A lighting apparatus for a refrigerator according to an embodiment of the present invention uses a light emitting diode with small volume and low heat generation amount so that the storage space of the refrigerator is assured as well as a risk of the degradation in the storage state of foods stored in the refrigerator due to heat emitted from the lighting apparatus is minimized.
REFRIGERATOR AND LIGHTING APPARATUS THEREOF

TECHNICAL FIELD

[0001] This document relates to a refrigerator and a lighting apparatus thereof.

BACKGROUND ART

[0002] A conventional refrigerator is constituted by a cooling chamber and a cold chamber. And, a top mount type wherein the cold chamber is provided at a upper side of a cooling room, a bottom freezer type wherein a cold chamber is provided at a lower side of a cooling chamber, and a side by side type wherein a cold chamber and a cool chamber coexist are divided. And, each of the cold chamber and the cooling chamber is opened and closed by means of a cold chamber door and a cooling chamber door, respectively. And, the rear upper portion of the cooling chamber is provided with a lamp. The lamp is to selectively light the inside of the cooling chamber in the state where the cooling chamber is opened. To this end, the lamp is formed to be flickered according to the opening and closing of the cooling door. And the lamp is fixed to the rear of the cooling chamber by means of a lamp socket.

[0003] Also, the lamp is protected by a lamp cover. In detail, the lamp cover plays a role of protecting the lamp and at the same time, preventing a phenomenon that foods received in the cooling chamber is influenced by heat generated when the lamp is lightened. To this end, the lamp cover is formed in a polyhedral shape having predetermined volume so that foods received in the cooling chamber can be sufficiently spaced.

[0004] A lighting apparatus of a refrigerator according to the prior art has the following problems.

[0005] Generally, as the lamp constituting the lighting apparatus for the conventional refrigerator, an incandescent lamp is used. However, such an incandescent lamp has high illumination, but the heat-generation amount when lighting is relatively large as well as heat is not sufficiently emitted. Therefore, the state of foods near the lamp due to heat generated when lighting the lamp is deteriorated.

[0006] Also, the lamp cover covering the lamp is formed in a polyhedral shape having a certain volume in order to minimize the transmission of heat emitted from the lamp to the cooling chamber. Therefore, it has a disadvantage that the storage capacity of the cooling chamber is degraded by the volume of the lamp cover.

DISCLOSURE OF INVENTION

Technical Problem

[0007] The present invention proposes to solve the conventional problems. It is an object of the present invention to provide a lighting apparatus for a refrigerator capable of minimizing a phenomenon that the storage state of foods received in a storage space is degraded by heat generated from a lamp.

[0008] It is another object of the present invention to provide a lighting apparatus for a refrigerator constituted to be able to minimize the reduction of storage capacity.

Technical Solution

[0009] In order to accomplish an object of the present invention, a lighting apparatus for a refrigerator according to an embodiment of the present invention comprises: a printed circuit board formed by surface-treating a substrate of metal material; a light emitting diode mounted on a front of the substrate and flickered in order to selectively light the storage space of the refrigerator; and a mount bracket for fixing the printed circuit board to one side of the storage space.

[0010] Also, a refrigerator according to an embodiment of the present invention comprises: a main body provided with a storage space for storing foods; a door rotatably mounted to the main body and selectively shielding the storage space; and a light emitting diode mounted to the inner side of the storage space and radiating light.

ADVANTAGEOUS EFFECTS

[0011] As described above, it can expect the following effect according to a lighting apparatus for a refrigerator.

[0012] First, in the present invention a storage space of a refrigerator is lighted by means of a light emitting diode mounted on a printed circuit board. Therefore, absolute heat-generation amount generated when lighting the light emitting diode is reduced as compared to a conventional incandescent lamp. And, heat generated from the light emitting diode is more effectively emitted by means of the printed circuit substrate. Therefore, a phenomenon that foods received in the storage space is directly influenced by means of heat generated when lighting the light emitting diode is minimized so that foods can be more freshly stored.

