

RANGE HOOD

TECHNICAL FIELD

[0001]

The present invention relates to a range hood and, in particular, to a range hood that causes a filter to rotate.

BACKGROUND ART

[0002]

Conventionally, range hoods that cause a filter to rotate during an exhaust operation have been proposed. For example, PTL 1 discloses a range hood that has small pressure loss and good oil gathering efficiency. This range hood includes: a fan that generates an air flow; a filter that exists on a flow channel of the air flow and on an upstream side of the fan, and that has holes for allowing the air flow to pass therethrough; an electric motor that rotates the filter; an oil content gathering member that surrounds the periphery of the filter; and a control part that controls rotation of the fan and the electric motor.

CITATION LIST

PATENT LITERATURE

[0003]

PTL 1: Japanese Patent Application Laid-open No. 2013-139945

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004]

In the range hood, however, noise such as a hissing sound is generated when the filter rotates at a high speed.

In view of this problem, the present invention provides a range hood that reduces the possibility of noise generation.

SOLUTION TO PROBLEM

[0005]

In order to solve the above problem, there is provided a range hood provided above or near a cooker, including: a fan that generates an air flow; a filter that exists on a flow channel of the air flow and on an upstream side of the fan and has holes for allowing the air flow to pass therethrough; an electric motor that rotates the filter; a

control part that performs control to cause the electric motor to rotate at at least two rotation speeds, which are a first rotation speed and a second rotation speed that is faster than the first rotation speed; and a cooking state monitor part that monitors a cooking state in the cooker, wherein the control part controls the rotation speed of the electric motor at the first rotation speed and the second rotation speed according to the cooking state monitored by the cooking state monitor part, an air volume of the air flow generated by the fan includes at least two air volumes, a first air volume and a second air volume larger than the first air volume, the second rotation speed used when the fan generates the air flow of the second air volume is faster than the second rotation speed used when the fan generates the air flow of the first air volume, and the first rotation speed used when the fan generates the air flow of the second air volume is faster than the first rotation speed used when the fan generates the air flow of the first air volume.

According to this configuration, the rotation speed of the electric motor that rotates the filter is controlled according to a cooking state, whereby the range hood that causes the filter to rotate at a high speed only when required and reduces the possibility of noise generation can be provided. In addition, noise generated by the filter is drowned out when the fan that generates an air flow rotates at a high speed. Therefore, in this case, the noise is hardly perceived even if the filter is made to rotate at a high speed. For this reason, the rotation speed of the filter is controlled according to whether the fan rotates at a high speed or a low speed, whereby the possibility of noise generation can be reduced and high oil gathering efficiency can be maintained. Further, since the flow speed of the oily smoke passing through the filter is different depending on an air volume, the required rotation speed of the filter is different. Accordingly, the first rotation speed and the second rotation speed can be made slow when an air volume is relatively small, whereby it is possible to reduce noise generated by the rotation of the filter while maintaining high oil gathering efficiency.

In addition, the range hood may further include: a determination part that determines whether oily smoke equal to or more than a prescribed threshold is generated on the basis of the cooking state monitored by the cooking state monitor part, wherein the control part causes the electric motor to rotate at the second rotation speed when the determination part determines that the oily smoke equal to or more than the prescribed threshold is generated.

According to this configuration, the filter is made to rotate at a high speed when the oily smoke equal to or more than the prescribed threshold is generated, whereby the possibility of large noise generation can be reduced.

5 In addition, when the determination part determines that the oily smoke equal to or more than the prescribed threshold or equal to or more than a threshold different from the prescribed threshold is not generated after determines that the oily smoke equal to or more than the prescribed threshold is generated, the control part may immediately stop rotation of the electric motor, cause the electric motor to immediately rotate at the first rotation speed, stop the rotation of the electric motor after maintaining the second
10 rotation speed for a prescribed time, or cause the electric motor to rotate at the first rotation speed after maintaining the second rotation speed for a prescribed time.

According to this configuration, the filter is controlled to rotate at a low speed or stop when the oily smoke equal to or more than the prescribed threshold is not generated, whereby the possibility of noise generation can be reduced.

15 In addition, the cooking state monitor part may be separated from the range hood and perform radio communication with the control part.

According to this configuration, since the cooking state monitor part is separated from the range hood, the cooking state monitor part can be arranged at a position suitable for monitoring an object.

