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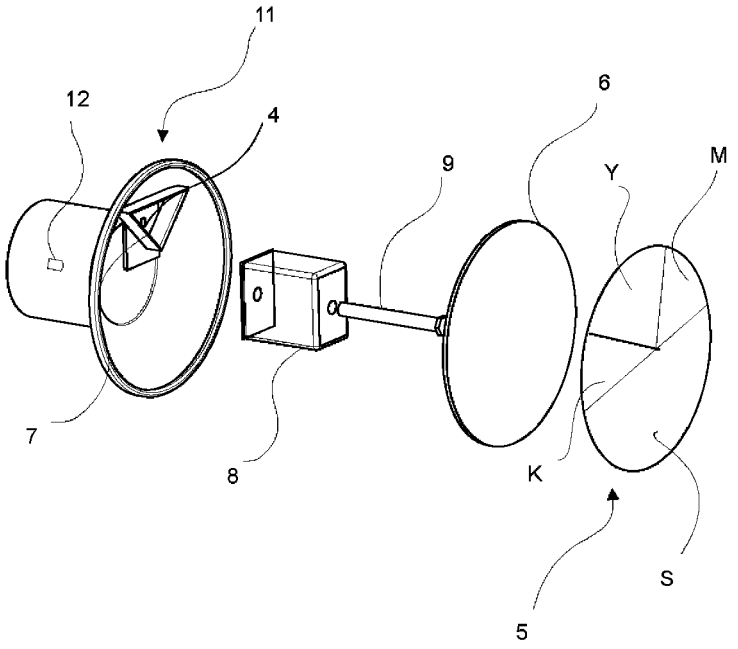
(54) A REFRIGERATOR COMPRISING AN ILLUMINATED CRISPER

(57) The present invention relates to a refrigerator (1) comprising a body (2); a crisper (3) which is disposed in the body (2) and wherein the vegetables and fruits are placed; at least one light source (4) which emits light into the crisper (3); and a glass (6) which is positioned so as to cover the light source (4) and which has at least two colors to simulate the sunlight, characterized by a shaft (9) which is connected to the glass (6) or the light source (4), a motor (8) which enables the shaft (9) to be moved, and a control unit (10) which enables the motor (8) to trigger the shaft (9) such that the light source (4) sweeps the colors on the glass (6) in an order predetermined by the producer.

Figure 3



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Description

[0001] The present invention relates to a refrigerator comprising an illuminated crisper which increases the vitamin values of the vegetables and fruits therein and which keeps the vegetables and fruits fresh.

[0002] Foodstuffs such as vegetables, fruits, etc. which are stored in refrigerators for a long time start to lose their freshness in the course of time. The researches show that some foodstuffs subjected to lights especially at certain wavelengths and in colors such as blue, orange, green, etc. can be stored and keep their colors for a longer time with increased vitamin values. It is observed that different types of vegetables and fruits in different colors remain fresh for a longer time under lights at different wavelengths. Therefore, in the state of the art refrigerators are developed, comprising crispers wherein light sources in different colors are simultaneously or synchronously operated to simulate color tones closest to the sunlight.

[0003] In the state of the art Patent Document No. AU2016344962B2, a refrigerator is disclosed, having a compartment wherein the sunlight is simulated as a result of the operational relation between the two light sources at two different wavelengths in different steps.

[0004] In the state of the art refrigerators comprising said illumination units and LED light sources in different colors, the sunlight transition is tried to be carried out by operating one or more than one light source in different colors in the crisper; however, the real sunlight transition cannot be achieved.

[0005] The aim of the present invention is the realization of a refrigerator comprising an illuminated crisper wherein the light transition is carried out as close as possible to the real sunlight cycle.

[0006] Another aim of the present invention is the realization of a refrigerator having a moving illumination module which is detachably attached to the crisper.

[0007] The refrigerator of the present invention comprises a crisper wherein the vegetables and fruits are placed, a housing which is provided on the walls in the crisper, and an illumination module having at least one claw which is detachably attached to the housing.

