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(54) **Range hood and control method thereof**

(57) Disclosed is a range hood (1) and a control method thereof. The range hood includes gas detection means (10) for detecting gas concentrations, and further includes: gas indication means (20) and control means, wherein the control means is used for controlling the gas indication means to display corresponding colors and/or brightness and/or images according to gas concentrations information detected by the gas detection means. Thus, users can know current gas concentrations by observing the colors and/or brightness and/or images displayed by the gas indication means, to prevent occurrence of fire accidents, and can infer the cooking state, to bring convenience to cooking of the users. Meanwhile, the gas indication means also plays a decoration role.

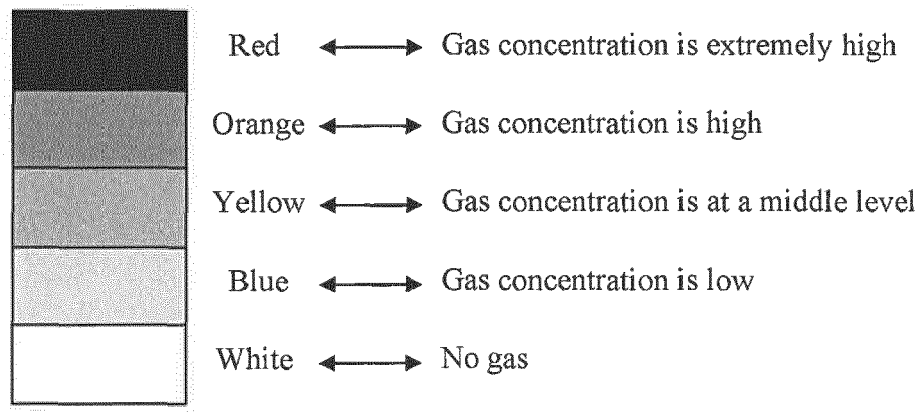

FIG. 2

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to the field of household appliances, and in particular, to a range hood and a control method thereof.

Related Art

[0002] Some range hoods currently on the market use small-size TFT display screens to display relevant information, however, as the household appliances show an intelligent development trend, and have more and more functions, while the area of the TFT display interface of the range hood is relatively limited, to display various functions and state parameters on a small area inevitably renders that displayed texts and graphics cannot be too large, and it is very inconvenient for users to view these texts and parameters while cooking. Especially some important parameters or alarms cannot be prominently displayed, and users may overlook such important information, which brings about serious consequences. Besides, some display interfaces may not be easily integrated into the overall design of the range hood, so that the appearance of the range hood is not congruous enough.

[0003] In addition, when a user selects boil or stew or other cooking manners for cooking, he does not need to take a long time to stay near the stove or in the kitchen, but the existing range hood has no corresponding real-time monitoring and long-distance prompting functions, the user cannot grasp the time of leaving well, which easily causes that water in the cooking vessel is evaporated and the food is burnt, or even causes a fire. In order to avoid occurrence of such situations, the user needs to go near the stove to view the state in the cooking vessel every little while, which is very troublesome.

[0004] Unless there is sufficient evidence to support, the prior arts described herein do not imply admitting that the prior arts are well known to persons of ordinary skill in the art prior to the filing date of the present application.

SUMMARY OF THE INVENTION

[0005] A main objective of the present invention is to provide a new range hood having gas concentrations indication means with respect to the above at least one technical problem.

[0006] The present invention provides a range hood, including gas detection means for detecting gas concentrations, and further includes: gas indication means and control means, wherein the control means is used for controlling the gas indication means to display corresponding colors and/or brightness and/or images according to gas concentrations information detected by the gas detection means. In this way, users can know current gas concentrations by observing the colors and/or brightness and/or images displayed by the gas indication means, to timely take measures to prevent occurrence of fire accidents. Further, the users can infer the state of cooking according to the current gas concentrations, without going near the stove to view every little while, which brings convenience to cooking of the users and is more humane. Meanwhile, the gas indication means also plays a decoration role, and the changed colors and/or brightness and/or images can bring about a unique visual effect, to avoid the dull feeling brought about by common kitchen appliances.

