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(54) **REFRIGERATOR LIGHT-SENSING SYSTEM CAPABLE OF SAVING ENERGY AND REDUCING NOISE**

(57) A refrigerator light-sensing system capable of saving energy and reducing noise comprising a control main body-refrigerator, a lower door hinge cover arranged at the lower end of the refrigerator, and a light-sensing device installed in the lower door hinge cover, wherein the light-sensing device is electrically connected to the refrigerator through a wireless transmission or a wire connection mode; the light-sensing device is internally provided with a light-sensing element, a power supply module, a controller, a refrigerator refrigeration system and a light intensity storage module; the

light-sensing element is connected to the controller through a wireless transmission or a wire; the present invention adopts a light-sensing element to convert the detected light signal into an electrical signal; the electrical signal is transmitted to the controller, and the controller judges the operation mode of the refrigeration system according to the intensity of the converted electrical signal; as the refrigerator isn't used when the user rests, the power consumption can be reduced and the noise can be reduced, achieving a better user experience.

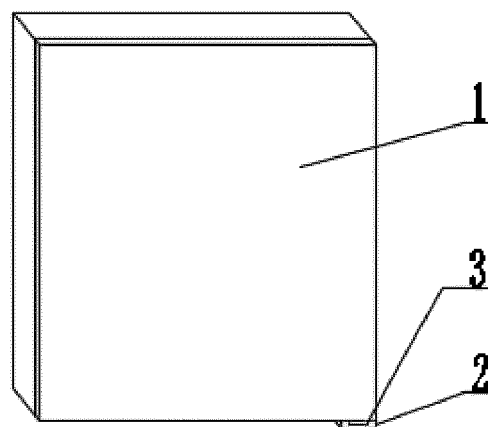


Figure 1

Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to the technical field of manufacturing refrigerators, and more particularly, to a refrigerator light-sensing system capable of saving energy and reducing noise.

BACKGROUND OF THE INVENTION

[0002] In the prior art, traditional refrigerators sold on the market, especially those used for hotel rooms, basically have a refrigeration system controlled based on the temperature inside the refrigerator. In fact, when a hotel customer rests at night, the refrigerator isn't used anymore, but the refrigeration system continues operating according to the preset temperature. Under such circumstances, the customer can be disturbed by the noise generated during the refrigeration process, and the electric energy cannot be saved, resulting in a poor user experience.

SUMMARY OF THE INVENTION

[0003] The purpose of the present invention is to solve the shortcomings in the prior art by providing a refrigerator light-sensing system capable of saving energy and reducing noise.

[0004] To achieve the above purpose, the present invention adopts the following technical solution:

A refrigerator light-sensing system capable of saving energy and reducing noise comprising a control main body-refrigerator, a lower door hinge cover arranged at the lower end of the refrigerator, and a light-sensing device installed in the lower door hinge cover, wherein the light-sensing device is electrically connected to the refrigerator through a wireless transmission or a wire connection mode.

[0005] In another preferred embodiment, the light-sensing device is internally provided with a light-sensing element, a power supply module, a controller, a refrigerator refrigeration system and a light intensity storage module. The light-sensing element is connected to the controller through a wireless transmission or a wire, and the light-sensing element can convert the detected optical signal into an electrical signal. The light intensity storage module in the light-sensing device can store a light intensity value preset by a user. The light-sensing device not only can be installed at the position shown in Figure 1, but can be installed outside the refrigerator at any position where the light intensity changes can be easily sensed. The modules in the light-sensing device can also be separated and installed in different positions through electrical connection.