20

ADVANTAGEOUS EFFECTS OF INVENTION

As described above, the present invention can provide a range hood that causes a filter to rotate at a high speed only when required and reduces the possibility of noise generation.

25

BRIEF DESCRIPTION OF DRAWINGS

Figs. 1(A) and 1(B) are a front elevational view and a side elevational view in a case in which the range hood of a first embodiment according to the present invention is installed, respectively.

30

Figs 2(A) and 2(B) are a bottom view of the range hood of the first embodiment according to the present invention and a bottom view thereof in which an airflow guide

plate has been removed, respectively.

Fig. 3 is a cross-sectional view of an I-I cross section in Fig. 2(B) of the range hood of the first embodiment according to the present invention.

Figs. 4(A) and 4(B) are a perspective view and an enlarged perspective view of the range hood of the first embodiment according to the present invention, respectively.

Fig. 5 is a flowchart showing the control method of the range hood of the first embodiment according to the present invention.

Fig. 6 is a flowchart showing the control method of the range hood of a first modified example of the first embodiment according to the present invention.

Fig. 7 is a flowchart showing the control method of the range hood of a second modified example of the first embodiment according to the present invention.

Fig. 8 is a flowchart showing the control method of the range hood of a third modified example of the first embodiment according to the present invention.

Figs. 9(A) and 9(B) are a front elevational view and a side elevational view in a case in which the range hood of a second embodiment according to the present invention is installed, respectively.

Figs. 10(A) and 10(B) are a front elevational view and a side elevational view in a case in which the range hood of a third embodiment according to the present invention is installed, respectively.

Figs. 11(A) and 11(B) are a front elevational view and a side elevational view in a case in which the range hood of a fourth embodiment according to the present invention is installed, respectively.

DESCRIPTION OF EMBODIMENTS

[0012]

Hereinafter, respective embodiments will be described with reference to the drawings.

<First Embodiment>

A range hood 1 according to the present embodiment will be described with reference to Figs. 1 to 4. The range hood 1 is installed in a kitchen in which a cooker CD is installed, is arranged above the cooker CD as shown in Fig. 1, catches oily smoke, steam, or the like generated when cooking is made with the cooker CD, and exhausts air to an outside or the like after being subjected to purification. The range hood 1 has a thin hood part 2 having, at its inside surface, an inside panel 5 concave above the hood part 2 for gathering the oily smoke or the like generated by cooking made under the range hood 1. Note that the range hood 1 of the present embodiment is arranged above

the cooker CD but may be arranged near the lateral side of the cooker CD.

[0013]

As shown in Figs. 2 to 4, the hood part 2 is coupled to a blower box 3 connected to an exhaust duct (not shown) near a communication opening 6 of the inside panel 5 that is positioned on an upper rear side. The blower box 3 is positioned on the back surface side of a frieze board 9 and has a fan 4 that is a sirocco fan and generates an air flow D1 inside the blower box 3. Accordingly, the pressure inside the communication opening 6 becomes negative as the fan 4 operates, and air under the inside panel 5 is sucked in via the communication opening 6 and then discharged to the outside via the exhaust duct. The communication opening 6 communicates with the fan 4 and is positioned on a flow channel of the air flow D1 generated by the fan 4 and on the upstream side of the fan 4 in the air flow.

[0014]

The range hood 1 includes, at the position of the communication opening 6, a disc-shaped filter 10 having holes 11 for allowing the air flow D1 to pass therethrough, an electric motor 20 that has a shaft coupled to the center of the disc-shaped filter 10 and rotates the filter 10, and an oil content gathering member 60 that is attached to the inside panel 5 and arranged so as to surround the outer peripheral edge of the filter 10. Accordingly, the range hood 1 exists on the flow channel of the air flow D1 generated by the fan 4 and on the upstream side of the fan 4 in the flow and is provided with the filter 10 capable of rotational movement that has the holes 11 for allowing the air flow to pass therethrough from bottom to top as shown diagrammatically in the figures.

[0015]

In addition, the range hood 1 includes a control part 30 that controls the rotation of the fan 4 and the electric motor 20, and an operation part 70 that outputs an operation/stop signal or the like for the range hood 1 to the control part 30 upon receiving an operation from a user. The control part 30 is constituted by a known microcomputer containing a control program or the like describing a method for controlling the rotation of the fan 4 and the electric motor 20 that will be described later. The operation part 70 is constituted by a switch to be operated by the user of the range hood 1 and arranged at a lateral surface on the front side of the hood part 2. The operation part 70 is, of course, not limited to this configuration but may be configured to receive a signal from a remote controller or a cooker separated from the range hood 1 to perform an output. Further, the operation part 70 outputs not only the operation signal/stop signal for the range hood 1 but also a signal for providing instructions for changing rotation speeds of the fan 4 and the electric motor 20 to the control part 30.