[0008] The illumination module is positioned in the crisper together with a motor, a shaft connected to the motor, at least one light source, a printed circuit board whereon preferably the light source is disposed, and a glass having at least two colors whereon the sunlight can be simulated.

[0009] The refrigerator of the present invention further comprises a control unit which enables the motor to trigger the shaft such that the light source sweeps the colors on the glass in an order predetermined by the producer.

[0010] According to the order predetermined by the producer, first the shades of blue are generated in order to simulate the sunlight in the morning hours, then the whitish shades of blue in order to simulate the bright white of the sun in the noon, then the color red to simulate the orangey sunlight in the afternoon hours, followed by the color black to simulate the night.

[0011] In a preferred embodiment of the present invention, the glass is circular or spherical and is attached to the illumination module so as to cover the part of the illumination module facing the crisper.

[0012] The illumination module is in the form of a bowl which is suitable to be positioned together with the motor, the light source, the shaft and the glass such that the light source is placed inside so as to be covered by the glass.

[0013] In an embodiment of the present invention, one half of the glass is coated with a black film and the other half with a colored film containing gradations in blue, red and green.

[0014] In another preferred embodiment of the present invention, one half of the glass surface is dyed with black masterbatch and the other half with blue, red and green masterbatch.

[0015] In an embodiment of the present invention, the shaft connected to the motor rotates the glass and the colored and black film layer thereon clockwise or counterclockwise, and thus the glass coated with the colored and black film rotates over the light source around the central point which is the point thereof in contact with the shaft and makes a full round. By moving the glass, the light source sweeps the day and night colors on the glass and simulates a normal sunlight cycle in the crisper.

[0016] In another embodiment of the present invention, the shaft connected to the motor triggers the light source, and the light source makes a circular movement by sweeping all the colors on the glass. Thus, the light source makes a circular sweeping movement with a diameter smaller than the diameter of the glass and simulates the day cycle.

[0017] In a preferred embodiment of the present invention, the light source is at least one white LED light.

[0018] In a preferred embodiment of the present invention, the illumination module comprises a barrier so as to partially surround the light source. Said barrier prevents the light leaks from the light source towards the parts other than the glass surfaces.

[0019] The refrigerator realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of the refrigerator of the present invention.

Figure 2 - is the sideways schematic view of the cross-section A-A in Figure 1.

Figure 3 - is the exploded schematic view of the illumination module, the motor, the light source and the glass in the refrigerator of the present invention.

[0020] The elements illustrated in the figures are numbered as follows:

1. Refrigerator

2. Body
3. Crisper
4. Light source
5. Film
6. Glass
7. Barrier
8. Motor
9. Shaft
10. Control unit
11. Illumination module
12. Claw
13. Housing

S. Black color
M. Blue color
Y. Green color
K. Red color

[0021] The refrigerator (1) comprises a body (2); a crisper (3) which is disposed in the body (2) and wherein the vegetables and fruits are placed; at least one light source (4) which emits light into the crisper (3); and a glass (6) which is positioned so as to cover the light source (4) and which has at least two colors to simulate the sunlight.

[0022] The refrigerator (1) of the present invention comprises a shaft (9) which is connected to the glass (6) or the light source (4), a motor (8) which enables the shaft (9) to be moved, and a control unit (10) which enables the motor (8) to trigger the shaft (9) such that the light source (4) sweeps the colors on the glass (6) in an order predetermined by the producer.

[0023] The refrigerator (1) of the present invention comprises the light source (4) which emits light into the crisper (3) and the glass (6) which has at least two colors thereon so as to cover the light source (4). The glass (6) or the light source (4) is connected to the shaft (9), and the motor (8) triggers the shaft (9). When the motor (8) triggers the shaft (9), the glass (6) or the light source (4) moves such that the light source (4) sweeps the colors on the glass (6) in the order predetermined by the producer. For example, when the shaft (9) triggers the glass (6), the glass (6) starts to rotate and the light source (4) sweeps the colors on the moving glass (6) in order. When the shaft (9) is connected to the light source (4) and the shaft (9) triggers the light source (4), the light source (4) makes a circular movement so as to sweep the colors on the glass (6) in order.