[0007] Further, in order to reflect the cooking state directly, the gas concentrations information is associated with the cooking state, and the gas indication means indicates a corresponding cooking state by displaying colors and/or brightness and/or images.

[0008] Further, in order to enable users to clearly distinguish the colors and/or brightness and/or images displayed by the gas indication means remotely, the gas indication means includes projection means.

[0009] Preferably, the projection means is used for projecting the colors and/or brightness and/or images onto a wall and/or floor and/or ceiling of a room where the gas indication means is located, to facilitate users' observation.

[0010] Preferably, a projection position of the projection means is adjustable, so as to facilitate users to adjust the projection position according to room layout, thereby improving applicability of the gas indication means.

[0011] Preferably, the gas indication means includes a light-emitting element of more than two colors, which further facilitate users' observation or determination with colors of the light-emitting element or colors obtained by mixing in suitable proportions reflecting gas concentrations in different ranges.

[0012] Preferably, the light-emitting element is a light-emitting diode.

[0013] Preferably, the gas indication means includes a red light-emitting diode, a green light-emitting diode and a blue light-emitting diode.

[0014] Further, in order to save the cost and utilize the design of the existing range hood, the gas indication means is further used for providing lighting for the range hood. In this way, the gas indication means integrates functions of lighting and gas indication.

[0015] Further, when the gas concentrations reaches a certain level, in order to remind the users and to prevent dangers, the range hood further includes alarm means, the range hood is preset with an alarm concentration, and the alarm means is used for performing a reminding operation when the gas concentrations information reaches the alarm concentration.

[0016] Further, in order to further improve detection accuracy of the gas detection means, the gas detection means includes an ultrasonic sensor.

[0017] The present invention further provides a control method for a range hood, including: a. detecting gas con-

centrations, to obtain gas concentrations information; and b. displaying corresponding colors and/or brightness and/or images according to the gas concentrations information. Through the control method, the range hood displays corresponding information according to the gas concentrations, and users can understood the current cooking state, to prevent occurrence of cooking accidents.

[0018] To further remind the users and prevent occurrence of cooking accidents, the range hood further includes alarm means, the range hood is preset with an alarm concentration, and the method further includes: c. judging whether the gas concentrations information reaches the alarm concentration; and if yes, controlling the alarm means to perform a reminding operation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a range hood according to an embodiment of the present invention;

FIG. 2 is a view of a correspondence relationship between colors and gas concentrations of a gas indication means according to an embodiment of the present invention;

FIG. 3 is a flow chart of steps of a control method for a range hood according to an embodiment of the present invention.

[0020] Descriptions about reference signs in the drawings:

1-range hood; 10-gas detection means; 20-gas indication means.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0021] To make the objectives, structures, features and functions of the present invention further understood, detailed descriptions are given below with reference to embodiments.

[0022] The cooking process may generate a certain amount of flue gas, gas concentrations generated in different cooking states generally are different, for example, in the process of boiling water, the amount of steam generated when water is heated to 80°C is obviously different from that generated after the water is heated to be boiling, and thus, the present invention sends corresponding prompt information to users by detecting gas concentrations during the cooking. It should be noted that, the gas mentioned in the present invention refers to oil fume, water vapor, etc. Referring to FIG. 1, FIG. 1 is a range hood according to an embodiment of the present invention, a range hood 1 of the present invention includes gas detection means 10, gas indication means 20 and control means (not shown). The gas detection means 10 is used for detecting gas concentrations, and the control means is used for controlling the gas indication means 20 to display corresponding colors and/or brightness and/or images according to gas concentration information detected by the gas detection means 10.

[0023] As an embodiment of the present invention, the gas detection means 10 includes an ultrasonic sensor, mounted in an inner space in the main body of the range hood 1. With the change of the gas concentrations, a voltage signal output by the ultrasonic sensor also changes, and the current gas concentration can be calculated by detecting the voltage signal; thus, the gas concentration information detected by the gas detection means 10 is a voltage value. The gas indication means 20 includes a light-emitting element of more than two colors, and the light-emitting element may be a light-emitting diode (LED), a cold cathode fluorescent tube (CCFL), an organic light-emitting diode (OLED), etc. As the LED lamp has little power consumption, has a low cost, and has a variety of colors, LED preferably serves as the light-emitting element in this embodiment.