[0016]

The air under the inside panel 5 contains steam, oily smoke, or the like generated by cooking. As the fan 4 operates, the air is sucked in the holes 11 of the filter 10 that exists at the communication opening 6, that is, positioned on the flow channel of the air flow D1 generated by the fan 4 and on the upstream side of the fan 4, and then passes through the holes 11. Upon receiving the operation signal from the operation part 70, the control part 30 causes the fan 4 to rotate to generate the air flow D1 and causes the filter 10 provided to be rotatable by the electric motor 20 to rotate by energizing the electric motor 20. The range hood 1 causes the filter 10 to rotate to gather an oil content contained in the air into an oil content gathering member 60.

[0017]

A method for gathering an oil content will be described in detail. Warmed air rises toward the range hood 1 together with steam, oily smoke, or the like generated by cooking made under the range hood 1. As the fan 4 starts rotation with the start of the operation of the range hood 1, the fan 4 generates the air flow. Subsequently, the air rising around an airflow guide plate 7 is sucked in the place between the airflow guide plate 7 and the inside panel 5, then passes through the holes 11 of the filter 10, and is absorbed into the fan 4 inside the blower box 3. After that, the air is discharged into the exhaust duct from the blower box 3.

[0018]

In an operating state, the control part 30 performs control to cause the electric motor 20 that rotates the filter 10 to rotate when the range hood 1 causes the fan 4 that generates the air flow to rotate to gather the oily smoke or the like generated by cooking. A rotation number per unit time of the filter 10 depends on the opening state of the holes of the filter but may only be at least 230 rpm (Rotation Per Minute) or more. When the filter 10 rotates at the high rotation speed, the surface (the portion at which the holes 11 do not exist) of the filter 10 drags air contacting the surface with a frictional force and a of the air is transmitted to surrounding air by the viscosity of the dragged air. Therefore, since the movement of the air is generated near the surface of the filter 10 and the filter 10 performs a rotational movement, the air makes a spiral movement around the shaft of the electric motor 20.

[0019]

The movement of the spiral air is generated at both surfaces of the filter 10, that is, both the lower surface and the upper surface of the filter 10. In other words, the movement of the spiral air is generated at both the upstream side surface and the downstream side surface of the filter 10 in the air flow. In the present embodiment,

the air generated by the fan 4 flows through the holes 11 of the filter 10. Therefore, on the downstream side of the filter 10, a spiral flow directed to the outer peripheral edge of the filter 10 is generated with the movement of the spiral air separated from the surface of the filter 10 and sucked by the fan 4. On the other hand, on the upstream side of the filter 10, a high-density air layer directed to the outer peripheral edge of the filter 10 and accompanying a spiral flow is formed with the movement of the spiral air held down on the surface of the filter 10.

[0020]

An oil content generated by cooking or the like flows together with the air flow and reaches a place near the upstream side surface of the filter 10. Some portions (an oil content having a relatively small particle diameter) of the oil content having reached the place near the upstream side surface are flicked off in the direction of the outer peripheral edge of the filter 10 after undergoing the spiral flow directed to the outer peripheral edge of the high-density air layer, and other portions (an oil content having a relatively large particle diameter) thereof are flicked off in the direction of the outer peripheral edge of the filter 10 after colliding with the upstream side surface (the portion where the holes 11 do not exist). As a result, the oil content is gathered and collected by the oil content gathering member 60 provided so as to surround the outer peripheral edge of the disc-shaped filter 10. Accordingly, the range hood 1 of the present embodiment hardly allows the attachment of the oil content on the downstream side of the filter 10 in an airflow channel, and thus can remarkably reduce the labor of cleaning/washing the fan 4, the exhaust duct, or the like on the downstream side of the filter 10.