[0024] In an embodiment of the present invention, the refrigerator (1) comprises a control unit (10) which enables the glass (6) to be rotated over the light source (4) clockwise or counterclockwise or such that the light source (4) sweeps the colors on the glass (6) in an order so as to simulate the day cycle. Thus, when the glass (6) moves over the light source (4) or when the light source (4) is moved so as to sweep the colors on the glass (6), the colors on the glass (6) are swept so as to simulate the sunlight.

[0025] In an embodiment of the present invention, the refrigerator (1) comprises an illumination module (11) wherein the motor (8), the light source (4) and the glass (6) are mounted together; at least one claw (12) which is provided on the illumination module (11); and at least one housing (13) which receives the claw (12). Thus, the components which move in the crisper (3) so as to simulate the sunlight are placed into the crisper (3) together, and an illumination module (11) which is detachably attached to the crisper (3) is obtained.

[0026] In an embodiment of the present invention, the refrigerator (1) comprises a glass (6) which is circular and which is coated with a film (5) the half of which is black (S) and the other half red (K), blue (M) and green (Y), and the white LED light source (4). Thus, all the light hues in a day including the night are provided on the glass (6), and when the white LED light source (4) sweeps the colors on the film (5), the day cycle is simulated.

[0027] In an embodiment of the present invention, the refrigerator (1) comprises a control unit (10) which ensures that a full clockwise or counterclockwise round of the glass (6) over the light source (4) is 24 hours.

[0028] In an embodiment of the present invention, the refrigerator (1) comprises a control unit (10) which, upon the movement of the glass (6), stops the movement of the glass (6) for 12 hours when the glass (6) surface coated with the black (S) film (5) completely overlaps the light source (4) after the glass (6) surface coated with the colored film (5) completes its round over the light source (4). Thus, when the shaft (9) triggers and moves the glass (6) and the light source (4) sweeps the moving glass (6), no energy is spent to simulate the night (darkness) at the end of the 12-hour daylight step, and when the light source (4) and the glass (6) surface coated with the black (S) film (5) completely overlap, the motor (8) stops the shaft (9) and the glass (6). In this embodiment, after the 12-hour darkness cycle is completed following the stopping of the glass (6), the control unit (10) moves the glass (6) to the initial position with respect to the light source (4).

[0029] In an embodiment of the present invention, the refrigerator (1) comprises a control unit (10) which turns off the light source (4) after the light source (4) sweeps the glass (6) surface coated with the colored film (5) for 12 hours so as to simulate the daytime hours. Thus, energy saving is provided while simulating the darkness.

[0030] In an embodiment of the present invention, the refrigerator (1) comprises a barrier (7) which is positioned so as to partially surround the light source (4) in order to control the light leaks from between the glass (6) and the light source (4). Thus, all the light emitted by the light source (4) is directed towards the glass (6) and a more intense light is provided in the crisper (3).

[0031] By means of the present invention, a refrigerator (1) is realized, comprising a moving illumination module (11) which is detachably attached to the crisper (3), wherein the ideal sunlight is simulated.

Claims

1. A refrigerator (1) **comprising** a body (2); a crisper (3) which is disposed in the body (2) and wherein the vegetables and fruits are placed; at least one light source (4) which emits light into the crisper (3); and a glass (6) which is positioned so as to cover the light source (4) and which has at least two colors to simulate the sunlight, **characterized by** a shaft (9) which is connected to the glass (6) or the light source (4), a motor (8) which enables the shaft (9) to be moved, and a control unit (10) which enables the motor (8) to trigger the shaft (9) such that the light source (4) sweeps the colors on the glass (6) in an order predetermined by the producer.

2. A refrigerator (1) as in Claim 1, **characterized by** a control unit (10) which enables the glass (6) to be rotated over the light source (4) clockwise or counterclockwise or such that the light source (4) sweeps the colors on the glass (6) in an order so as to simulate the day cycle.

