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(54) Liquid discharging apparatus

Flüssigkeitsausstoßvorrichtung

Appareil de décharge de liquide

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Description

BACKGROUND

1. Technical Field

[0001] The present invention relates to a liquid discharging apparatus having a configuration in which a medium supporting surface of a transportation belt capable of transporting a medium while supporting the medium on the medium supporting surface is cleaned with a cleaning solution by a cleaning member.

2. Related Art

[0002] As a liquid discharging apparatus of this type, an ink jet recording apparatus as described in JP-A-11-192694 can be exemplified.

[0003] JP-A-11-192694 discloses a technique of cleaning ink, dusts, and the like attached to a medium supporting surface of an endless belt with water and a cleaning brush.

[0004] Cleaning capability of the cleaning with water by the cleaning brush is lowered as an environment temperature becomes lower. However, JP-A-11-192694 does not disclose or suggest the problem relating to lowering of the cleaning capability due to lowering of the environment temperature.

[0005] US 2005/0195264 discloses a recording apparatus having a feeding device. The feeding device includes a conveying member for conveying a recording material. The feeding device also includes an electrode disposed in the conveying member for generating an electrostatic attraction force for electrostatic attraction of the recording material on the conveying member, and for controlling a temperature of a surface layer of the conveying member to provide a substantially constant resistance value of the surface layer of the conveying member.

SUMMARY

[0006] An advantage of an aspect of the invention is to provide a liquid discharging apparatus having a configuration in which a medium supporting surface of a transportation belt is cleaned with a cleaning solution and a cleaning member, which is not easily influenced by lowering of an environment temperature.

[0007] A liquid discharging apparatus according to the first aspect of the invention is defined in claim 1.

[0008] According to the aspect of the invention, the liquid discharging apparatus includes the heater that supplies heat to the cleaning portion of the medium supporting surface by the cleaning member and the controller that controls the cleaning temperature on the cleaning portion by driving the heater. Accordingly, control to increase the cleaning temperature on the cleaning portion can be performed. With this, even when the environment temperature lowers, the control is performed so as not to be influenced easily by the lowering of the environment temperature. That is to say, lowering of the cleaning capability can be suppressed even when the environment temperature lowers.

[0009] The expression "controls the cleaning temperature based on information relating to an environment temperature" has the following meaning. That is, when the environment temperature is low and the temperature of the cleaning portion is also lowered so that a cleaning effect by the cleaning member is lowered, the controller controls to increase the cleaning temperature by driving the heater.

[0010] According to the aspect of the invention, the cleaning temperature is controlled based on the information relating to the environment temperature. Therefore, when the environment temperature lowers, the cleaning temperature can be increased automatically.

[0011] Preferably, the controller controls the cleaning temperature on the cleaning portion based on information relating to a contamination degree of the medium supporting surface.

[0012] The expression "information relating to a contamination degree" includes information obtained by measuring the contamination degree directly, and physical amounts having correlations with change in the contamination degree, for example, information on the number of rotations of the transportation belt and the number of rotations of a motor for driving the transportation belt. Furthermore, the expression is also used to include an image data amount relating to a discharging amount of the liquid, a type of a fabric (whether or not the fabric is a type easy to be permeated with liquid, fiber density and so on) when the medium is a fabric, a method of performing preprocessing on the fabric (permeation processing or non-permeation processing), recording without margins or with margins, whether or not the medium supporting surface is used for a flushing region, and so on.

[0013] As the temperature of the cleaning solution or the like becomes higher, the cleaning capability becomes higher normally.

[0014] Accordingly, when a highly contaminated state where a contamination level is high is determined based on the information relating to the contamination degree, control to increase the cleaning temperature is performed so as to enhance the cleaning capability. Accordingly, sufficient cleaning can be performed.

[0015] Preferably, the heater supplies heat to the transportation belt.

[0016] Accordingly, the cleaning temperature can be increased easily and effectively.

[0017] Preferably, the heater supplies heat to the cleaning solution.

[0018] Accordingly, the cleaning temperature can be increased easily and effectively.

[0019] Preferably, the heater supplies heat to the cleaning member.

[0020] Accordingly, the cleaning temperature can be

increased easily and effectively.

[0021] Preferably, the controller adjusts at least any one of a) a pressing force of the cleaning member, b) a rotating speed of the cleaning member, and c) a transportation speed of the transportation belt based on the information relating to the contamination degree of the medium supporting surface.

[0022] The expression "adjust" means that the controller increases/decreases the pressing force, the rotating speed, and/or the transportation speed, in other words, adjusts strength of a cleaning force of the cleaning member for the medium supporting surface.

[0023] The expression "a transportation speed of the transportation belt" is used to indicate a movement speed of the transportation belt when the belt moves continuously like a line printer or the like. It is also used to indicate the speed at which the belt moves and/or indicate a stop time (standby time) mainly when the transportation belt moves intermittently.

[0024] Accordingly, the controller adjusts at least any one of a) the pressing force of the cleaning member, b) the rotating speed of the cleaning member, and c) the transportation speed of the transportation belt based on the information relating to the contamination degree of the medium supporting surface. Through this adjustment, the strength of the cleaning force of the cleaning member for the medium supporting surface can be controlled. With this, the strength of the cleaning force of the cleaning member can be changed in accordance with the contamination degree of the medium supporting surface of the transportation belt.

[0025] Accordingly, a problem that the cleaning force of the cleaning member becomes too large relative to the actual contamination level and the medium supporting surface is abraded can be solved. Furthermore, a problem that the cleaning force of the cleaning member becomes insufficient relative to the actual contamination level and the cleaning quality is lowered can also be solved. That is, the medium supporting surface can be cleaned with an appropriate strength of the cleaning force in accordance with the contamination degree. This can suppress the abrasion without lowering the cleaning quality.

[0026] Preferably, the controller executes adjustment of "a) the pressing force of the cleaning member" first based on the information relating to the contamination degree.

[0027] Accordingly, the controller executes adjustment of "a) the pressing force of the cleaning member" first based on the information relating to the contamination degree. This makes it possible to adjust the strength of the cleaning force of the cleaning member for the medium supporting surface effectively and easily.

[0028] Preferably, the controller has a plurality of cleaning operation modes in which strengths of cleaning forces of the cleaning member for the medium supporting surface are different, and selects and executes one of the plurality of cleaning operation modes based on the information.

[0029] Accordingly, the controller selects and executes one of the plurality of cleaning operation modes in which strengths of the cleaning forces are different based on the information relating to the contamination degree. Therefore, a control configuration can be simplified.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] Embodiments of the invention will now be described by way of example only with reference to the accompanying drawings, wherein like numbers reference like elements.

Fig. 1 is a schematic side view illustrating a liquid discharging apparatus in a first embodiment of the invention.

Fig. 2 is a block diagram illustrating the liquid discharging apparatus in the first embodiment of the invention.

Fig. 3 is a flowchart for explaining control in the first embodiment of the invention.

Fig. 4 is a flowchart for explaining control in a second embodiment of the invention.

Fig. 5 is a flowchart for explaining control in a third embodiment of the invention.

Fig. 6 is a schematic side view illustrating main parts in a fourth embodiment of the invention.

Fig. 7 is a flowchart for explaining control in a fifth embodiment of the invention.

Fig. 8 is a flowchart for explaining control in a sixth embodiment of the invention.

Fig. 9 is a flowchart for explaining control in a seventh embodiment of the invention.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

First Embodiment, Fig. 1 to Fig. 3

[0031] Hereinafter, an ink jet recording apparatus as a liquid discharging apparatus according to one embodiment of the invention is described in detail with reference to the accompanying drawings.

[0032] Fig. 1 is a schematic side view illustrating an ink jet recording apparatus 1 according to a first embodiment of the invention.

[0033] The ink jet recording apparatus 1 in the embodiment includes a feeding portion 2. The feeding portion 2 can feed out a roll R1 of a recording medium P formed by a fabric medium in a roll form for recording, as an example. Furthermore, the ink jet recording apparatus 1 includes a transportation mechanism 3. The transportation mechanism 3 transports the recording medium P in a transportation direction A by an endless transportation belt 10. The transportation belt 10 supports the recording medium P on a medium supporting surface F to which an adhesive is attached. It should be noted that the adhesive may not be attached to the transportation belt. In

addition, the ink jet recording apparatus 1 includes a recording mechanism 4. The recording mechanism 4 performs recording by causing a recording head 7 as a discharging head to reciprocate in a width direction (that is also as a width direction of the recording medium P) B of the transportation belt 10. The width direction B intersects with the transportation direction A of the recording medium P.

[0034] The ink jet recording apparatus 1 in the embodiment includes a cleaning mechanism 15 for cleaning the transportation belt 10. Furthermore, the ink jet recording apparatus 1 includes a winding mechanism 18. The winding mechanism 18 includes a winding shaft 17 for winding the recording medium P therearound and a cutter 16 for cutting the recording medium P that is being wound.

[0035] The feeding portion 2 includes a rotating shaft 5 also serving as a set position of the roll R1 of the recording medium P for recording. The feeding portion 2 has a configuration capable of feeding out the recording medium P to the transportation mechanism 3 from the roll R1 set on the rotating shaft 5 through a driven roller 6. When the recording medium P is fed out to the transportation mechanism 3, the rotating shaft 5 rotates in a rotating direction C.