[0021]

On the other hand, when the filter 10 rotates, particularly when the filter 10 rotates at a high speed, the movement of the air near the surface of the filter 10 becomes fast. As a result, a sound such as a hissing sound is generated. The range hood 1 causes the filter 10 to rotate at a high speed only when required and reduces the possibility of noise generation. The range hood 1 further includes a cooking state monitor part 40 that monitors a cooking state in the cooker CD and a determination part 50 that determines whether the oily smoke equal to or more than a prescribed threshold has been generated on the basis of the cooking state monitored by the cooking state monitor part 40.

[0022]

In the present embodiment, the cooking state monitor part 40 is a smoke sensor that is provided at the end of the inside panel 5 and senses smoke in the air.

The system of the smoke sensor is not particularly limited so long as the smoke sensor measures the concentration of particles in the air. For example, a system that applies light in the direction of the cooker CD and measures a scattered light amount of the light to sense the mass concentration of oil particles contained in the oily smoke rising from the cooker CD may be used.

[0023]

The determination part 50 determines whether the oily smoke equal to or more than the prescribed threshold has been generated on the basis of the cooking state monitored by the smoke sensor of the cooking state monitor part 40. In order to set the prescribed threshold, the mass concentration or the like of oil particles contained in the oily smoke generated when cooking of stir-fried food, fried food, or the like is made with oil may be, for example, acquired in advance.

[0024]

The control part 30 performs control to cause the electric motor 20, that is, the filter 10 to rotate at various rotation speeds, and performs control to cause the same to rotate at at least two rotation speeds, which are a first rotation speed and a second rotation speed that is faster than the first rotation speed. The first rotation speed is a rotation speed that is a relatively low speed at which a sound like a hissing sound is hardly generated, and is, for example, about 500 rpm. Note that the first rotation speed may only be slower than the second rotation speed and includes zero. Further, the second rotation speed is a rotation speed that is a relatively high speed at which a sound like a hissing sound is generated, and is, for example, 1500 rpm. As the filter 10 rotates at a higher speed, the flow of spiral air becomes stronger and oil content gathering efficiency becomes higher. Therefore, when the concentration of oil particles in the oily smoke becomes high, the filter 10 preferably rotates at a relatively high speed. Accordingly, the control part 30 controls the rotation speed of the electric motor 20 using the first rotation speed that is a relatively low speed and the second rotation speed that is a relatively high speed according to the cooking state monitored by the cooking state monitor part 40. As described above, the rotation speed of the electric motor 20 that rotates the filter 10 is controlled according to the cooking state, whereby the range hood 1 that causes the filter 10 to rotate at a high speed only when required and reduces the possibility of noise generation can be provided.

[0025]

More specifically, the determination part 50 determines whether the oily smoke equal to or more than the prescribed threshold has been generated on the basis of the cooking state monitored by the cooking state monitor part 40, and the control part 30

causes the electric motor 20 to rotate at the second rotation speed that is a relatively high speed when the determination part 50 determines that the oily smoke equal to or more than the prescribed threshold has been generated. As described above, the filter 10 is made to rotate at a high speed only when the oily smoke equal to or more than the prescribed threshold has been generated, whereby the possibility of large noise generation can be reduced.

[0026]

The control method of the control part 30 will be described with reference to Fig. 5. Note that S in the flowchart represents a step. In S100, the control part 30 starts the operation of the range hood 1 when a user performs the operation or the like of the operation part 70. That is, the control part 30 causes the fan 4 to rotate to generate the air flow, causes the filter 10 to rotate at a first rotation speed that is a relatively low speed at which a noise level is low, and causes the smoke sensor of the cooking state monitor part 40 to start monitoring the state of oily smoke.

[0027]

In S102, the cooking state monitor part 40 senses an amount of the oily smoke (the mass concentration of oil particles contained in the oily smoke) generated and transmits the sensed amount generated to the control part 30. In S104, the control part 30 determines whether the amount of the oily smoke generated sensed by the cooking state monitor part 40 is a prescribed threshold set in advance or more. When the amount of the oily smoke generated is equal to or more than the prescribed threshold, the control part 30 causes the filter 10 to rotate at a second rotation speed that is a relatively high speed in S106. When the generated amount of the oily smoke is less than the prescribed threshold, the control part 30 skips the step of S106 and maintains the low noise level.

