl der Trommel (5) oder des Elektromotors (4) im Verlauf eines zweiten vorbestimmten Zeitraums (T2) eine zweite vorbestimmte Drehzahl (S2) nicht erreicht oder diese nicht stabil einhält, beendet und direkt mit der Ausführung des Heißlufttrocknungsvorgangs begonnen wird.
4. Textilaufbereitungsvorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass:** der bereits abgeschlossene Schleudertrocknungsvorgang, wenn er beendet und mit der Ausführung des Heißlufttrocknungsvorgangs begonnen wird, mindestens 60 % des gesamten Prozesses des Schleudertrocknungsvorgangs ausmacht.
5. Textilaufbereitungsvorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass:**

sie eine Anzeigevorrichtung (11) umfasst, wobei diese, wenn der Schleudertrocknungsvorgang beendet wird, einen Anteil des bereits abgeschlossenen Schleudertrocknungsvorgangs am gesamten Prozess des Schleudertrocknungsvorgangs anzeigt.

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6. Textilaufbereitungsvorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass:** der Schleudertrocknungsvorgang mehrere Stufen mit ansteigender Drehzahl (P1 bis P5) umfasst; der Elektromotor (4) und die Trommel (5) auf diesen Drehzahlstufen im Verlauf bestimmter Zeiträume (T1 bis T5) eine entsprechende Drehzahl einhalten; mit dem Erfassen begonnen wird, ob die Drehzahl der Trommel (5) oder des Elektromotors (4) im Verlauf von bestimmten Zeiträumen (T1 bis T5) die entsprechende Drehzahl erreicht oder stabil einhält, wenn der Schleudertrocknungsvorgang zu den Anfangspunkten (ST1 bis ST5) jeder einzelnen Drehzahlstufe (P1 bis P5) übergeht, und einem Erfassungsergebnis entsprechend ermittelt wird, ob der Schleudertrocknungsvorgang beendet und der Heißlufttrocknungsvorgang storniert werden soll.
7. Verfahren zum Steuern eines Schleudertrocknungsvorgangs und eines Heißlufttrocknungsvorgangs einer Textilaufbereitungsvorrichtung, das das Auswählen und dann das Beginnen mit dem Ausführen eines Schleudertrocknungsvorgangs und eines darauf folgenden Heißlufttrocknungsvorgangs umfasst, **dadurch gekennzeichnet, dass:** eine Erfassungsvorrichtung (12) bei dem Schleudertrocknungsvorgang eine Drehzahl einer Trommel (5) oder eines Elektromotors (4) erfasst; der Schleudertrocknungsvorgang, wenn die Drehzahl im Verlauf eines ersten vorbestimmten Zeitraums (T1) eine erste vorbestimmte Drehzahl (S1) nicht erreicht oder diese nicht stabil einhält, beendet und der darauf folgende Heißlufttrocknungsvorgang storniert wird.
8. Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass:** der bereits abgeschlossene Schleudertrocknungsvorgang, wenn er beendet und der Heißlufttrocknungsvorgang storniert wird, weniger als 60 % eines gesamten Prozesses des Schleudertrocknungsvorgangs ausmacht.
9. Verfahren nach Anspruch 7 oder 8, **dadurch gekennzeichnet, dass:** wenn die Drehzahl der Trommel (5) oder des Elektromotors (4) die erste vorbestimmte Drehzahl (S1) erreicht und diese im Verlauf eines ersten bestimmten Zeitraums (T1) einhält, die Drehzahl dann erhöht wird; der Schleudertrocknungsvorgang, wenn die Erfassungsvorrichtung (12) erfasst, dass die Drehzahl der Trommel (5) oder des Elektromotors (4) im Verlauf eines zweiten vorbestimmten Zeitraums (T2) eine zweite vorbestimmte Drehzahl (S2) nicht erreicht oder diese nicht stabil

einhält, beendet und direkt mit der Ausführung des Heißlufttrocknungsvorgangs begonnen wird.