[0036] The transportation mechanism 3 includes the transportation belt 10, a transportation driving roller 8, and a transportation driven roller 9. The transportation belt 10 transports the recording medium P that has been fed out from the feeding portion 2 while supporting the recording medium P. The transportation driving roller 8 and the transportation driven roller 9 move the transportation belt 10. The recording medium P is mounted on the transportation belt 10 at a position on the upstream side in the transportation direction A so as to be attached to the medium supporting surface F of the transportation belt 10 in a pressurized manner by a pressure roller 12.

[0037] When the recording medium P is transported, the transportation driving roller 8 rotates in the rotating direction C and the transportation belt 10 moves in a movement direction E, that is, is rotationally moved.

[0038] The recording mechanism 4 includes the recording head 7, a carriage (not illustrated), and a carriage motor 26 (Fig. 2). The recording head 7 discharges ink onto the recording medium P supported by the transportation belt 10 so as to perform recording. The recording head 7 is mounted on the carriage. The carriage motor 26 causes the carriage to reciprocate in the width direction B. It should be noted that in Fig. 1, the width direction B is a perpendicular direction with respect to the plane of the paper on which Fig. 1 is illustrated.

[0039] The recording mechanism 4 causes the recording head 7 to reciprocate for recording at the time of the recording. While the recording head 7 is being moved, the transportation mechanism 3 stops transportation of the recording medium P. In another expression, the reciprocation of the recording head 7 and the transportation of the recording medium P are alternately performed at the time of the recording. That is to say, the transportation mechanism 3 transports the recording medium P intermittently so as to correspond to the reciprocation of the recording head 7 at the time of the recording.

[0040] The recording mechanism 4 has a configuration in which the recording head 7 is caused to reciprocate for recording. Note that the recording mechanism is not limited to having the configuration. Alternatively, the recording mechanism may include a what-is-called line head on which nozzle rows for discharging ink are provided in the width direction intersecting with the transportation direction A.

[0041] The cleaning mechanism 15 of the transportation belt 10 includes a cleaning roller 13 as a cleaning member, a cleaning solution tank 14 accommodating a cleaning agent for cleaning the cleaning roller 13, and a cylinder 19 as a pressing portion that presses the cleaning roller 13 against the transportation belt 10. The cylinder 19 not only can press the cleaning roller 13 against the transportation belt 10 but also can separate the cleaning roller 13 from the transportation belt 10.

[0042] The cleaning roller 13 is pressed against the transportation belt 10 by the cylinder 19. A controller 20 (see Fig. 2) controls the pressing force thereof.

[0043] As will be described in detail later, the controller 20 is electrically connected to the cylinder 19, the feeding portion 2, the transportation mechanism 3, the recording mechanism 4, the cleaning mechanism 15, the winding mechanism 18, and the like and controls to transport the recording medium P intermittently so as to correspond to the reciprocation of the recording head 7.

[0044] The cleaning roller 13 is formed so as to have a length in the width direction B that is longer than the length of the transportation belt 10 in the width direction B. This enables the cleaning roller 13 to clean overall the transportation belt 10 in the width direction B. Further, a wide contact surface of the transportation belt 10 can be cleaned, thereby suppressing cleaning unevenness in the transportation belt 10 effectively.

[0045] The winding mechanism 18 is a mechanism for winding the recording medium P on which recording has been performed and that has been transported from the transportation mechanism 3 through a driven roller 11 around the winding shaft 17. That is to say, the winding mechanism 18 winds the recording medium P as a roll R2 by setting a paper tube or the like for winding on the winding shaft 17 and winding the recording medium P around it.

[0046] Then, in the ink jet recording apparatus 1 in the embodiment, the controller 20 controls operations of the cleaning mechanism 15 and the like. That is, the controller 20 is configured so as to adjust the pressing force of the cleaning roller 13 by the cylinder 19 based on information relating to the contamination degree of the medium supporting surface F. With this, the strength of the cleaning force of the cleaning roller 13 for the medium supporting surface F can be adjusted effectively and easily.

[0047] Instead of the adjustment of the pressing force

of the cleaning roller 13, the controller. 20 may be configured so as to adjust the rotating speed of the cleaning roller 13 by a cleaning roller motor 37, which will be described later, based on the information relating to the contamination degree of the medium supporting surface F. Alternatively, the controller 20 may be configured so as to adjust the transportation speed of the transportation belt 10 by a transportation motor 27, which will be described later, based on the information relating to the contamination degree of the medium supporting surface F.

[0048] Furthermore, a plurality of the adjustment targets may be combined. When the plurality of adjustment targets are combined, they are combined in the following manner. That is, first, the controller 20 adjusts the pressing force of the cleaning roller 13, and then, adjusts the rotating speed of the cleaning roller 13 when the adjustment is not sufficient.

[0049] In the ink jet recording apparatus 1 in the embodiment, a contamination detector 38 is provided. The contamination detector 38 measures the contamination degree of the medium supporting surface F directly.

[0050] As the contamination detector 38, a contamination detector that irradiates the surface of the medium supporting surface F with laser beams so as to obtain the contamination degree based on attenuation of reflected light due to the contamination, and a contamination detector that image-captures the surface of the medium supporting surface F by a charge-coupled device (CCD) camera so as to obtain the contamination degree based on color change can be exemplified. In addition, a contamination detector that emits sound waves onto the surface of the medium supporting surface F so as to obtain the contamination degree based on change of sound quality such as a frequency and an intensity due to the contamination can be exemplified.

[0051] The information relating to the contamination degree may be defined using physical amounts having correlations with the change of the contamination degree, for example, the number of rotations of the transportation belt and the number of rotations of the motor for driving the transportation belt.

[0052] Alternatively, an image data amount relating to a discharging amount of the liquid, a type of a fabric (whether or not the fabric is a type easy to be permeated with liquid, fiber density and so on) when the medium is a fabric, a method of performing preprocessing on the fabric (permeation processing or non-permeation processing), recording without margins or with margins, whether or not the medium supporting surface is used for a liquid discharging region for flushing, and the like can be used as the information. The flushing is executed as a maintenance operation of the discharging head.

[0053] The ink jet recording apparatus 1 in the embodiment further includes a heater 40 that supplies heat to a cleaning portion 39 (Fig. 1) of the cleaning roller 13 for the medium supporting surface F. The heater 40 is provided on the cleaning solution tank 14, and is configured so as to heat a cleaning solution 41 therein and increase the temperature thereof. As will be described later, a place on which the heater 40 is provided is not limited to the cleaning solution tank 14. The controller 20 is configured to drive the heater 40 through a heater driving portion 43 (Fig. 2) so as to control the cleaning temperature on the cleaning portion 39. In addition, in the embodiment, the controller 20 is configured to control the cleaning temperature based on information relating to the environment temperature that is obtained by a temperature detector 42.

[0054] The expression "cleaning temperature" is a temperature of the cleaning portion 39 where the cleaning roller 13 cleans by making contact with the medium supporting surface F of the transportation belt 10 during cleaning. The cleaning temperature is determined by combining temperatures of respective members constituting the cleaning portion 39, such as a temperature of the cleaning solution 41 constituting a part of the cleaning mechanism 15, a temperature of the cleaning roller 13 itself, and a temperature of the medium supporting surface F of the transportation belt 10. The cleaning temperature is changed by changing the temperature of any one of the members constituting the cleaning portion 39, or the temperatures of equal to or more than two of the members.

[0055] Next, an electrical configuration of the ink jet recording apparatus 1 in the embodiment is described with reference to Fig. 2.

[0056] The controller 20 is provided with a central processing unit (CPU) 21 for controlling the ink jet recording apparatus 1 overall. The CPU 21 is connected to a read only memory (ROM) 23 and a random access memory (RAM) 24 through a system bus 22. The ROM 23 stores therein control programs of various types, which are executed by the CPU 21, and the like. The RAM 24 can store data temporarily. The CPU 21 is connected to a head driving portion 25 for driving the recording head 7 through the system bus 22.

[0057] The CPU 21 is connected to a motor driving portion 32 through the system bus 22. The motor driving portion 32 is a portion for driving the carriage motor 26, the transportation motor 27, a feeding motor 28, a winding motor 29, and the cleaning roller motor 37.

[0058] The carriage motor 26 is a motor for moving the carriage (not illustrated) on which the recording head 7 is mounted. The transportation motor 27 is a motor for driving the transportation driving roller 8. The feeding motor 28 is a rotating mechanism of the rotating shaft 5 and is a motor for driving the rotating shaft 5 for feeding out the recording medium P to the transportation mechanism 3. The winding motor 29 is a driving motor for rotating the winding shaft 17. The cleaning roller motor 37 is a motor for rotating the cleaning roller 13.

[0059] The CPU 21 is connected to a cylinder driving portion 36 through the system bus 22. The CPU 21 is also connected to a cutter driving portion 33 for driving the cutter 16 to cut the recording medium P through the

system bus 22. The CPU 21 is further connected to the heater driving portion 43 for driving the heater 40 through the system bus 22.