[0024] In a preferred embodiment of the present invention, the gas indication means 20 includes a red LED, a green LED and a blue LED, the three colors are three primary colors, and generate multiple colors and/or brightness by mixing in certain proportions, for example, yellow can be obtained by mixing the red LED and the green LED according to a proportion of 1:1; and white can be obtained by mixing the red LED, the green LED and the blue LED according to a proportion of 1:1:1. The control means can generate different colors by controlling opening or closing of each LED separately. The range hood 1 is preset with a correspondence relationship between colors and gas concentrations, the control means may be a micro-controller (MCU), referring to FIG. 2, FIG. 2 is a view of a correspondence relationship between colors and gas concentrations of a gas indication means according to an embodiment of the present invention, the gas concentrations are divided into five ranges, when there is no flue gas, the gas indication means 20 displays white; when the gas concentration is low, the gas indication means 20 displays blue; when the gas concentration reaches a middle level, the gas indication means 20 displays yellow; when the gas concentration is high, the gas indication means 20 displays orange; and when the gas concentration is extremely high, the gas indication means 20 displays red. Further, in order to prevent occurrence of dangerous events, the range hood 1 further includes alarm means, the range hood 1 is preset with an alarm concentration, and a reminding operation is performed when the detected gas concentration information reaches the alarm concentration. In this embodiment, the alarm concentration, like the gas concentration information, is also a voltage value. Preferably, the alarm means includes a buzzer, and the buzzer gives an alarm sound when the detected gas concentration information reaches the alarm concentration. Therefore, a user can know

the level of the gas concentration without going near the stove as long as he observes the color displayed by the gas indication means 20 remotely, and can then infer the cooking state in the cooking vessel. For example, in the case of making a soup, when the user observes that the color displayed by the gas indication means 20 is blue, it indicates that the water is not boiling; when the user observes that the color displayed by the gas indication means 20 is orange, it indicates that a large amount of water vapor has generated, and the water in the cooking vessel has been boiled, and at this time, the user needs to go to the kitchen to adjust the first to be small, using a small fire to simmer.

[0025] Further, in order to facilitate the user to directly know the cooking state, and in order that the user can infer the cooking state from the level of the gas concentration without according to experience, the range hood 1 associates the gas concentration information with the cooking state, and the gas indication means 20 indicates a corresponding cooking state directly by displaying colors and/or brightness and/or images. Herein, the present invention is not limited to displaying colors and/or brightness, corresponding images, such as texts or pictures also can be displayed. Certainly, the cooking state is also relevant to the cooking manner, therefore, the range hood 1 previously has stored information related to different cooking manners, for example, a correspondence relationship between gas concentration information and cooking states in different cooking manners such as decoct, fry, stir-fry, and boil.

[0026] In order to further enable users to clearly distinguish the colors and/or brightness and/or images displayed by the gas indication means 20 remotely, the gas indication means 20 includes projection means, which projects the colors onto a wall and/or floor and/or ceiling of a room where the gas indication means 20 is located. In this way, the colors and/or brightness and/or images displayed on the wall and/or floor and/or ceiling of the room where the gas indication means 20 is located can be clearly distinguished in other rooms, i.e., the gas concentration or the cooking state. Further, in order to adapt to different room layouts, a projection position of the projection means is adjustable, and a user can adjust his projection position to a suitable position, to facilitate observation.

[0027] In another preferred embodiment of the present invention, the gas indication means 20 also serves as lighting means of the range hood 1, to provide lighting for the range hood 1. The gas indication means 20 displays corresponding colors and/or brightness corresponding to different gas concentrations. For example, the gas indication means 20 only displays orange light, and displays different brightness corresponding to different gas concentrations, and at night or in the case of dim light, the gas indication means 20 provides lighting for users while emitting orange light. In addition, the present invention further provides a control method for a range hood, referring to FIG. 3, FIG. 3 is a flow chart of steps of a control method for a range hood according to an embodiment of the present invention, wherein the control method includes:

Step a: detecting gas concentration, to obtain gas concentration information; and

Step b. displaying corresponding colors and/or brightness and/or images according to the gas concentration information.