10. Verfahren nach Anspruch 9, **dadurch gekennzeichnet, dass:** der bereits abgeschlossene Schleudertrocknungsvorgang, wenn er beendet und mit der Ausführung des Heißlufttrocknungsvorgangs begonnen wird, mindestens 60 % des gesamten Prozesses des Schleudertrocknungsvorgangs ausmacht.
11. Verfahren nach einem der Ansprüche 7 bis 10, **dadurch gekennzeichnet, dass:** der Schleudertrocknungsvorgang mehrere Stufen mit ansteigender Drehzahl (P1 bis P5) umfasst; der Elektromotor (4) und die Trommel (5) auf diesen Drehzahlstufen im Verlauf bestimmter Zeiträume (T1 bis T5) eine entsprechende Drehzahl einhalten; mit dem Erfassen begonnen wird, ob die Drehzahl der Trommel (5) oder des Elektromotors (4) im Verlauf von bestimmten Zeiträumen (T1 bis T5) die entsprechende Drehzahl erreicht oder stabil einhält, wenn der Schleudertrocknungsvorgang zu den Anfangspunkten (ST1 bis ST5) jeder einzelnen Drehzahlstufe (P1 bis P5) übergeht, und einem Erfassungsergebnis entsprechend ermittelt wird, ob der Schleudertrocknungsvorgang beendet und der Heißlufttrocknungsvorgang storniert werden soll.

Revendications

1. Dispositif de traitement d'étoffe, comprenant un tambour (5) entraîné par un moteur électrique (4), un dispositif de commande (10) utilisé pour commander l'exécution d'une procédure de séchage par essorage et d'une procédure de séchage thermique subséquente, et un dispositif de détection (12) pour détecter une vitesse de rotation du tambour ou du moteur électrique, **caractérisé en ce que** : lorsque la procédure de séchage par essorage et la procédure de séchage thermique sont toutes les deux sélectionnées, dans la procédure de séchage par essorage, si le dispositif de détection (12) détecte que le tambour (5) ou le moteur électrique (4) manque à atteindre ou à rester stable à une première vitesse de rotation (S1) prédéfinie sur une première durée (T1) prédéfinie, la procédure de séchage par essorage est stoppée et la procédure de séchage thermique subséquente est annulée.
2. Dispositif de traitement d'étoffe selon la revendication 1, **caractérisé en ce que** : lorsque la procédure de séchage par essorage est stoppée et que la procédure de séchage thermique est annulée, la procédure de séchage par essorage déjà terminée représente moins de 60% d'un processus complet de la procédure de séchage par essorage.

3. Dispositif de traitement d'étoffe selon l'une quelconque des revendications 1 et 2, **caractérisé en ce que** : si la vitesse de rotation du tambour (5) ou du moteur électrique (4) atteint la première vitesse de rotation (S1) prédéfinie et maintient la première vitesse de rotation (S1) prédéfinie sur une première durée (T1) prédéfinie, la vitesse de rotation est alors augmentée ; si le dispositif de détection (12) détecte que la vitesse de rotation du tambour (5) ou du moteur électrique (4) manque à atteindre ou à rester stable à une deuxième vitesse de rotation (S2) prédéfinie sur une deuxième durée (T2) prédéfinie, la procédure de séchage par essorage est stoppée, et l'exécution de la procédure de séchage thermique est démarrée directement.
4. Dispositif de traitement d'étoffe selon la revendication 2, **caractérisé en ce que** : lorsque la procédure de séchage par essorage est stoppée et que l'exécution de la procédure de séchage thermique est démarrée, la procédure de séchage par essorage déjà terminée représente au moins 60% du processus complet de la procédure de séchage par essorage.
5. Dispositif de traitement d'étoffe selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** : comprenant un dispositif d'affichage (11), dans lequel, lorsque la procédure de séchage par essorage est stoppée, le dispositif d'affichage (11) affiche un rapport de la procédure de séchage par essorage déjà terminée sur le processus complet de la procédure de séchage par essorage.
6. Dispositif de traitement d'étoffe selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la procédure de séchage par essorage comprend une pluralité de stades incrémentiels de vitesse de rotation (P1 à P5) ; sur ces stades de vitesse de rotation, le moteur électrique (4) et le tambour (5) maintiennent une vitesse de rotation correspondante sur des durées (T1 à T5) définies ; lorsque la procédure de séchage par essorage passe aux points de départ (ST1 à ST5) de chacun des stades de vitesse de rotation (P1 à P5), une détection si la vitesse de rotation du tambour (5) ou du moteur électrique (4) atteint ou reste stable à la vitesse de rotation correspondante sur les durées (T1 à T5) prédéfinies est démarrée, et il est déterminé s'il convient de stopper la procédure de séchage par essorage et s'il convient d'annuler la procédure de séchage thermique en fonction d'un résultat de détection.
7. Procédé de commande d'une procédure de séchage par essorage et d'une procédure de séchage thermique d'un dispositif de traitement d'étoffe, comprenant la sélection et ensuite le démarrage de l'exécution d'une procédure de séchage par essorage et