[0060] Further, the CPU 21 is connected to an input/output portion 30. The input/output portion 30 is connected to a monitor 34, a control panel 35, an interface 31 for inputting recording data and the like from an external apparatus such as a personal computer (PC) and so on, the contamination detector 38, and the temperature detector 42 that are provided on the ink jet recording apparatus 1 in order to transmit/receive data and signals to and from them. Description of Action, Fig. 3

[0061] An action of the embodiment is described with reference to Fig. 3.

[0062] A recording operation is started at step S1. With the recording operation, ink is discharged from the recording head 7 and recording of an image corresponding to image data is executed on the recording medium P that is being transported intermittently in the transportation direction A by the transportation belt 10 while being supported on the medium supporting surface F.

[0063] A cleaning operation is also started at step S1. That is to say, cleaning is performed in a state where the cleaning roller 13 is pressed against the medium supporting surface F of the transportation belt 10 with an initially set pressing force by the cylinder 19.

[0064] Whether or not the environment temperature obtained by the temperature detector 42 is equal to or lower than a set level is determined at step S2. The set level can be set appropriately by acquiring test data indicating that cleaning capability by the cleaning roller 13 is lowered due to lowering of the environment temperature.

[0065] When the environment temperature is low and the determination at step S2 is "Yes", the process proceeds to step S3 and the heater 40 is turned ON. With this, the temperature of the cleaning solution 41 is increased, so that the cleaning capability is enhanced. The processing at step S3 is controlled so as to prevent the temperature of the cleaning solution from being increased too high and the temperature of the cleaning solution is kept in a set ra nge.

[0066] Subsequently, the process proceeds to step S4, and whether or not recording is finished is determined. When the determination is "No", the process returns to step S2.

[0067] When the determination is "No" at step S2, the process proceeds to step S5. That is, the heater 40 is turned OFF and unnecessary heating is stopped. Then, the process proceeds to step S4.

[0068] As is understood by the above description with reference to Fig. 3, according to the embodiment, the cleaning temperature on the cleaning portion 39 can be controlled to be increased. With this, even when the environment temperature lowers, the control is performed so as not to be influenced easily by the lowering of the environment temperature. That is to say, lowering of the cleaning capability can be suppressed even when the environment temperature lowers.

Second Embodiment, Fig. 4

[0069] Control in a second embodiment is described with reference to Fig. 4.

[0070] A recording operation is started at step S11. With the recording operation, ink is discharged from the recording head 7 and recording of an image corresponding to image data is executed on the recording medium P that is being transported intermittently in the transportation direction A by the transportation belt 10 while being supported on the medium supporting surface F.

[0071] A cleaning operation is also started at step S11. That is to say, cleaning is performed in a state where the cleaning roller 13 is pressed against the medium supporting surface F of the transportation belt 10 with an initially set pressing force by the cylinder 19.

[0072] Whether or not the environment temperature obtained by the temperature detector 42 is equal to or lower than a set level is determined at step S12. When the environment temperature is low and the determination at step S12 is "Yes", the process proceeds to step S13 and whether or not the degree of contamination is equal to or higher than a set level is determined based on the information relating to the contamination degree obtained by the contamination detector 38.

[0073] When the determination is "Yes" in the more highly contaminated state, the process proceeds to step S14 and the heater 40 is turned ON. With this, the temperature of the cleaning solution 41 is increased, so that the cleaning capability is enhanced. The processing at step S14 is controlled so as to prevent the temperature of the cleaning solution from being increased too high and the temperature of the cleaning solution is kept in a set range.

[0074] Subsequently, the process proceeds to step S15, and whether or not recording is finished is determined. When the determination is "No", the process returns to step S12.

[0075] When the determination is "No" at step S12 or step S13, the process proceeds to step S16. That is, the heater 40 is turned OFF and unnecessary heating is stopped. Then, the process proceeds to step S15.

[0076] As is understood by the above description with reference to Fig. 4, according to the embodiment, the cleaning temperature on the cleaning portion 39 can be easily controlled to be increased in the highly contaminated state. With this, even when the environment temperature lowers, the control is performed so as not to be influenced easily by the lowering of the environment temperature. That is to say, lowering of the cleaning capability can be suppressed even when the environment temperature lowers.

Third Embodiment, Fig. 5

[0077] Control in a third embodiment is described with

reference to Fig. 5.

[0078] A recording operation is started at step S21. With the recording operation, ink is discharged from the recording head 7 and recording of an image corresponding to image data is executed on the recording medium P that is being transported intermittently in the transportation direction A by the transportation belt 10 while being supported on the medium supporting surface F.

[0079] A cleaning operation is also started at step S21. That is to say, cleaning is performed in a state where the cleaning roller 13 is pressed against the medium supporting surface F of the transportation belt 10 with an initially set pressing force by the cylinder 19.

[0080] Whether or not the degree of contamination is equal to or higher than a set level is determined based on the information relating to the contamination degree obtained by the contamination detector 38 at step S22.

[0081] When the determination is "Yes" in the more highly contaminated state, the process proceeds to step S23 and the heater 40 is turned ON. With this, the temperature of the cleaning solution 41 is increased, so that the cleaning capability is enhanced. The processing at step S23 is controlled so as to prevent the temperature of the cleaning solution from being increased too high and the temperature of the cleaning solution is kept in a set range.

[0082] Subsequently, the process proceeds to step S24, and whether or not recording is finished is determined. When the determination is "No", the process returns to step S22.

[0083] When the determination is "No" at step S22, the process proceeds to step S25. That is, the heater 40 is turned OFF and unnecessary heating is stopped. Then, the process proceeds to step S24.

[0084] As is understood by the above description with reference to Fig. 5, according to the embodiment, the cleaning temperature on the cleaning portion 39 can be controlled to be increased. With this, even when the environment temperature lowers, the control is performed so as not to be influenced easily by the lowering of the environment temperature. That is to say, lowering of the cleaning capability can be suppressed even when the environment temperature lowers.

Fourth Embodiment, Fig. 6

[0085] In the above embodiments, the heater 40 is provided on the cleaning solution tank 14. However, in the present embodiment, a belt heater 45 for supplying heat to the transportation belt 10 is provided. A cleaning member is constituted by a cleaning brush 46, a cleaning brush 47 for cleaning the cleaning brush 46, and liquid tanks 48, 49 for the respective brushes. Heaters 50 and 51 are provided on the liquid tanks 48, 49, respectively. In Fig. 6, a reference numeral 52 denotes a water sprayer and a heater (not illustrated) is also provided on the water sprayer.

[0086] As described in the embodiment, the places on which the heaters are provided other than the cleaning solution tank 14 in the first embodiment can be selected. It is needless to say that the heaters may be provided on only one or some the places as illustrated in Fig. 6.

Fifth Embodiment, Fig. 7

[0087] Control in a fifth embodiment is described with reference to Fig. 7.

[0088] Processings at step S31 to step S33 and step S35 are the same as the processings at step S1 to step S3 and step S5 in the first embodiment, respectively, and description thereof is omitted.

[0089] Whether or not the degree of contamination on the medium supporting surface F of the transportation belt 10 is equal to or higher than a set level that has been initially set is determined based on the information relating to the contamination degree measured by the contamination detector 38 at step S34. When the determination is "Yes", the process proceeds to step S36 and the cylinder 19 is driven to strengthen the pressing force by one stage. With this, the cleaning for the transportation belt 10 by the cleaning roller 13 is performed with the cleaning force, which has become stronger by one stage.

[0090] Subsequently, the process proceeds to step S37, and whether or not recording is finished is determined. When the determination is "No", the process returns to step S32.

[0091] When the determination is "No" at step S34, the process proceeds to step S38 and the cylinder 19 is driven to weaken the pressing force by one stage. With this, the cleaning for the transportation belt 10 by the cleaning roller 13 is performed with the cleaning force, which has become weaker by one stage.

[0092] As is understood by the above description with reference to Fig. 7, according to the embodiment, the cleaning can be performed while adjusting the pressing force of the cleaning roller 13 against the medium supporting surface F to an appropriate pressing force in accordance with the degree of contamination on the medium supporting surface F. This can suppress the abrasion without lowering the cleaning quality on the medium supporting surface F. In steps S36 and S38, if the pressing force has already been increased/decreased to a maximum/minimum force, then that existing pressing force can be maintained instead of being increased/decreased further.

Sixth Embodiment, Fig. 8

[0093] Control in a sixth embodiment is described with reference to Fig. 8.

[0094] The sixth embodiment is basically the same as the fifth embodiment. The processings at steps S36 and S38 in the fifth embodiment correspond to adjustment (up/down) of the pressing force of the cleaning roller 13. Instead of this, processings at steps S46 and S48 in the sixth embodiment correspond to adjustment (rotating

speed up, rotating speed down) of the rotating speed of the cleaning roller 13.

[0095] Description of other configurations and action effects is omitted.

Seventh Embodiment, Fig. 9

[0096] Control in a seventh embodiment is described with reference to Fig. 9.