[0028]

In S108, the control part 30 determines whether a signal for ending the operation has been received from the operation part 70 or the like. When the signal has not been received, the control part 30 repeatedly performs the steps S104 to S108 to continue the operation. When the signal has been received, the control part 30 ends the operation of the range hood 1 in S110. That is, the control part 30 causes the fan 4 to end the rotation, causes the filter 10 to end the rotation, and causes the smoke sensor of the cooking state monitor part 40 to stop the monitoring of the state of the oily smoke. As described above, the filter is made to rotate at a high speed at which large noise is generated only when the oily smoke equal to or more than the prescribed threshold has been generated, whereby the possibility of large noise generation can be

reduced. Note that the control part 30 may perform a residual operation after having received the signal for ending the operation from the operation part 70 or the like. The residual operation may be an operation by which the filter 10 is made to rotate until a certain time elapses, or may be an operation based on the monitoring result of the cooking state monitor part 40.

[0029]

A modified example (first modified example) of the control method will be described with reference to Fig. 6. Note that in order to avoid duplicated descriptions, the same steps as those of the above embodiment will be omitted and a different point will be mainly described. Steps S200 to S210 are the same as steps S100 to S110. In S204, the control part 30 determines whether an amount of the oily smoke generated sensed by the cooking state monitor part 40 is equal to or more than the prescribed threshold set in advance. When the amount of the oily smoke generated is equal to or more than the prescribed threshold, the control part 30 causes the filter 10 to rotate at a second rotation speed that is a relatively high speed in S206. When the generated amount of the oily smoke is less than the prescribed threshold, the control part 30 zeros the rotation speed of the filter, that is, stops the rotation of the filter 10 in S212. As described above, the control part 30 causes the filter 10 to temporarily rotate at a first rotation speed that is a relatively low speed in S200, but may stop the rotation of the filter 10 to prevent the generation of noise when the amount of the oily smoke generated is smaller than the threshold.

[0030]

A modified example (second modified example) of the control method will be described with reference to Fig. 7. Note that in order to avoid duplicated descriptions, the same steps as those of the above embodiment will be omitted and a different point will be mainly described. Steps S300 to S310 are the same as steps S100 to S110. In S304, the control part 30 determines whether an amount of oily smoke generated sensed by the cooking state monitor part 40 is a equal to or more than prescribed threshold set in advance. When the amount of the oily smoke generated is equal to or more than the prescribed threshold, the control part 30 causes the filter 10 to rotate at a second rotation speed that is a relatively high speed in S306. When the amount of the oily smoke generated is less than the prescribed threshold, the control part 30 causes the filter 10 to rotate at a first rotation speed that is a relatively low speed in S312. According to this configuration, even if the control part 30 controls the rotation of the filter 10 using the second rotation speed that is a relatively high speed after the amount of the oily smoke generated has temporarily exceeded the threshold, the control part 30

can bring the second rotation speed back to the first rotation speed that is a relatively low speed when the amount of the oily smoke generated becomes an amount smaller than the prescribed threshold, whereby the possibility of large noise generation can be reduced.

[0031]

A modified example (third modified example) of the control method will be described with reference to Fig. 8. Note that in order to avoid duplicated descriptions, the same steps as those of the above embodiment will be omitted and a different point will be mainly described. Steps S400 to S410 are the same as steps S100 to S110. In S404, the control part 30 determines whether an amount of oily smoke generated sensed by the cooking state monitor part 40 is equal to or more than a prescribed threshold set in advance. When the amount of the oily smoke generated is equal to or more than the prescribed threshold, the control part 30 causes the filter 10 to rotate at a second rotation speed that is a relatively high speed in S406. When the amount of the oily smoke generated is less than the prescribed threshold, the control part 30 maintains a previous rotation speed for a prescribed time in S412. That is, even in a case in which the control part 30 controls the rotation of the filter 10 using the second rotation speed that is a relatively high speed after the amount of the oily smoke generated has temporarily exceeded the threshold and then brings the second rotation speed back to a first rotation speed that is a relatively low speed when the amount of the oily smoke generated has become an amount smaller than the prescribed threshold, the control part 30 maintains the second rotation speed that is a relatively high speed for a certain time. After that, in S414, the control part 30 causes the filter 10 to rotate at the first rotation speed that is a relatively low speed. As described above, the second rotation speed that is a high speed is maintained for a certain time, whereby the oily smoke or the like can be substantially gathered.