d'une procédure de séchage thermique subséquente, **caractérisé en ce que** : pendant la procédure de séchage par essorage, un dispositif de détection (12) détecte une vitesse de rotation d'un tambour (5) ou d'un moteur électrique (4) ; si la vitesse de rotation manque à atteindre ou à rester stable à une première vitesse de rotation (S1) prédéfinie sur une première durée (T1) prédéfinie, la procédure de séchage par essorage est stoppée, et la procédure de séchage thermique subséquente est annulée.

dure de séchage thermique en fonction d'un résultat de détection.

8. Procédé selon la revendication 7, **caractérisé en ce que** : lorsque la procédure de séchage par essorage est stoppée et que la procédure de séchage thermique est annulée, la procédure de séchage par essorage déjà terminée représente moins de 60% d'un processus complet de la procédure de séchage par essorage.
9. Procédé selon la revendication 7 ou 8, **caractérisé en ce que** : si la vitesse de rotation du tambour (5) ou du moteur électrique (4) atteint la première vitesse de rotation (S1) prédéfinie et maintient la première vitesse de rotation (S1) prédéfinie sur une première durée (T1) définie, la vitesse de rotation est alors augmentée ; si le dispositif de détection (12) détecte que la vitesse de rotation du tambour (5) ou du moteur électrique (4) manque à atteindre ou à rester stable à une deuxième vitesse de rotation (S2) prédéfinie sur une deuxième durée (T2) prédéfinie, la procédure de séchage par essorage est stoppée, et l'exécution de la procédure de séchage thermique est démarrée directement.
10. Procédé selon la revendication 9, **caractérisé en ce que** : lorsque la procédure de séchage par essorage est stoppée et que l'exécution de la procédure de séchage thermique est démarrée, la procédure de séchage par essorage déjà terminée représente au moins 60% du processus complet de la procédure de séchage par essorage.
11. Procédé selon l'une quelconque des revendications 7 à 10, **caractérisé en ce que** : la procédure de séchage par essorage comprend une pluralité de stades incrémentiels de vitesse de rotation (P1 à P5) ; sur ces stades de vitesse de rotation, le moteur électrique (4) et le tambour (5) maintiennent une vitesse de rotation correspondante sur des durées (T1 à T5) définies ; lorsque la procédure de séchage par essorage passe aux points de départ (ST1 à ST5) de chacun des stades de vitesse de rotation (P1 à P5), une détection si la vitesse de rotation du tambour (5) ou du moteur électrique (4) atteint ou reste stable à la vitesse de rotation correspondante sur les durées (T1 à T5) prédéfinies est démarrée, et il est déterminé s'il convient de stopper la procédure de séchage par essorage et s'il convient d'annuler la procé-