[0097] The seventh embodiment is also basically the same as the fifth embodiment. The processings at steps S36 and S38 in the fifth embodiment correspond to adjustment (up/down) of the pressing force of the cleaning roller 13. Instead of this, processings at steps S56 and S58 in the seventh embodiment correspond to adjustment (extension/shortening) of a stop time (standby time) of the transportation belt 10 that is moved intermittently, in other words, the time for which the belt 10 stops at each intermittent movement.

[0098] Description of other configurations and action effects is omitted.

[0099] The foregoing description has been given by way of example only and it will be appreciated by a person skilled in the art that modifications can be made without departing from the scope of the present invention.

Claims

1. A liquid discharging apparatus (1) comprising:

a transportation belt (10) that has a medium supporting surface (F) and is capable of transporting a medium (P) while supporting the medium on the medium supporting surface;
a discharging head (7) for discharging liquid onto the medium supported by the transportation belt;
a cleaning mechanism (15) that has a cleaning member (13) making contact with the transportation belt so as to clean the medium supporting surface;
a heater (40) for supplying heat to a cleaning portion of the medium supporting surface, the cleaning portion being the part of the medium supporting surface (F) at which the cleaning member (13) makes contact with the medium supporting surface (F) during cleaning; and
a controller (20) for controlling a cleaning temperature on the cleaning portion by driving the heater, **characterized in that**:

the cleaning member (13) is adapted to clean the medium supporting surface with a cleaning solution, and
the controller is adapted to control the cleaning temperature based on information relating to an environment temperature.

2. The liquid discharging apparatus according to claim 1,
wherein the controller is adapted to control the cleaning temperature based on information relating to a contamination degree of the medium supporting surface.

3. The liquid discharging apparatus according to claim 1 or claim 2,
wherein the heater is adapted to supply heat to the transportation belt.

4. The liquid discharging apparatus according to any one of the preceding claims, wherein the heater is adapted to supply heat to the cleaning solution.

5. The liquid discharging apparatus according to any one of the preceding claims, wherein the heater is adapted to supply heat to the cleaning member.

6. The liquid discharging apparatus according to claim 2,
wherein the controller adjusts at least any one of a) a pressing force of the cleaning member (13), b) a rotating speed of the cleaning member (13), and c) a transportation speed of the transportation belt (10) based on the information relating to the contamination degree of the medium supporting surface.

7. The liquid discharging apparatus according to claim 6,
wherein the controller (20) is adapted to execute adjustment of a) the pressing force of the cleaning member first based on the information relating to the contamination degree.

8. The liquid discharging apparatus according to claim 6 or claim 7,
wherein the controller has a plurality of cleaning operation modes in which strengths of cleaning forces by the cleaning member for the medium supporting surface are different, and is adapted to select and execute one of the plurality of cleaning operation modes based on the information.

Patentansprüche

1. Flüssigkeitsausstoßvorrichtung (1) umfassend:

ein Förderband (10), welches eine Medienträgerfläche (F) hat und fähig ist, ein Medium (P) zu befördern, während es das Medium auf der Medienträgerfläche trägt;
einen Ausstoßkopf (7) zum Ausstoßen von Flüssigkeit auf das Medium, welches vom Förderband getragen ist;
einen Reinigungsmechanismus (15), welcher

ein Reinigungsbauteil (13) hat, welches Kontakt mit dem Förderband herstellt um die Medienträgerfläche zu reinigen;
ein Heizgerät (40) zum Zuleiten von Hitze zu einem Reinigungsabschnitt der Medienträgerfläche, wobei der Reinigungsabschnitt der Teil der Medienträgerfläche (F) ist, an welchem der Reinigungsbauteil (13) Kontakt mit der Medienträgerfläche (F) während einer Reinigung herstellt; und
eine Steuerung (20) zum Steuern einer Reinigungstemperatur auf dem Reinigungsabschnitt durch Antreiben des Heizgeräts,
dadurch gekennzeichnet, dass:

das Reinigungsbauteil (13) angepasst ist, die Medienträgerfläche mit einer Reinigungslösung zu reinigen, und
die Steuerung angepasst ist, die Reinigungstemperatur basierend auf Informationen bezüglich einer Umgebungstemperatur zu steuern.

2. Flüssigkeitsausstoßvorrichtung nach Anspruch 1, wobei die Steuerung angepasst ist, die Reinigungstemperatur basierend auf Informationen bezüglich eines Verunreinigungsgrads der Medienträgerfläche zu steuern.

3. Flüssigkeitsausstoßvorrichtung nach Anspruch 1 oder Anspruch 2,
wobei das Heizgerät angepasst ist, dem Förderband Wärme zuzuleiten.

4. Flüssigkeitsausstoßvorrichtung nach einem der vorangehenden Ansprüche,
wobei das Heizgerät angepasst der Reinigungslösung Wärme zuzuleiten.

5. Flüssigkeitsausstoßvorrichtung nach einem der vorangehenden Ansprüche,
wobei das Heizgerät angepasst dem Reinigungsbauteil Wärme zuzuleiten.

6. Flüssigkeitsausstoßvorrichtung nach Anspruch 2, wobei die Steuerung zumindest eines von a) einer Druckkraft des Reinigungsbauteils (13), b) einer Drehgeschwindigkeit des Reinigungsbauteils (13) und c) einer Beförderungsgeschwindigkeit des Förderbands (10) basierend auf den Informationen bezüglich des Verunreinigungsgrades der Medienträgerfläche reguliert.

7. Flüssigkeitsausstoßvorrichtung nach Anspruch 6, wobei die Steuerung (20) angepasst ist, eine Regulierung a) der Druckkraft des Reinigungsbauteils basierend auf den Informationen bezüglich des Verunreinigungsgrades auszuführen.

8. Flüssigkeitsausstoßvorrichtung nach Anspruch 6 oder Anspruch 7,
wobei die Steuerung mehrere Reinigungsbetriebsmodi hat, in welchen Stärken von Reinigungskräften durch das Reinigungsbauteil für die Medienträgerfläche verschieden sind, und angepasst ist, einen der mehreren Reinigungsbetriebsmodi basierend auf den Informationen auszuwählen und auszuführen.

Revendications

1. Appareil d'éjection de liquide (1) comprenant :

une courroie de transport (10) qui a une surface de support pour support (F) et qui est capable de transporter un support (P) tout en supportant le support sur la surface de support pour support ;
une tête d'éjection (7) pour éjecter du liquide sur le support qui est supporté par la courroie de transport ;
un mécanisme de nettoyage (15) qui a un élément de nettoyage (13) établissant le contact avec la courroie de transport de manière à nettoyer la surface de support pour support ;
un dispositif de chauffage (40) pour fournir de la chaleur à une partie de nettoyage de la surface de support pour support, la partie de nettoyage étant la partie de la surface de support pour support (F) où l'élément de nettoyage (13) établit le contact avec la surface de support pour support (F) pendant le nettoyage ; et
un contrôleur (20) pour contrôler une température de nettoyage sur la partie de nettoyage en commandant le dispositif de chauffage,
caractérisé en ce que :

l'élément de nettoyage (13) est adapté pour nettoyer la surface de support pour support avec une solution de nettoyage, et
le contrôleur étant adapté pour contrôler la température de nettoyage sur la base d'une information concernant une température de l'environnement.

2. Appareil d'éjection de liquide selon la revendication 1,
dans lequel le contrôleur est adapté pour contrôler la température de nettoyage sur la base de l'information concernant un degré de contamination de la surface de support pour support.

3. Appareil d'éjection de liquide selon la revendication 1 ou la revendication 2,
dans lequel le dispositif de chauffage est adapté pour fournir de la chaleur à la courroie de transport.

4. Appareil d'éjection de liquide selon l'une quelconque des revendications précédentes,
dans lequel le dispositif de chauffage est adapté pour fournir de la chaleur à la solution de nettoyage.