[0032]

As described above, when the determination part 50 determines that oily smoke equal to or more than a prescribed threshold is not generated after determines that the oily smoke equal to or more than the prescribed threshold is generated, the control part 30 may immediately stop the rotation of the electric motor 20, cause the electric motor 20 to immediately rotate at the first rotation speed at which a noise level is low, stop the rotation of the electric motor 20 after maintaining the second rotation speed at which gathering efficiency is high for a prescribed time, or cause the electric motor 20 to rotate at the first rotation speed after maintaining the second rotation speed for a prescribed time. According to this configuration, the filter 10 is controlled

to rotate at a low speed or stop when oily smoke equal to or more than a prescribed threshold is not generated any more, whereby the possibility of noise generation can be reduced.

[0033]

Note that the present embodiment describes the case in which the determination part 50 determines that oily smoke equal to or more than the prescribed threshold is not generated after determines that the oil smoke equal to or more than the prescribed threshold is generated. However, without being limited to this case, the control part 30 may perform the following control on the basis of a threshold having a value different from the prescribed threshold after the determination part 50 once determines that the oily smoke equal to or more than the prescribed threshold is generated. That is, when the determination part 50 determines that oily smoke equal to or more than a threshold different from a prescribed threshold is not generated after determines that the oily smoke equal to or more than the prescribed threshold is generated, the control part 30 may immediately stop the rotation of the electric motor 20, cause the electric motor 20 to immediately rotate at the first rotation speed at which a noise level is low, stop the rotation of the electric motor 20 after maintaining the second rotation speed at which gathering efficiency is high for a prescribed time, or cause the electric motor 20 to rotate at the first rotation speed after maintaining the second rotation speed for a prescribed time.

[0034]

Further, the air volume of an air flow generated by the fan 4 includes at least two air volumes, a first air volume and a second air volume larger than the first air volume. The second rotation speed used when the fan 4 generates the air flow of the second air volume may be made faster than the second rotation speed used when the fan 4 generates the air flow of the first air volume. The first rotation speed used when the fan 4 generates the air flow of the second air volume may be made faster than the first rotation speed used when the fan 4 generates the air flow of the first air volume. According to this configuration, noise generated by the filter 10 is drowned out when the fan 4 that generates an air flow rotates at a high speed. Therefore, in this case, the noise is hardly perceived even if the filter 10 is made to rotate at a high speed. For this reason, the rotation speed of the filter 10 is controlled according to whether the fan 4 rotates at a high speed or a low speed, whereby the possibility of noise generation can be reduced and high oil gathering efficiency can be maintained. Further, since the flow speed of oily smoke passing through the filter is different depending on an air volume, the required rotation speed of the filter 10 is different. Accordingly, the first rotation

speed and the second rotation speed can be made slow when an air volume is relatively small, whereby it is possible to reduce noise generated by the rotation of the filter 10 while maintaining high oil gathering efficiency.

[0035]

<Second Embodiment>

A range hood 1A according to the present embodiment will be described with reference to Fig. 9. Note that in order to avoid duplicated descriptions, the descriptions of the same constituents as those of the above embodiment will be omitted by giving the same symbols to the constituents and a different point will be mainly described. The range hood 1A includes: a fan 4 that generates an air flow; a filter 10 that exists on the flow channel of the air flow and on the upstream side of the fan, and that has holes for allowing the air flow to pass therethrough; an electric motor 20 that rotates the filter 10; a control part 30 that performs control to cause the electric motor 20 to rotate at at least two rotation speeds, which are a first rotation speed and a second rotation speed that is faster than the first rotation speed; and a cooking state monitor part 40A that monitors a cooking state in a cooker CD.

[0036]

The cooking state monitor part 40A is a pot bottom temperature sensor that senses the temperature of a pot bottom provided on the cooker CD. The pot bottom temperature sensor may be a known sensor used in a cooker and has communication means for transmitting the temperature to the range hood 1A. The range hood 1A has a communication part (not shown) that receives the temperature of the pot bottom from the communication means and transmits the received temperature to the control part 30. The cooking state monitor part 40A transmits information on the temperature to the control part 30, for example, when it is assumed that cooking is made using oil in a state in which the temperature of the pot bottom largely exceeds 100°C. When receiving such information, the control part 30 may cause the filter 10 to rotate at the second rotation speed that is a relatively high speed. As described above, the filter 10 is made to rotate at a high speed at which large noise is generated only when cooking is made in a state in which the temperature of a pot bottom on the cooker CD exceeds a prescribed temperature, whereby the possibility of large noise generation can be reduced.