[0006] In another preferred embodiment, the controller in the light-sensing device can judge the target temperature in the refrigerator according to the intensity of the

light signal detected by the light-sensing element. When the light intensity is lower than the preset value in the light intensity storage module, the controller adjusts the temperature inside the refrigerator, for instance, adjusting the temperature from the original 5°C to 15°C, or directly reducing or switching-off the power of the refrigeration system, thereby enabling the temperature inside the refrigerator to slowly rise to about 15°C. When the light-sensing device senses that the light intensity outside the refrigerator is restored to or greater than the preset value, the controller adjusts the target temperature in the refrigerator back to the original stage of temperature, e.g., 5°C. As the target temperature 5°C is far lower than the existing temperature 15°C in the refrigerator, the refrigeration system increases the refrigeration output power of the whole refrigerator under the control of the controller, or immediately switches to a full-powered operation of refrigeration from the original stopped state, thereby making the refrigeration system return to the originally-set temperature and operate according to the control logic.

[0007] Compared with the prior art, the present invention has the following advantages:

The refrigerator light-sensing system capable of saving energy and reducing noise of the present invention adopts a light-sensing element to convert the detected light signal into an electrical signal. The electrical signal can be transmitted to the controller through a wireless transmission. The controller compares the received signal with the preset light intensity value. When the light intensity is lower than the preset light intensity value, the controller controls the refrigeration system of the refrigerator to reduce or switch-off the output power of the whole refrigeration system according to different types of refrigerators, or directly adjusts the temperature in the refrigerator, for example, from the preset 5°C to about 15°C. Although the temperature rises, the refrigeration of food isn't affected. When the user rests, the refrigerator is no longer used, not affecting the user experience. Meanwhile, the electric energy can be saved and the noise can be reduced. When the light intensity is greater than the preset value, the controller adjusts the target temperature in the refrigerator back to the original stage of temperature, e.g., 5°C. As the target temperature 5°C is far lower than the existing temperature 15°C in the refrigerator, the refrigeration system increases the refrigeration output power of the whole refrigerator under the control of the controller, or immediately switches to a full-powered operation of refrigeration from the original stopped state, thereby making the refrigeration system return to the originally-set temperature and operate according to the control logic. Thus, the user experience can be greatly improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Figure 1 is a structural diagram of the refrigerator light-sensing system capable of saving energy and reducing noise of the present invention, and Figure 2 is a control principle diagram of the refrigerator light-sensing system capable of saving energy and reducing noise of the present invention.

[0009] In Figures:

1-Refrigerator, 2-Lower Door Hinge Cover, 3-Light-sensing Device, 4-Light-sensing Element, 5-Controller

DETAILED DESCRIPTION OF THE INVENTION

[0010] To make the technical means, inventive features, purpose and effect of the present invention easy to understand, detailed embodiments are combined hereinafter to elaborate the technical solution of the present invention.

[0011] As shown in Figures 1-2, a refrigerator light-sensing system capable of saving energy and reducing noise comprises a control main body-refrigerator 1, a lower door hinge cover 2 arranged at the lower end of the refrigerator 1, and a light-sensing device 3 installed in the lower door hinge cover 2, wherein the light-sensing device 3 is electrically connected to the refrigerator 1 through a wireless transmission or a wire connection mode. The light-sensing device 3 is internally provided with a light-sensing element 4, a power supply module, a controller 5, a refrigerator refrigeration system and a light intensity storage module. The light-sensing element 4 is connected to the controller 5 through a wireless transmission or a wire, and the light-sensing element 4 can convert the detected optical signal into an electrical signal. The light intensity storage module in the light-sensing device 3 can store a light intensity value preset by a user. The light-sensing device 3 not only can be installed at the position shown in Figure 1, but can be installed outside the refrigerator 1 at any position where the light intensity changes can be easily sensed. The modules in the light-sensing device 3 can also be separated and installed in different positions through electrical connection. The controller in the light-sensing device 3 can judge the operation mode of the refrigeration system according to the intensity of the light signal detected by the light-sensing element 4. When the light intensity is lower than the predetermined value in the light intensity storage module, the controller 5 adjusts the temperature inside the refrigerator 1, for instance, adjusting the temperature from 5°C to 15°C, or directly reducing or switching-off the power of the refrigeration system, thereby enabling the temperature inside the refrigerator to slowly rise to about 15°C. When the light-sensing device 4 senses that the light intensity outside the refrigerator 1 is restored to or greater than the preset value, the controller 5 adjusts the target temperature in the refrigerator back to the original stage of temperature, e.g., 5°C. As the target temperature (5°C) is far lower than the existing temperature (15°C) in the refrigerator, the refrigeration system in-

creases the refrigeration output power of the whole refrigerator 1 under the control of the controller 5, or immediately switches to a full-powered operation of refrigeration from the original (stopped) state, thereby making the refrigeration system return to the originally-set temperature and operate according to the control logic.