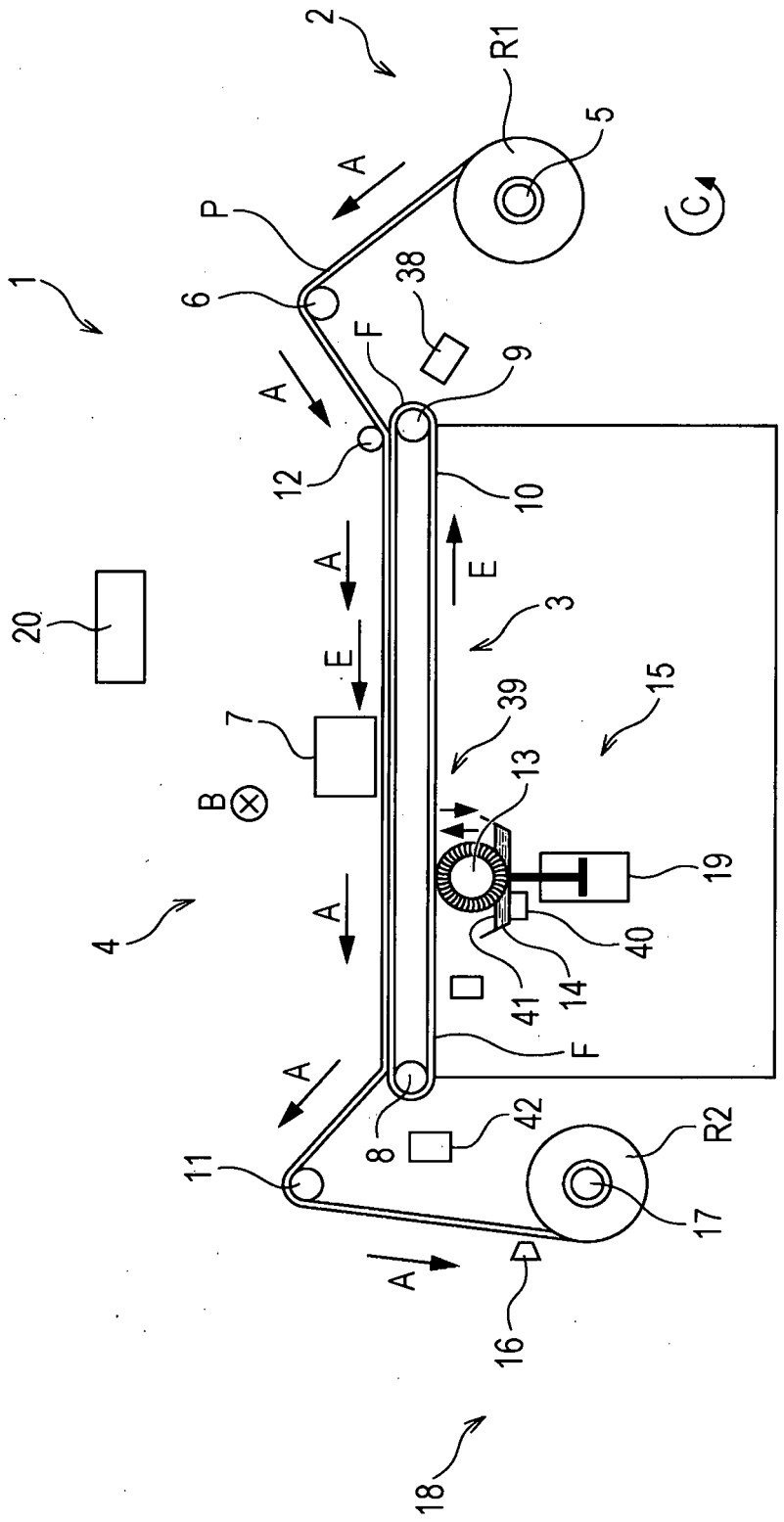
5. Appareil d'éjection de liquide selon l'une quelconque des revendications précédentes,
dans lequel le dispositif de chauffage est adapté pour fournir de la chaleur à l'élément de nettoyage.

6. Appareil d'éjection de liquide selon la revendication 2,
dans lequel le contrôleur ajuste au moins l'une quelconque d'entre a) une force de pression de l'élément de nettoyage (13), b) une vitesse de rotation de l'élément de nettoyage (13), et c) une vitesse de transport de la courroie de transport (10) sur la base de l'information concernant le degré de contamination de la surface de support pour support.

7. Appareil d'éjection de liquide selon la revendication 6,
dans lequel le contrôleur (20) est adapté pour exécuter l'ajustement de : a) la force de pression de l'élément de nettoyage d'abord sur la base de l'information concernant le degré de contamination.

8. Appareil d'éjection de liquide selon la revendication 6 ou la revendication 7,
dans lequel le contrôleur a une pluralité de modes de fonctionnement de nettoyage où des intensités de forces de nettoyage par l'élément de nettoyage pour la surface de support pour support sont différentes, et est adapté pour sélectionner et exécuter l'un de la pluralité des modes de fonctionnement de nettoyage sur la base de l'information.

FIG. 1


1
2
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6
7
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9
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14
15
16
17
18
19
20
38
39
40
41
42
R1
R2
P
A
E
F
B
C

FIG. 2

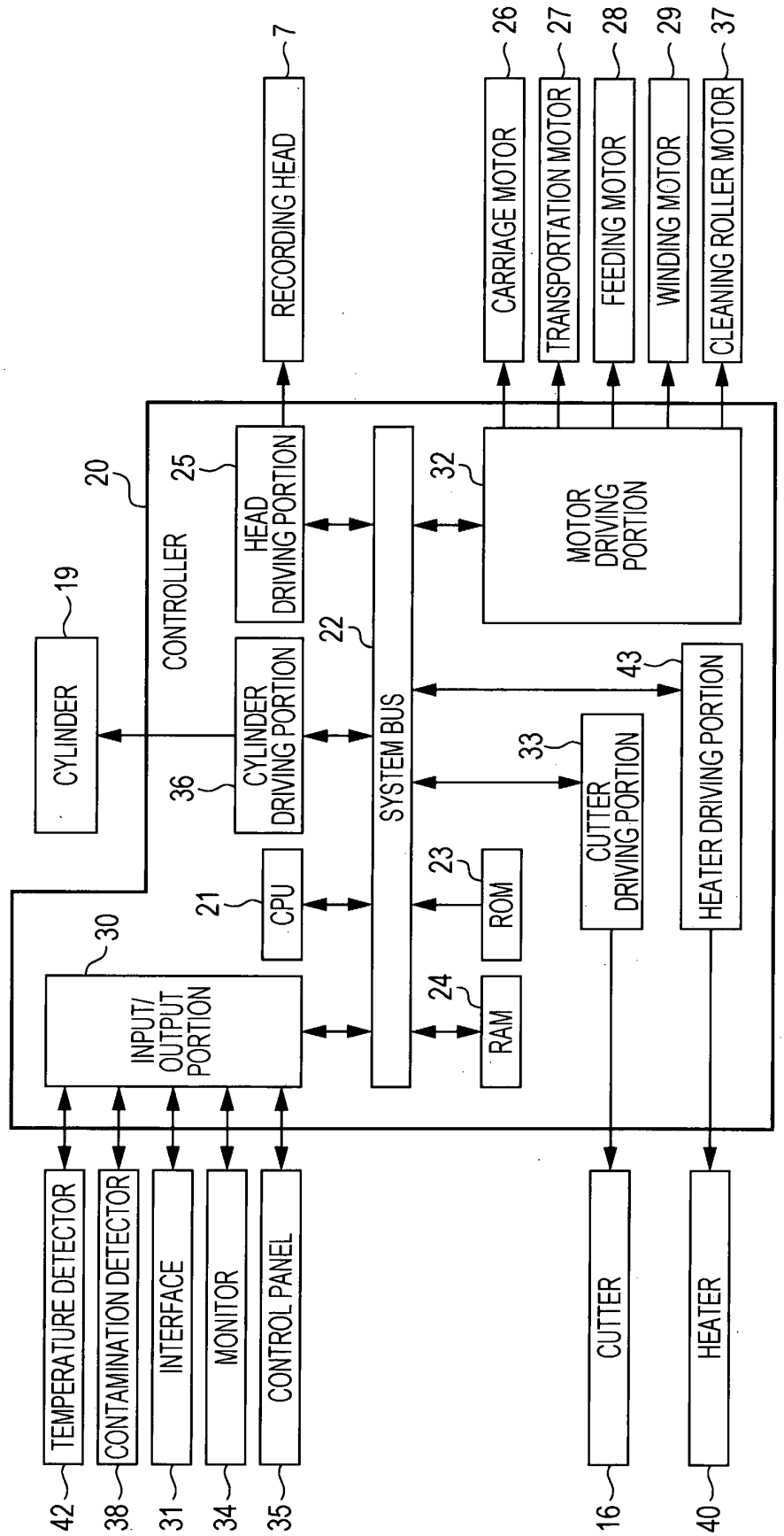

RECORDING HEAD
7
CARRIAGE MOTOR
26
TRANSPORTATION MOTOR
27
FEEDING MOTOR
28
WINDING MOTOR
29
CLEANING ROLLER MOTOR
37
20
CONTROLLER
25
HEAD DRIVING PORTION
32
MOTOR DRIVING PORTION
19
CYLINDER
22
SYSTEM BUS
43
HEATER DRIVING PORTION
36
CYLINDER DRIVING PORTION
33
CUTTER DRIVING PORTION
21
CPU
23
ROM
30
INPUT/ OUTPUT PORTION
24
RAM
TEMPERATURE DETECTOR
CONTAMINATION DETECTOR
INTERFACE
MONITOR
CONTROL PANEL
CUTTER
HEATER
42
38
31
34
35
16
40