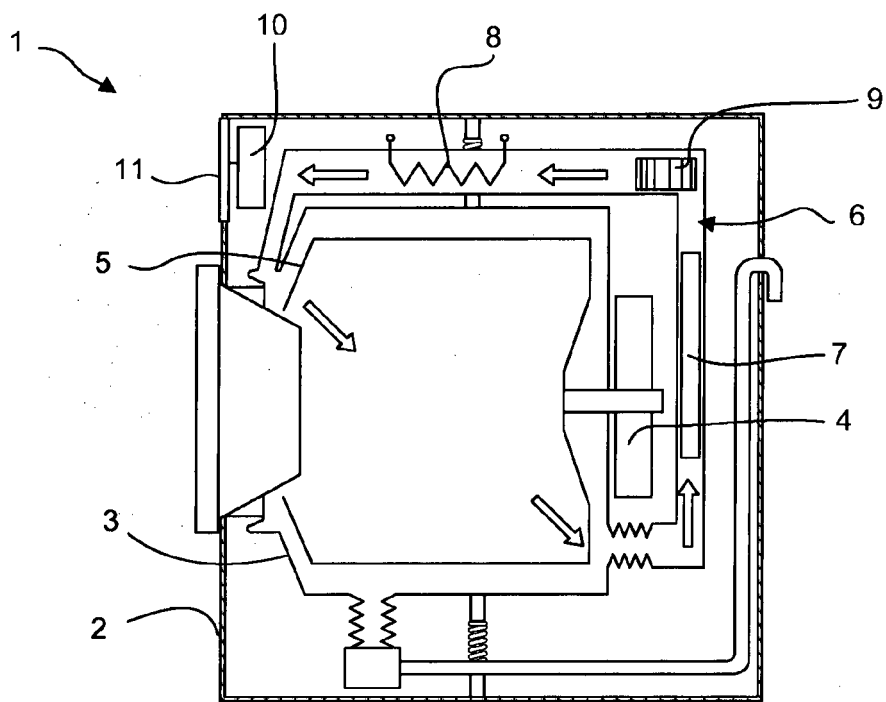


FIG. 1

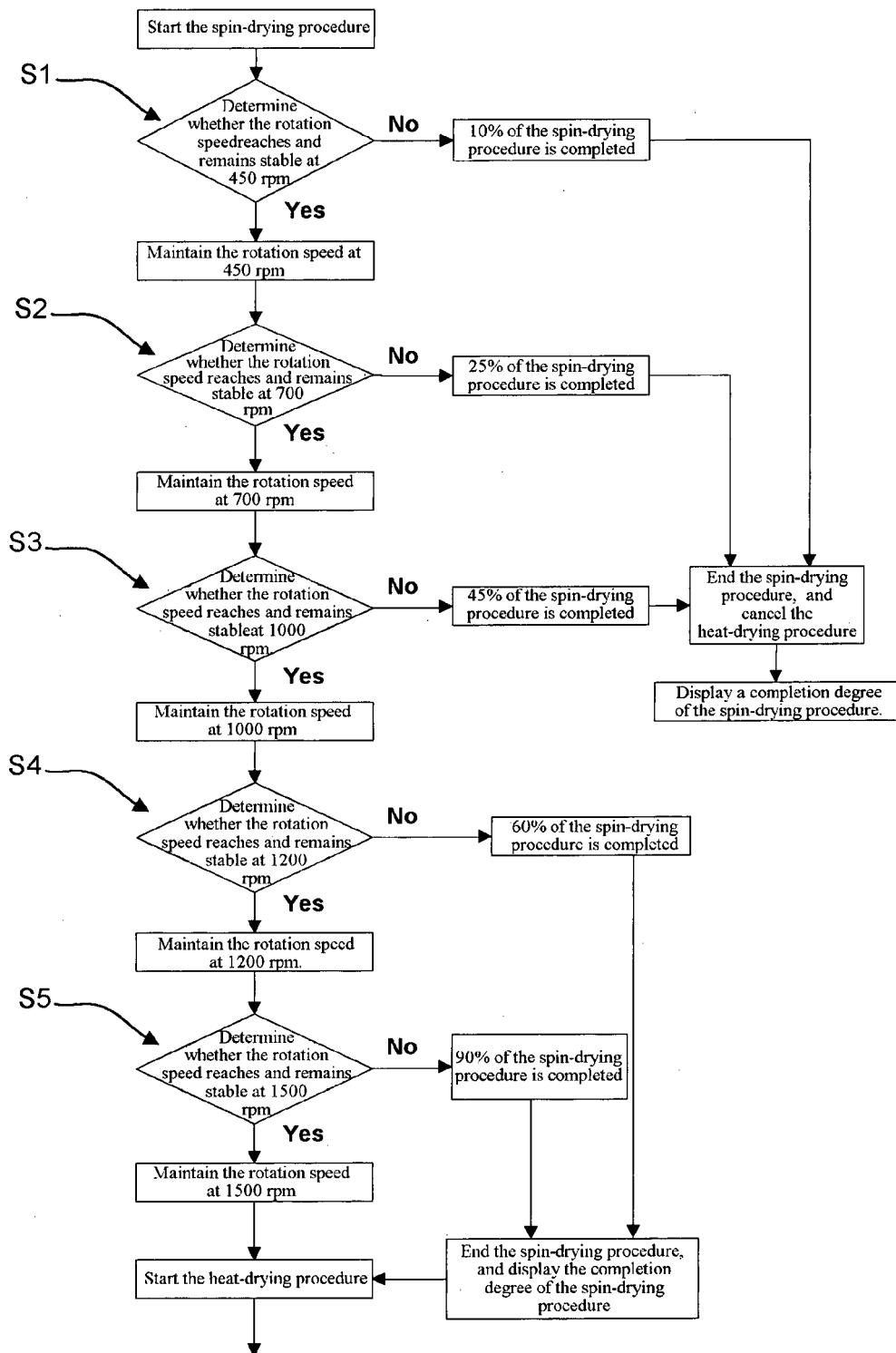


FIG. 2