The range hood further includes alarm means, the range hood is preset with an alarm concentration, and the method further includes:

Step c. judging whether the gas concentration information reaches the alarm concentration; and if yes, controlling the alarm means to perform a reminding operation. If no, the reminding operation is not performed, for example, the process goes back to step a, to achieve real-time monitoring on the gas concentration.

[0028] The present invention has been description by the above relevant embodiments, however, the embodiments are only examples for implementing the present invention. It must be pointed out that, embodiments disclosed does not limit the scope of the present invention. On the contrary, variations and modifications made without departing from the spirit and scope of the present invention fall within the scope of the present invention.

Claims

1. A range hood (1), comprising gas detection means (10) for detecting gas concentrations;
gas indication means (20); and
control means, used for controlling the gas indication means (20) to display corresponding colors and/or brightness and/or images according to gas concentrations information detected by the gas detection means (10).

2. The range hood (1) according to claim 1, **characterized in that**, the gas concentrations information is associated with a cooking state, and the gas indication means (20) indicates a corresponding cooking state by displaying colors and/or brightness and/or images.

3. The range hood (1) according to claim 1, **characterized in that**, the gas indication means (20) comprises projection means.

4. The range hood (1) according to claim 3, **characterized in that**, the projection means is used for projecting the colors and/or brightness and/or images onto a wall and/or floor and/or ceiling of a room where

the gas indication means (20) is located.

5. The range hood (1) according to claim 3, **characterized in that**, a projection position of the projection means is adjustable.

6. The range hood (1) according to claim 1, **characterized in that**, the gas indication means (20) comprises a light-emitting element of more than two colors.

7. The range hood (1) according to claim 6, **characterized in that**, the light-emitting element is a light-emitting diode.

8. The range hood (1) according to claim 7, **characterized in that**, the gas indication means (20) comprises a red light-emitting diode, a green light-emitting diode, and a blue light-emitting diode.

9. The range hood (1) according to any one of claims 6 to 8, **characterized in that**, the gas indication means (20) is further used for providing lighting for the range hood (1).

10. The range hood (1) according to any one of claims 1 to 8, **characterized by** further comprising alarm means, wherein the range hood is preset with an alarm concentration, and the alarm means is used for performing a reminding operation when the gas concentrations information reaches the alarm concentration.

11. The range hood (1) according to any one of claims 1 to 8, **characterized in that**, the gas detection means (10) comprises an ultrasonic sensor.

12. A control method for a range hood (1), comprising:

a. detecting gas concentrations, to obtain gas concentrations information; and
b. displaying corresponding colors and/or brightness and/or images according to the gas concentrations information.

13. The control method for a range hood (1) according to claim 12, **characterized in that**, the range hood (1) further comprises alarm means, the range hood is preset with an alarm concentration, and the method further comprises:

c. judging whether the gas concentrations information reaches the alarm concentration; and if yes, controlling the alarm means to perform a reminding operation.