FIG. 3

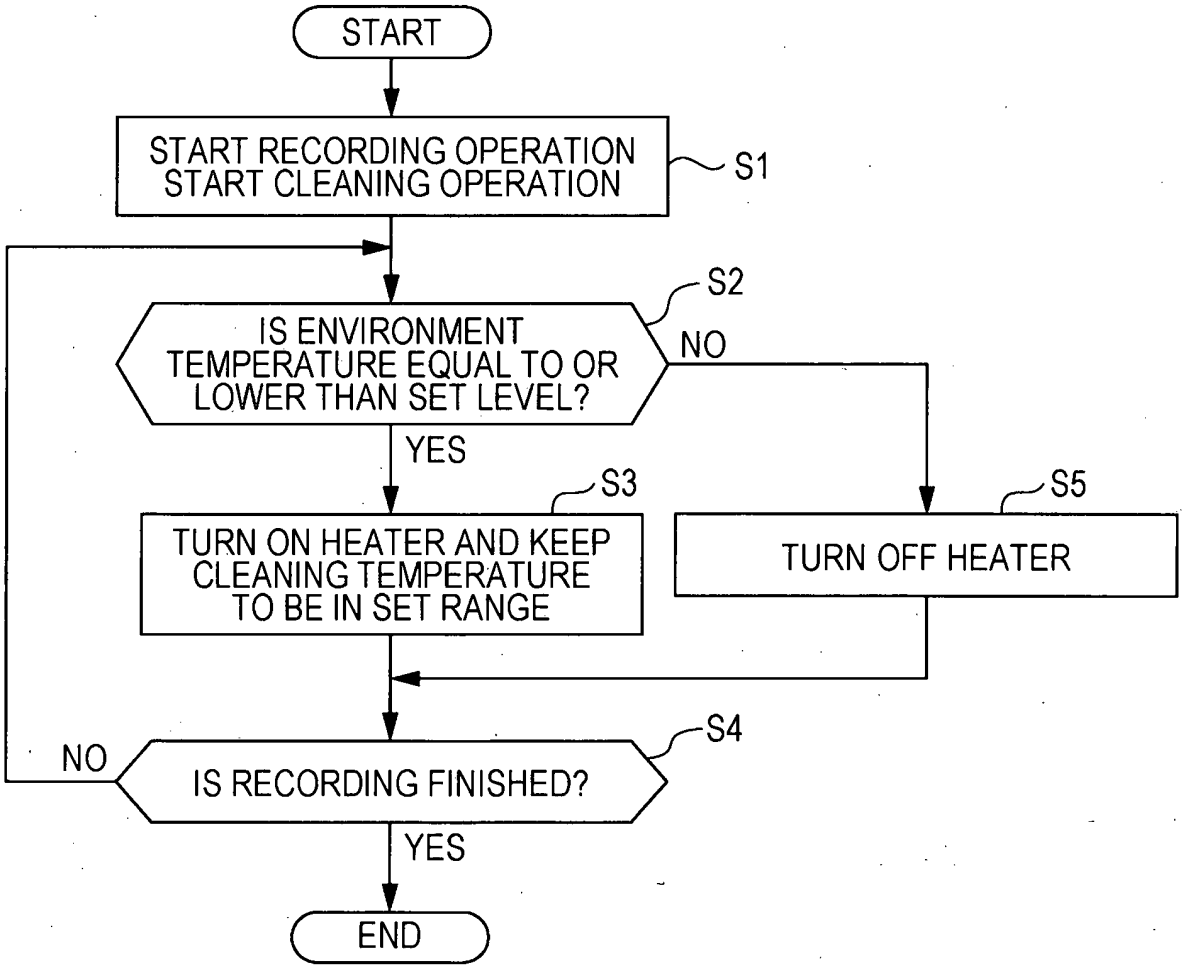

START
START RECORDING OPERATION
START CLEANING OPERATION
S1
S2
IS ENVIRONMENT TEMPERATURE EQUAL TO OR LOWER THAN SET LEVEL?
NO
YES
S3
TURN ON HEATER AND KEEP CLEANING TEMPERATURE TO BE IN SET RANGE
S5
TURN OFF HEATER
S4
NO
IS RECORDING FINISHED?
YES
END

FIG. 4

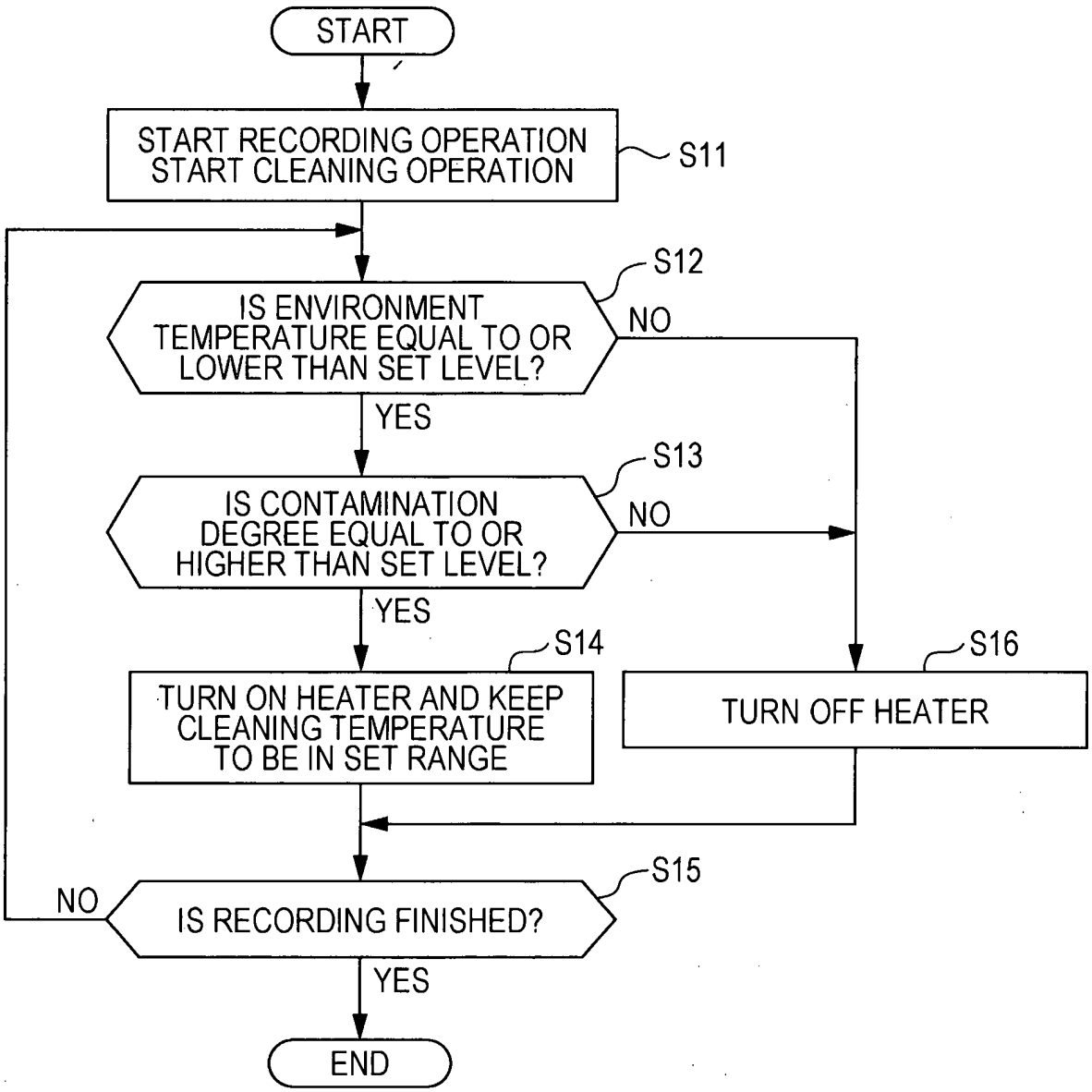

START
START RECORDING OPERATION
START CLEANING OPERATION
S11
S12
IS ENVIRONMENT TEMPERATURE EQUAL TO OR LOWER THAN SET LEVEL?
NO
YES
S13
IS CONTAMINATION DEGREE EQUAL TO OR HIGHER THAN SET LEVEL?
NO
YES
S14
TURN ON HEATER AND KEEP CLEANING TEMPERATURE TO BE IN SET RANGE
S16
TURN OFF HEATER
S15
NO
IS RECORDING FINISHED?
YES
END