[0012] In conclusion, during the use of the present invention, the light signal outside the refrigerator 1 can be detected and converted into an electrical signal by the light-sensing element 4 in the light-sensing device 3, and the electrical signal can be transmitted to the controller 5 through a wireless transmission. At this point, the controller 5 judges the operation mode of the refrigeration system according to the intensity of the converted electrical signal, and the controller 5 compares the intensity of the light signal with the preset light intensity value stored in the light intensity storage module. When the light intensity outside the refrigerator 1 sensed by the light-sensing element 4 in the light-sensing device 3 is lower than the preset light intensity value, for refrigerators with a compressor or an absorption refrigeration system, the controller 5 adjusts the temperature inside the refrigerator 1, for example, from the original 5°C to about 15°C. For refrigerators with a semiconductor refrigeration system, the output power of the whole refrigeration system can be reduced, thus reducing the input power of the semiconductor refrigeration chip and the fan. In this way, the noise can be greatly reduced, providing the user a comfortable environment when resting, and the electric energy can be saved. When the light-sensing element 4 in the light-sensing device 3 senses that the light intensity outside the refrigerator 1 is restored to or greater than the preset value, for refrigerators with a compressor or an absorption refrigeration system, the controller 5 adjusts the target temperature in the refrigerator back to the original temperature, e.g., 5°C. As the target temperature (5°C) is far lower than the existing temperature (15°C) in the refrigerator, the refrigeration system increases the refrigeration output power of the whole refrigerator 1 under the control of the controller 5, or immediately switches to a full-powered operation of refrigeration from the original (stopped) state, thereby making the refrigeration system return to the originally-set temperature and operate according to the control logic. According to the aforesaid, the electric energy is saved, the noise of the refrigerator is reduced, providing the user a comfortable and quiet environment. Meanwhile, the practicability of the refrigerator is enhanced, effectively improving the user experience.

[0013] The basic principles, main features and advantages of the present invention are shown and described above. It should be understood by those skilled in the art that the present invention is not limited by the aforesaid embodiments, and they are only used for elaborating the principles of the present invention. Without departing from the spirit and scope of the present invention, variations and improvements should all fall within the scope of the present invention. The scope of the present inven-

tion is defined by the claims and their equivalents.

Claims

1. A refrigerator light-sensing system capable of saving energy and reducing noise, comprising:
 - a control main body-refrigerator (1),
 - a lower door hinge cover (2) arranged at the lower end of the refrigerator (1), and
 - a light-sensing device (3) installed in the lower door hinge cover (2), wherein the light-sensing device (3) is electrically connected to the refrigerator (1) through a wireless transmission or a wire connection mode.

2. The refrigerator light-sensing system capable of saving energy and reducing noise of claim 1, wherein the light-sensing device (3) is internally provided with a light-sensing element (4), a power supply module, a controller (5), a refrigerator refrigeration system and a light intensity storage module, wherein the light-sensing element (4) is connected to the controller (5) through a wireless transmission or a wire, and the light-sensing element (4) can convert the detected optical signal into an electrical signal, wherein the light intensity storage module in the light-sensing device (3) can store a light intensity value preset by a user, wherein the light-sensing device (3) not only can be installed at the position shown in Figure 1, but can be installed outside the refrigerator (1) at any position where the light intensity changes can be easily sensed, wherein the modules in the light-sensing device (3) can also be separated and installed in different positions through electrical connection.