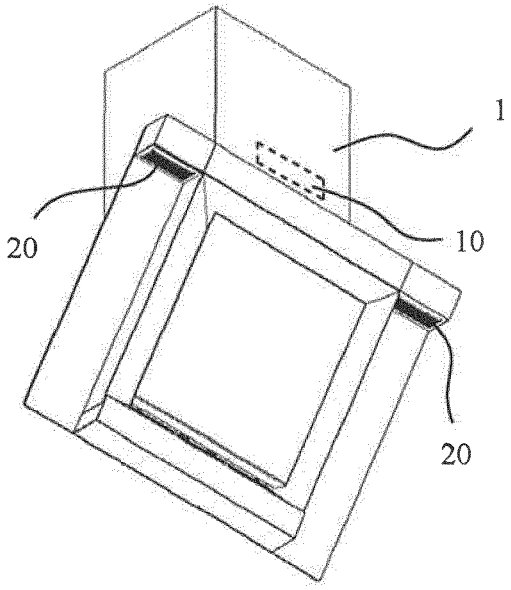
1
20
10
20

FIG. 1

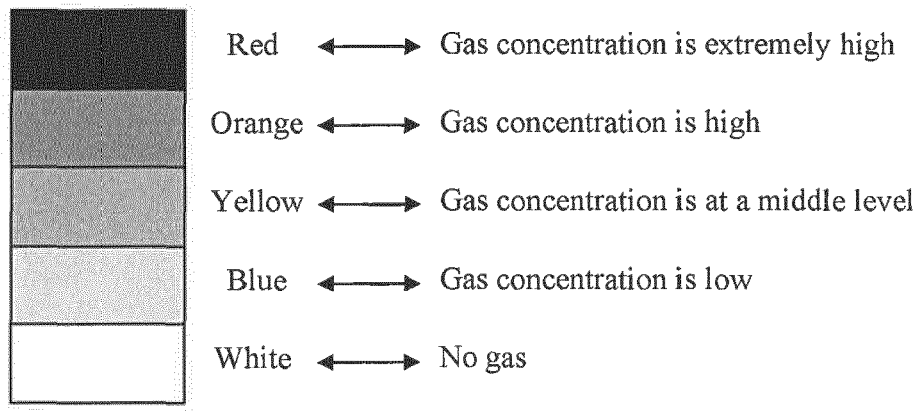
Red ⟷ Gas concentration is extremely high
Orange ⟷ Gas concentration is high
Yellow ⟷ Gas concentration is at a middle level
Blue ⟷ Gas concentration is low
White ⟷ No gas

FIG. 2

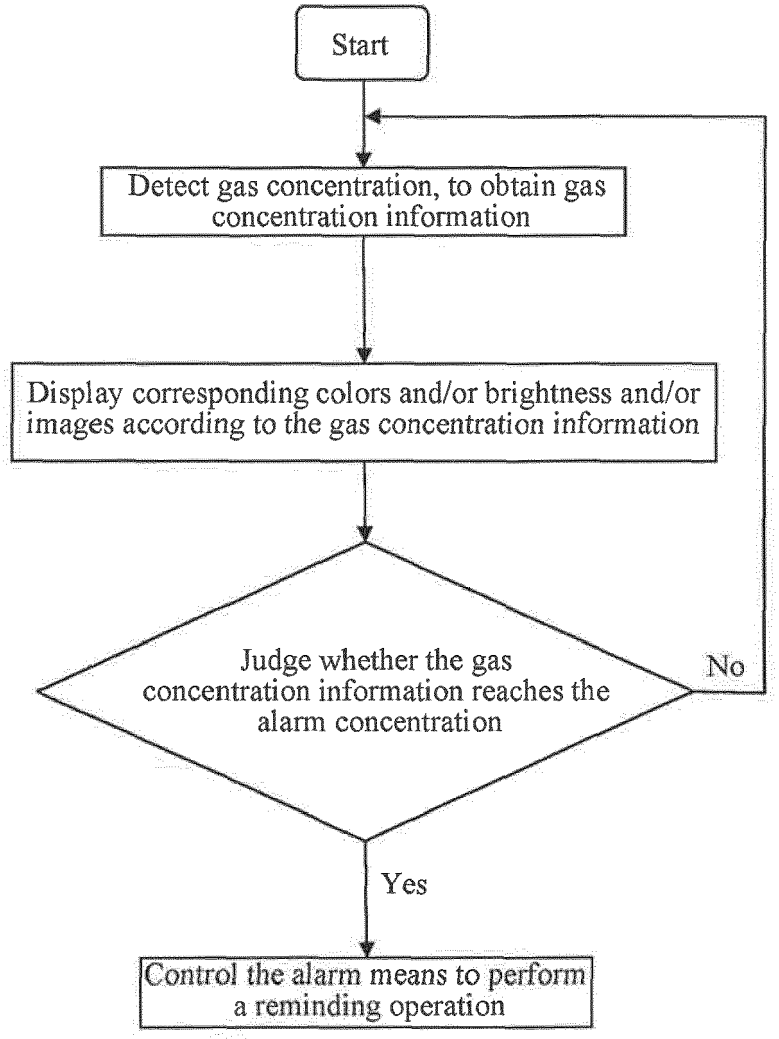
Start
Detect gas concentration, to obtain gas concentration information
Display corresponding colors and/or brightness and/or images according to the gas concentration information
Judge whether the gas concentration information reaches the alarm concentration
No
Yes
Control the alarm means to perform a reminding operation

FIG. 3