FIG. 5

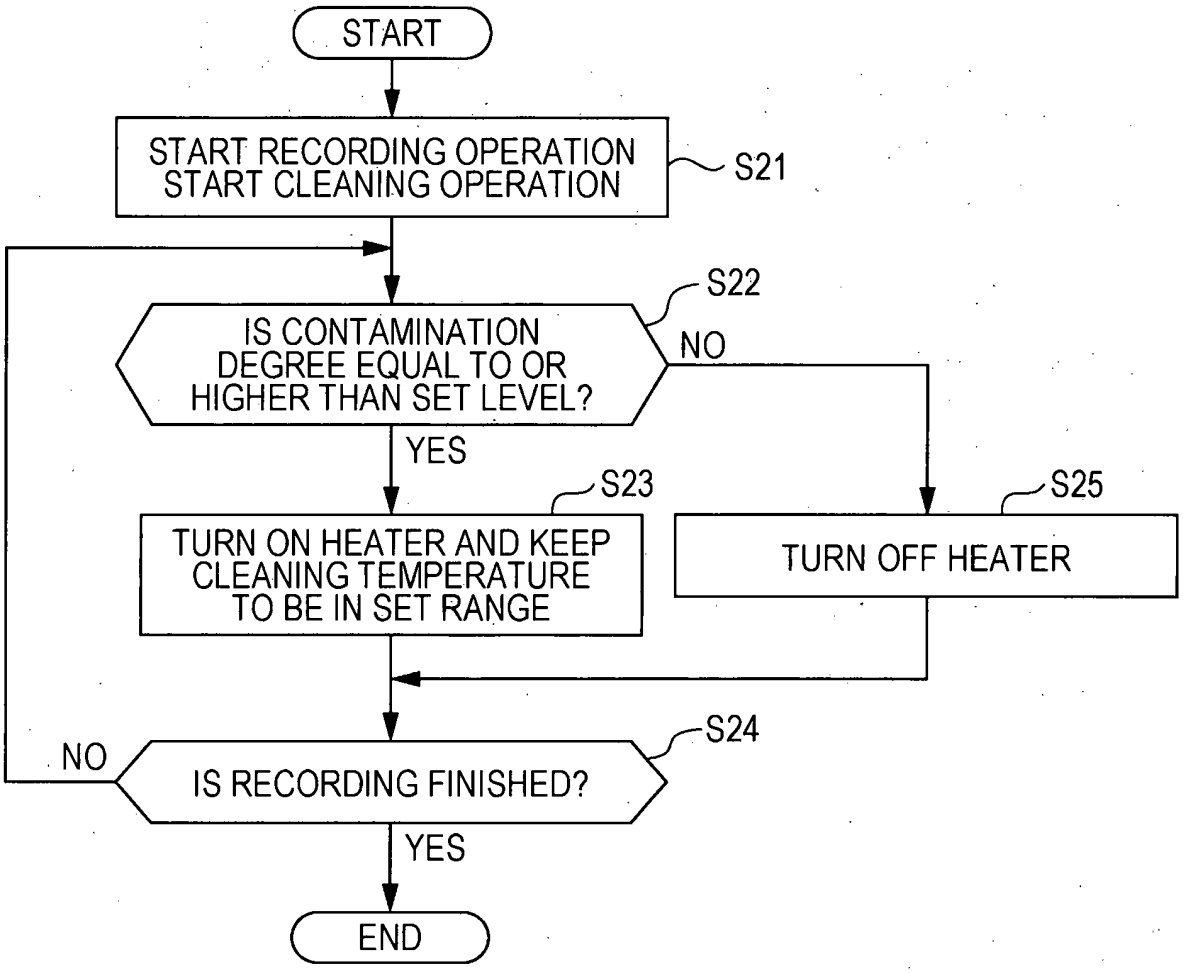

START
START RECORDING OPERATION
START CLEANING OPERATION
S21
S22
IS CONTAMINATION DEGREE EQUAL TO OR HIGHER THAN SET LEVEL?
NO
YES
S23
TURN ON HEATER AND KEEP CLEANING TEMPERATURE TO BE IN SET RANGE
S25
TURN OFF HEATER
S24
NO
IS RECORDING FINISHED?
YES
END

FIG. 6

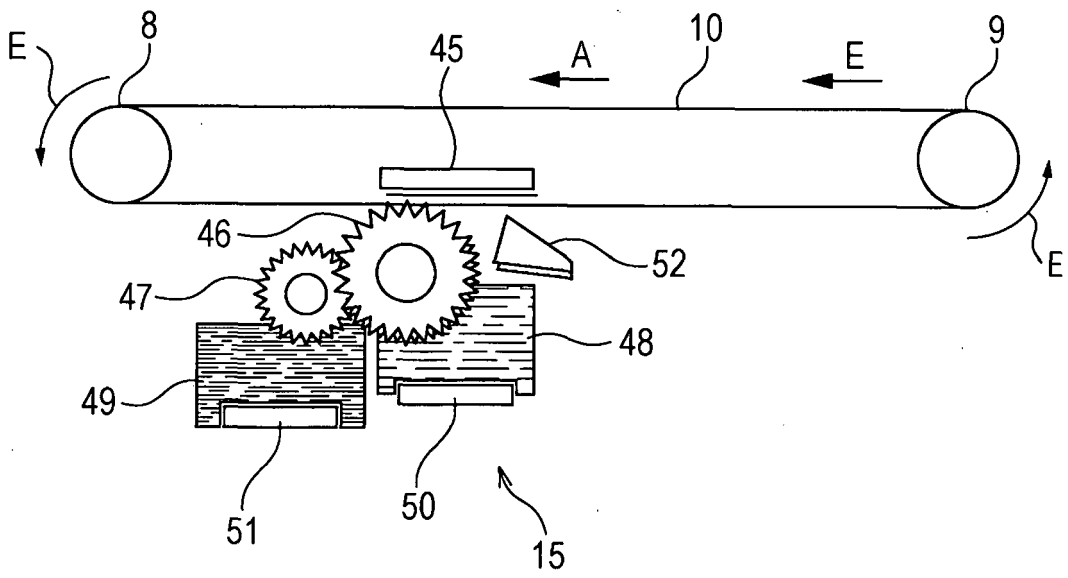


FIG. 7

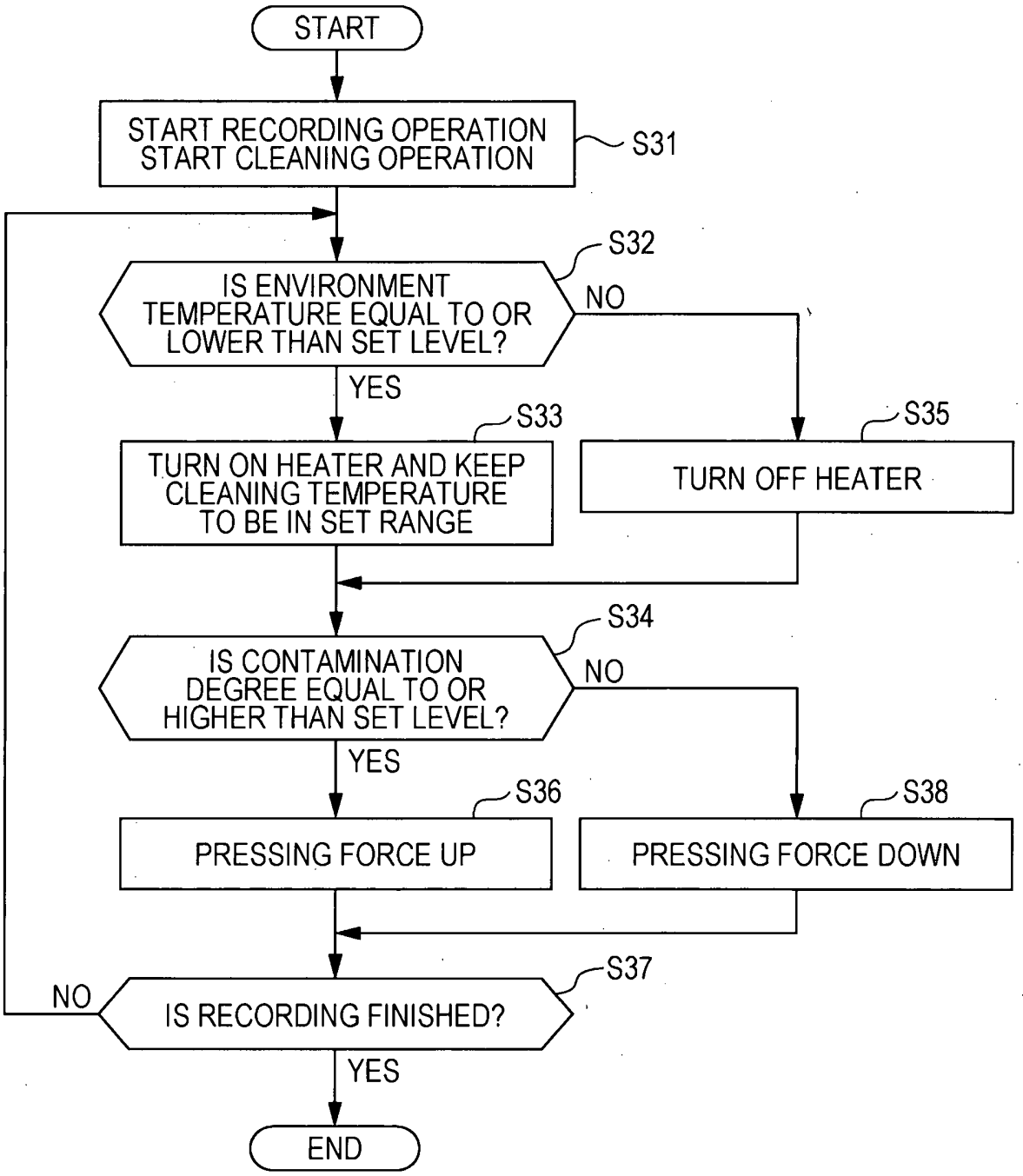

START
START RECORDING OPERATION
START CLEANING OPERATION
S31
S32
IS ENVIRONMENT TEMPERATURE EQUAL TO OR LOWER THAN SET LEVEL?
NO
YES
S33
TURN ON HEATER AND KEEP CLEANING TEMPERATURE TO BE IN SET RANGE
S35
TURN OFF HEATER
S34
IS CONTAMINATION DEGREE EQUAL TO OR HIGHER THAN SET LEVEL?
NO
YES
S36
PRESSING FORCE UP
S38
PRESSING FORCE DOWN
S37
NO
IS RECORDING FINISHED?
YES
END