3. The refrigerator light-sensing system capable of saving energy and reducing noise of claim 1, wherein the controller in the light-sensing device (3) can judge the target temperature in the refrigerator according to the intensity of the light signal detected by the light-sensing element (4), wherein when the light intensity is lower than the preset value in the light intensity storage module, the controller (5) adjusts the temperature inside the refrigerator (1), for instance, adjusting the temperature from the original 5°C to 15°C, or directly reducing or switching-off the power of the refrigeration system, thereby enabling the temperature inside the refrigerator to slowly rise to about 15°C, wherein when the light-sensing device (4) senses that the light intensity outside the refrigerator (1) is restored to or greater than the preset value, the controller (5) adjusts the target temperature in the refrigerator back to the original stage of temperature, e.g., 5°C, wherein as the target temperature 5°C is far lower than the existing temperature 15°C in the refrigerator, the refrigeration system

increases the refrigeration output power of the whole refrigerator (1) under the control of the controller (5), or immediately switches to a full-powered operation of refrigeration from the original stopped state, thereby making the refrigeration system return to the originally-set temperature and operate according to the control logic.

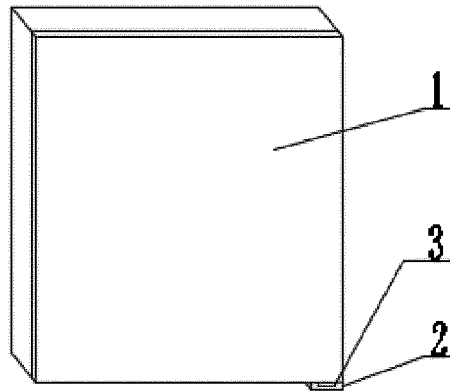


Figure 1

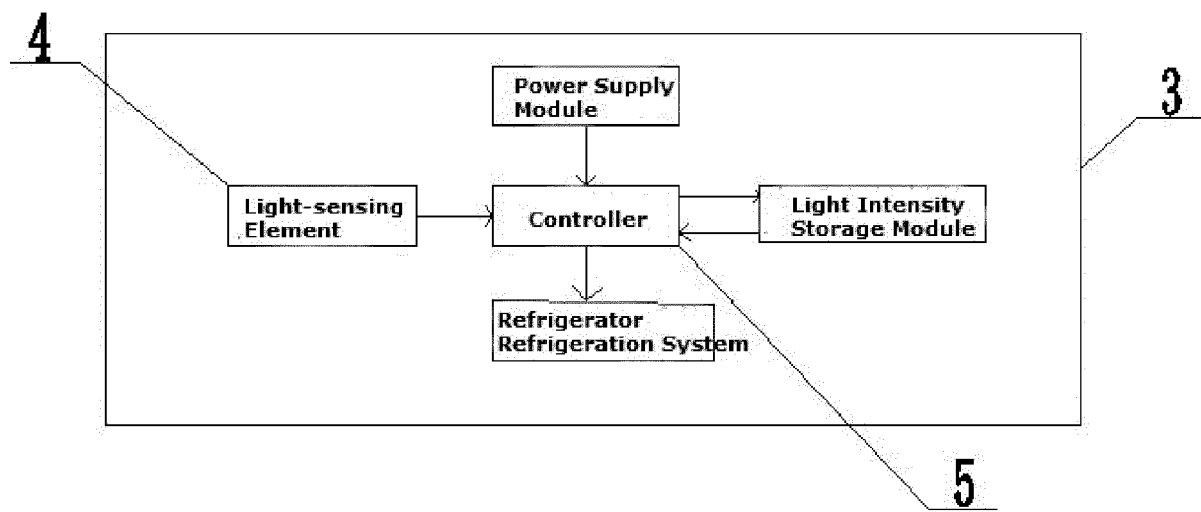


Figure 2



EUROPEAN SEARCH REPORT

Application Number
EP 20 16 6966

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EPO FORM 1503 03.82 (P04C01)

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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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