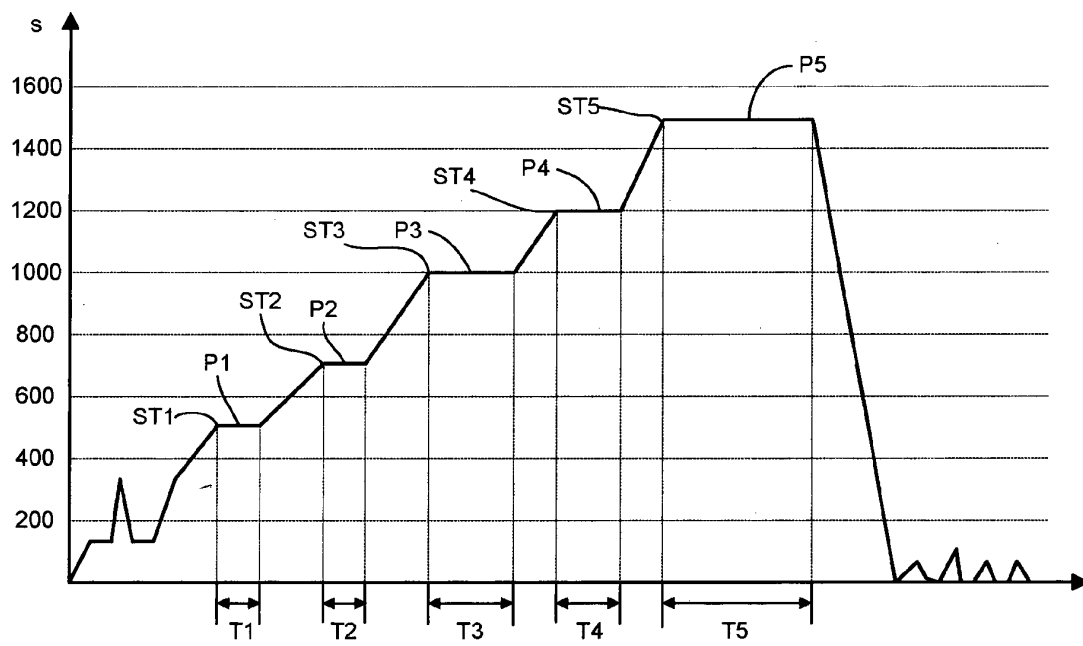


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1526210 A2 [0003]