[0013] Also, the present invention removes a printed circuit board and a lighting cover shielding the light emitting diode mounted on the printed circuit board and can be formed to have relatively small volume as compared to the prior art. Therefore, the degeneration in the storage capacity of the storage space is minimized, making it possible to more effectively use the refrigerator.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a perspective view showing an inside of a refrigerator comprising a lighting apparatus; and

[0015] FIG. 2 is a cross-sectional view taken along line I-I' of FIG. 1.

MODE FOR THE INVENTION

[0016] Hereinafter, preferred embodiments of a lighting apparatus for a refrigerator according to the present invention will be described in more detail.

[0017] FIG. 1 shows a perspective view of an inside of a refrigerator comprising a lighting apparatus and FIG. 2 shows a cross-sectional view taken along line I-I' of FIG. 1.

[0018] Referring to FIGS. 1 and 2, the refrigerator according to the present invention comprises a main body 30 having a cold chamber 31 and a cooling chamber 33 provided therein, a cold chamber door 311 and a cooling chamber door 331 rotatably mounted to the front of the body 30 to open and close the cold chamber door 31 and the cooling chamber door 33, respectively, a lighting apparatus mounted on the rear upper portion of the cooling chamber 33, and a door switch SW provided on one side of the front of the main body 30 to sensing the opening and closing of the cooling chamber door 331.

[0019] In detail, the lighting apparatus comprise a printed circuit board 41, a plurality of light emitting diodes 43 mounted on the printed circuit board 41, a mount bracket 45 allowing the printed circuit board 41 to be mounted to the rear
wall of the cooling chamber 31, and a lighting cover 49 covering the light emitting diode 43. And, the lighting cover 49 can be formed with a lighting opening 491 for emitting light.

0020 The printed circuit board 41 is formed by surface-treating the substrate of aluminum material in an approximately rectangular shape. The molding of the printed circuit board 41 with aluminum material is to more effectively emit heat generated when lighting the light emitting diode 43.

0021 And, the plurality of light emitting diodes 43 are mounted on the front of the printed circuit board at a predetermined distance. And, as the light emitting diode 43, a high output light emitting diode having output of 1 W or more can be used. Although the high output light emitting diode as the lighting member is used, heat-generation amount generated when lighting the lighting apparatus is a significantly small value as compared to the conventional incandescent lamp.

0022 Also, as described above, the mount bracket 45 is to allow the printed circuit board 41 whose front is mounted with the light emitting diode 43 to fix to the rear upper end of the cooling chamber 33. The mount bracket 45 is constituted by a bracket main body 46 and a pair of flange parts 47.

0023 The bracket body 46 is formed in a relatively large rectangular plate shape as compared to the printed circuit board 41. The front of the bracket body 46 is formed with a seating groove 461 to which the printed circuit board 41 is firmly seated. And, the bottom surface of the seating groove 461 is formed with a plurality of insert holes 462, wherein a lead wire (not shown) transmits various electrical signals to the printed circuit board 41 via the insert hole 462.

0024 The flange part 47 is formed at both ends of the bracket main body 46. And, through holes 474 are perforated in each flange part 47. The through hole 471 is a hole through which a screw is penetrated, wherein the screw fixes the mount bracket 45 to the rear end of the cooling room 33. That is, the screw penetrating through the through hole 471 is engaged with the rear end of the cooling chamber 33 so that the lighting apparatus is fixed.

0025 Meanwhile, the lighting cover 49 for protecting the printed circuit board mounted with the light emitting diode 43 is provided. The lighting cover 49 is formed in a flat polyhedral shape to be able to shield the mount bracket 45. When lighting the light emitting diode 43, relatively small amount of heat is emitted so that the lighting cover 49 does not need to have large volume like the conventional incandescent lamp. In other words, since it is sufficient if the lighting cover performs only a function capable of covering the printed circuit board mounted with the light emitting diode 43, it can be formed in a flat shape. This can be made because it is sufficient if the lighting cover performs only a protection function. And, the lighting cover 49 is formed of a transparent or semitransparent material capable of transmitting light from the light emitting diode 43 to the cooling chamber 33 or its inner side can be provided with a predetermined size of lighting opening 491.