[0037]

<Third Embodiment>

A range hood 1B according to the present embodiment will be described with reference to Fig. 10. Note that in order to avoid duplicated descriptions, the

descriptions of the same constituents as those of the above embodiments will be omitted by giving the same symbols to the constituents and a different point will be mainly described. The range hood 1B includes: a fan 4 that generates an air flow; a filter 10 that exists on a flow channel of the air flow and on the upstream side of the fan, and that has holes for allowing the air flow to pass therethrough; an electric motor 20 that rotates the filter 10; a control part 30 that performs control to cause the electric motor 20 to rotate at at least two rotation speeds, which are a first rotation speed and a second rotation speed that is faster than the first rotation speed; and a cooking state monitor part 40B that monitors a cooking state in a cooker CD.

[0038]

In the present embodiment, the cooking state monitor part 40B is a temperature sensor that is provided at the end of an inside panel 5 and senses the temperatures of a pot or the like and its content on the cooker CD. The system of the temperature sensor is not particularly limited so long as the temperature sensor is a type such as an infrared camera that measures temperatures in a non-contact state. Note that in the present embodiment, the cooking state monitor part 40B is used in combination with the cooking state monitor part 40 that is a smoke sensor and the cooking state monitor part 40A that is a pot bottom temperature sensor described above, and the control part 30 can control the rotation speed of the filter 10 by comprehensively considering these sensors. The cooking state monitor part 40B may be, of course, used alone. As described above, the filter 10 is made to rotate at a high speed at which large noise is generated when cooking is made in a state in which the temperatures of a pot or the like and its content exceed a prescribed temperature on the cooker CD, whereby the possibility of large noise generation can be reduced.

[0039]

Note that when cooking is made by a plurality of heating sources in a cooker having the plurality of heating sources, the filter 10 may be made to rotate at the second rotation speed if the temperature of even one of the heating sources exceeds a prescribed temperature. Further, in a cooker comprising a grill, the filter 10 may be made to rotate at the second rotation speed when the grill is used. The use of the grill may be sensed when a temperature near a grill exhaust port is sensed by a temperature sensor provided in the range hood, or may be sensed when the range hood receives cooking menu information selected with the cooker or a cooker signal relating to an operation or the like to ignite the grill. When the temperature near the grill exhaust port is sensed by the temperature sensor provided in the range hood, it may be determined that the grill is in use on the condition that the temperature near the grill

exhaust port exceeds a specified value lower than a prescribed temperature. This is because the temperature near the grill exhaust port becomes lower than the temperature inside the grill to which heat is actually applied.

[0040]

<Fourth Embodiment>

A range hood 1C according to the present embodiment will be described with reference to Fig. 11. Note that in order to avoid duplicated descriptions, the descriptions of the same constituents as those of the above embodiments will be omitted by giving the same symbols to the constituents and a different point will be mainly described. The range hood 1C includes: a fan 4 that generates an air flow; a filter 10 that exists on a flow channel of the air flow and on the upstream side of the fan, and that has holes for allowing the air flow to pass therethrough; an electric motor 20 that rotates the filter 10; a control part 30 that performs control to cause the electric motor 20 to rotate at at least two rotation speeds, which are a first rotation speed and a second rotation speed that is faster than the first rotation speed; and a cooking state monitor part 40C that monitors a cooking state in a cooker CD.

[0041]

In the present embodiment, the cooking state monitor part 40C is a sound sensor that is attached onto a wall surface between the range hood 1C and the cooker CD, and that collects a sound during cooking made on the cooker CD. The cooking state monitor part 40C is separated from the range hood 1C and performs radio communication with a control part 30 in order to more finely collect the sound during the cooking made on the cooker CD. The sound sensor preferably has directivity with respect to a pot or the like on the cooker CD and collects its frequency or size to analyze what type of cooking is being made.

[0042]

For example, the cooking state monitor part 40C distinguishes a sound generated when cooking of fried food or stir-fried food is made with oil from a sound generated when cooking of boiled food is made or water is boiled. When the former sound is generated, the cooking state monitor part 40C transmits information on the temperature to the control part 30. When receiving such information, the control part 30 may cause the filter 10 to rotate at the second rotation speed that is a relatively high speed. As described above, the filter 10 is made to rotate at a high speed at which large noise is generated depending on the state or attribute of a sound generated on the cooker CD, whereby the possibility of large noise generation can be reduced. Further, since the cooking state monitor part 40C is separated from the range hood 1C, the

cooking state monitor part 40C can be arranged at a position suitable for monitoring an object.