FIG. 8

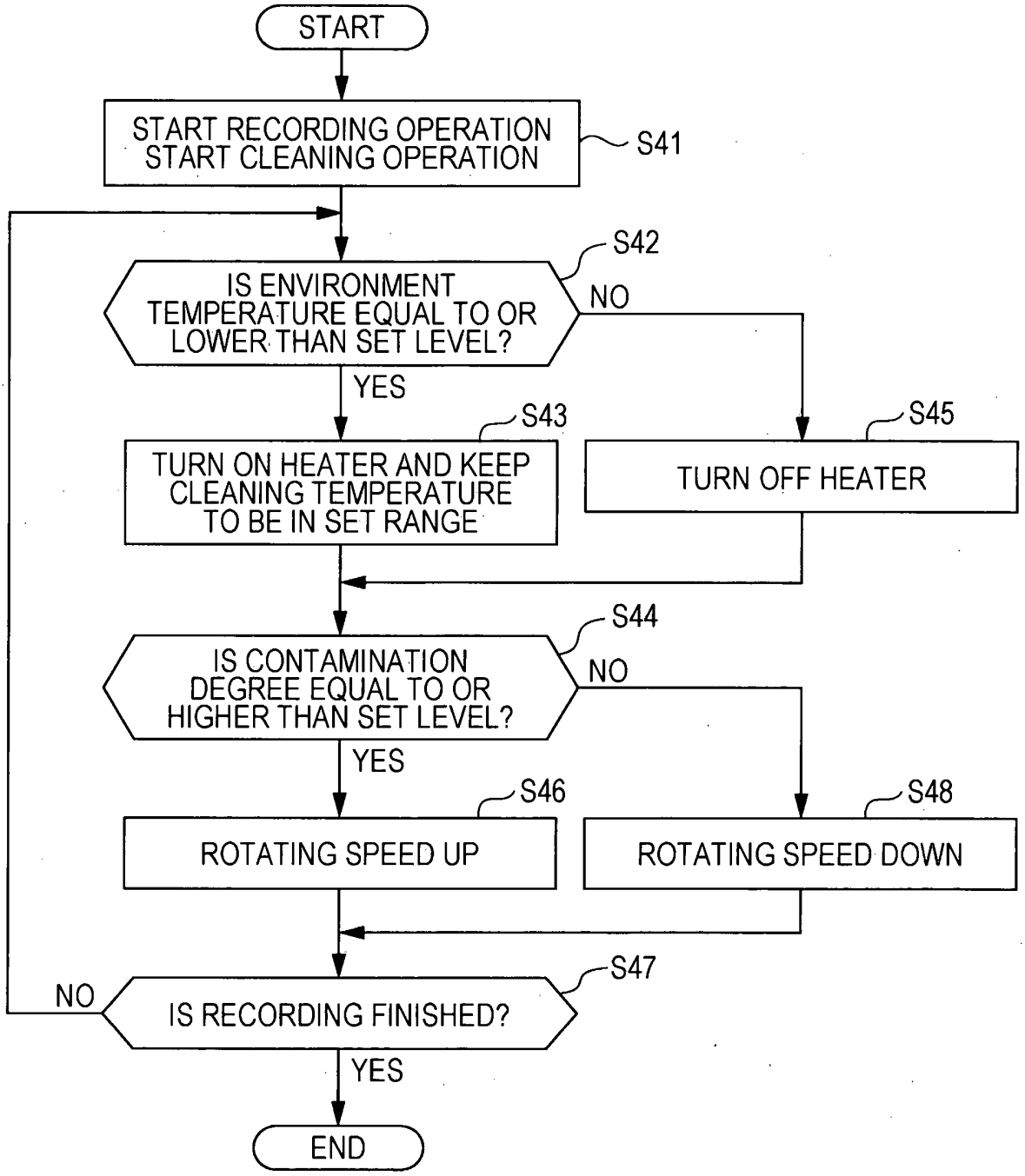
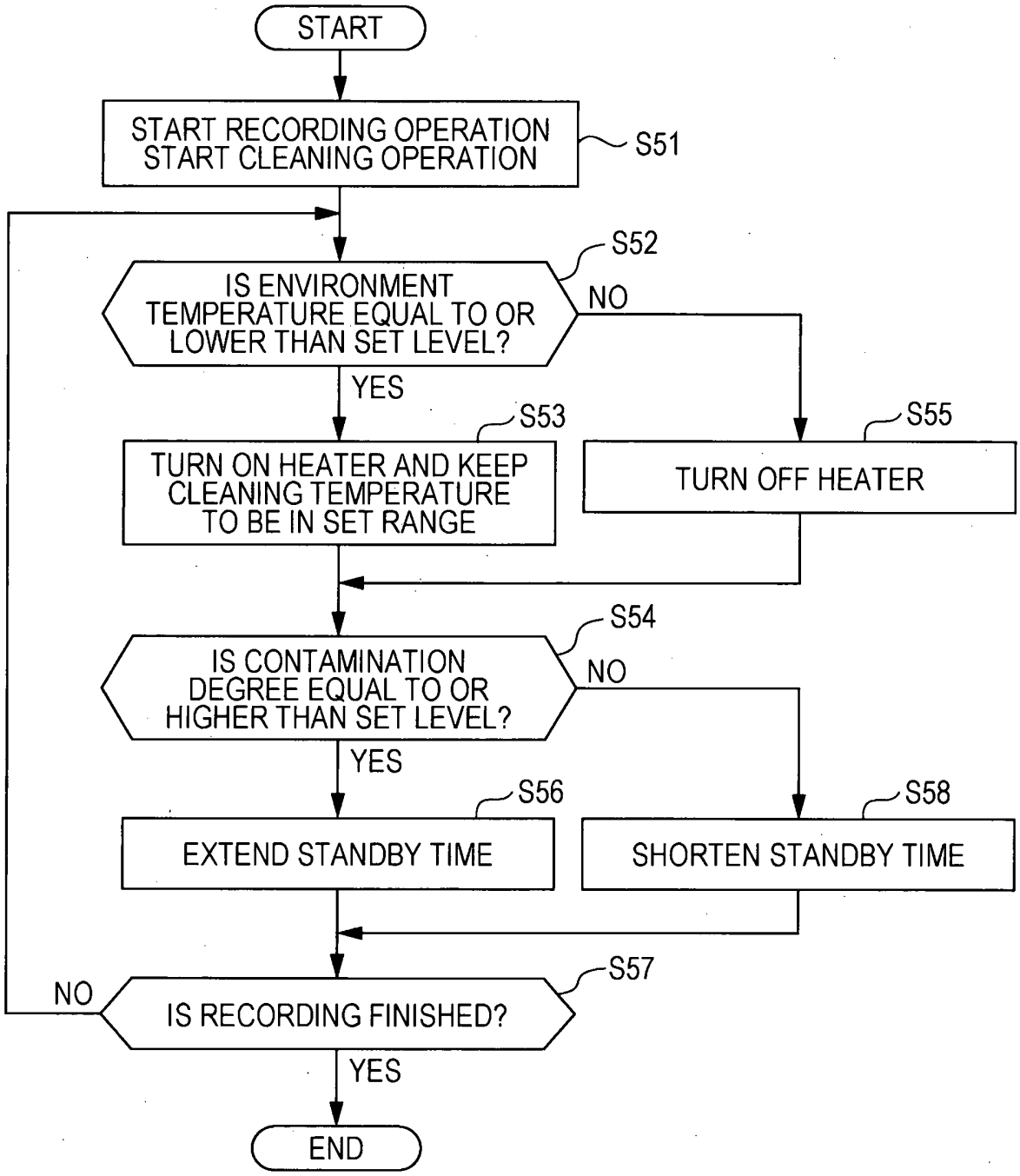

START
START RECORDING OPERATION
START CLEANING OPERATION
S41
S42
IS ENVIRONMENT TEMPERATURE EQUAL TO OR LOWER THAN SET LEVEL?
NO
YES
S43
TURN ON HEATER AND KEEP CLEANING TEMPERATURE TO BE IN SET RANGE
S45
TURN OFF HEATER
S44
IS CONTAMINATION DEGREE EQUAL TO OR HIGHER THAN SET LEVEL?
NO
YES
S46
ROTATING SPEED UP
S48
ROTATING SPEED DOWN
S47
NO
IS RECORDING FINISHED?
YES
END

FIG. 9


START
START RECORDING OPERATION
START CLEANING OPERATION
S51
S52
IS ENVIRONMENT TEMPERATURE EQUAL TO OR LOWER THAN SET LEVEL?
NO
YES
S53
TURN ON HEATER AND KEEP CLEANING TEMPERATURE TO BE IN SET RANGE
S55
TURN OFF HEATER
S54
IS CONTAMINATION DEGREE EQUAL TO OR HIGHER THAN SET LEVEL?
NO
YES
S56
EXTEND STANDBY TIME
S58
SHORTEN STANDBY TIME
S57
NO
IS RECORDING FINISHED?
YES
END

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 11192694 A **[0002] [0003] [0004]**
- US 20050195264 A **[0005]**