0026 Hereinafter, the action of the preferred embodiment of the lighting apparatus of the refrigerator according to the present invention will be described.

0027 First, in order to draw out foods received inside the cooling chamber 33 to the outside or receive foods inside the cooling chamber 33, the cooling chamber 33 is opened. To this end, the cooling chamber door 331 is rotated.

0028 Meanwhile, when the cooling chamber door 331 is rotated, the door switch SW provided in one side of the main body 30 is turned-on. And, if the door switch SW is turned-on, a controller (not shown) controlling the operation of the refrigerator turns-on the lighting apparatus. That is, the light emitting diode 43 is lightened to light the inside of the cooling chamber 33.

0029 Meanwhile, when the light emitting diode 43 is lightened, a constant amount of heat is generated. However, heat emitted from the light emitting diode 43 is relatively small as compared to the incandescent lamp and is smoothly emitted by means of the printed circuit board 41 and the mount bracket 45 formed of aluminum material. Therefore, a phenomenon that the temperature of foods received in the cooling chamber by means of heat generated when lighting the light emitting diode 43 is increased is minimized.

0030 Also, since the temperature increase of foods received in the cooling chamber 33 due to the heat generation of the light emitting diode 43 is minimized, a user can receive foods up to the rear end of the cooling chamber 33 adjacent to the lighting apparatus. Therefore, more foods can be received in the cooling chamber 33, making it possible to effectively use the refrigerator.

0031 And, when the accepting and drawing of foods to the inside and outside of the cooling chamber 33 are completed, the user reversely rotates the cooling chamber door 331. Then, the cooling door 33 is shielded and the door switch SW is turned-off by means of the rotation of the cooling door 331. And, if the door switch SW is opened, the light emitting diode 43 is put out so that the lighting of the cooling chamber 33 is completed.

1. A lighting apparatus for a refrigerator comprising:
   a printed circuit board formed by surface-treating a substrate of metal material;
   a light emitting diode mounted on a front of the substrate and flickered in order to selectively light the storage space of the refrigerator; and
   a mount bracket for fixing the printed circuit board to one side of the storage space.

2. The lighting apparatus as claimed in claim 1, wherein the light emitting diode outputs 1 W or more than 1 W.

3. The lighting apparatus as claimed in claim 1, wherein the mount bracket is formed of metal material.

4. The lighting apparatus as claimed in claim 1, wherein the mount bracket comprises:
   a bracket body provided with a seating groove in which the printed circuit board is firmly seated and at least one insert hole in which a lead wire connected to the printed circuit board is inserted; and
   a flange part provided on both sides of the bracket body and provided with a through hole through which an engagement member is penetrated.

5. The lighting apparatus as claimed in claim 1, wherein at least one of the printed circuit board and the mount bracket is formed of aluminum material.

6. A refrigerator, comprising:
   a main body provided with a storage space for storing foods;
   a door rotatably mounted to the main body and selectively shielding the storage space; and
   a light emitting diode mounted to the inner side of the storage space and radiating light.

7. The refrigerator as claimed in claim 6, wherein the light apparatus further comprises a printed circuit board mounted with the light emitting diode and a lighting cover covering the light emitting diode.
8. The refrigerator as claimed in claim 6, wherein the lighting cover is formed of transparent or semitransparent material.

9. The refrigerator as claimed in claim 7, wherein the lighting cover is provided with a lighting opening allowing light radiated from the light emitting diode to radiate to the inside of the storage space.

10. The refrigerator as claimed in claim 7, further comprising a door switch provided on one side of the front of the main body to sense the opening of the door, wherein the lighting apparatus is lightened by interlocking with the door switch.

11. The refrigerator as claimed in claim 7, wherein the storage space is a cold chamber or a cooling chamber.

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