[0043]

Note that in the present embodiment, the cooking state monitor part 40C is used in combination with the cooking state monitor part 40A that is a pot bottom temperature sensor described above, and the control part 30 can control the rotation speed of the filter 10 by comprehensively determining these sensors. For example, when the temperature of a pot bottom sensed by the pot bottom temperature sensor of the cooking state monitor part 40 is 100°C or less even if the sound sensor of the cooking state monitor part 40C detects a sound generated during cooking of fried food, the control part 30 may control the filter 10 using the first rotation speed that is a relatively low speed at which noise level is low. The cooking state monitor part 40C may be, of course, used alone.

[0044]

Note that the present invention is not limited to the exemplified embodiments but is capable of being carried out by a configuration within the range of contents described in the respective items of claims. That is, the present invention is particularly diagrammatically shown and described mainly in regard to the specific embodiments, but those skilled in the art could add various modifications to the embodiments described above in terms of quantities, applied examples, and other detailed configurations without departing from the range of the technical spirit and object of the present invention.

[0045]

For example, a cooking state monitor part may monitor a cooking state on the basis of information obtained by combining together any or all of a temperature sensor that detects the temperature of an object placed on a cooker CD, a color sensor that detects the color of the object placed on the cooker CD, a sound sensor that detects a sound generated by the object placed on the cooker CD, a particle sensor that detects particles existing in the space between the cooker CD and a range hood, and a cooker operation state sensor that detects cooking menu information selected with the cooker and the operation state of the cooker.

[0046]

Further, the present invention is not limited to a range hood but may be applied to any apparatus that gathers oily smoke generated from cooked food when a cooker is in use. For example, the present invention may be applied to an illumination apparatus equipped with an air cleaner.

REFERENCE SIGNS LIST

[0047]

1	Range hood
2	Hood part
3	Blower box
4	Fan
5	Inside panel
6	Communication opening
7	Airflow guide plate
9	Frieze board
10	Filter
11	Hole
20	Electric motor
30	Control part
40	Cooking state monitor part
50	Determination part
60	Oil content gathering member
70	Operation part
D1	Air flow direction
CD	Cooker

CLAIMS

1. A range hood provided above or near a cooker, comprising:
 - a fan configured to generate an air flow;
 - a filter disposed on a flow channel of the air flow and on an upstream side of the fan, and having holes for allowing the air flow to pass therethrough;
 - an electric motor configured to rotate the filter;
 - a control part configured to perform control to cause the electric motor to rotate at at least two rotation speeds, which are a first rotation speed and a second rotation speed that is faster than the first rotation speed; and
 - a cooking state monitor part configured to monitor a cooking state in the cooker, wherein
 - the control part controls the rotation speed of the electric motor at the first rotation speed and the second rotation speed according to the cooking state monitored by the cooking state monitor part,
 - an air volume of the air flow generated by the fan includes at least two air volumes, which are a first air volume and a second air volume that is larger than the first air volume,
 - the second rotation speed used when the fan generates the air flow of the second air volume is faster than the second rotation speed used when the fan generates the air flow of the first air volume, and
 - the first rotation speed used when the fan generates the air flow of the second air volume is faster than the first rotation speed used when the fan generates the air flow of the first air volume.
2. The range hood according to claim 1, further comprising:
 - a determination part configured to determine whether oily smoke equal to or more than a prescribed threshold is generated on the basis of the cooking state monitored by the cooking state monitor part, wherein
 - the control part causes the electric motor to rotate at the second rotation speed when the determination part determines that the oily smoke equal to or more than the prescribed threshold is generated.
3. The range hood according to claim 2, wherein,
 - when the determination part determines that the oily smoke equal to or more than the prescribed threshold or equal to or more than a threshold different from the prescribed threshold is not generated after determines that the oily smoke equal to or

more than the prescribed threshold is generated,

the control part immediately stops rotation of the electric motor, causes the electric motor to immediately rotate at the first rotation speed, stops the rotation of the electric motor after maintaining the second rotation speed for a prescribed time, or causes the electric motor to rotate at the first rotation speed after maintaining the second rotation speed for a prescribed time.

4. The range hood according to any one of claims 1 to 3, wherein
the cooking state monitor part is separated from the range hood and performs radio communication with the control part.