3. A refrigerator (1) as in Claim 1 or 2, **characterized by** an illumination module (11) wherein the motor (8), the light source (4) and the glass (6) are mounted together; at least one claw (12) which is provided on the illumination module (11); and at least one housing (13) which receives the claw (12).

4. A refrigerator (1) as in any one of the above claims, **characterized by** a glass (6) which is circular and which is coated with a film (5) the half of which is black (S) and the other half red (K), blue (M) and green (Y), and the white LED light source (4).

5. A refrigerator (1) as in any one of the above claims, **characterized by** a control unit (10) which ensures that a full clockwise or counterclockwise round of the glass (6) over the light source (4) is 24 hours.

6. A refrigerator (1) as Claim 4 or 5, **characterized by** a control unit (10) which, upon the movement of the glass (6), stops the movement of the glass (6) for 12 hours when the glass (6) surface coated with the black (S) film (5) completely overlaps the light source (4) after the glass (6) surface coated with the colored film (5) completes its round over the light source (4).

7. A refrigerator (1) as in Claim 4, **characterized by** a control unit (10) which turns off the light source (4) after the light source (4) sweeps the glass (6) surface coated with the colored film (5) for 12 hours so as to simulate the daytime hours.

8. A refrigerator (1) as in any one of the above claims, **characterized by** a barrier (7) which is positioned so as to partially surround the light source (4) in order to control the light leaks from between the glass (6) and the light source (4).

Figure 1

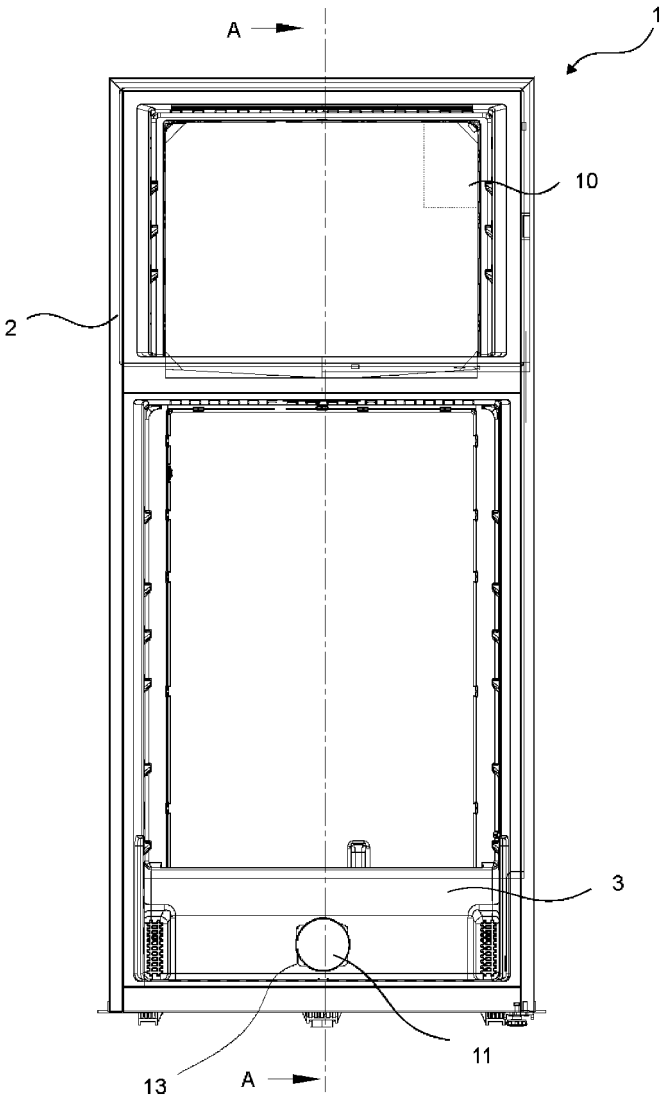


Figure 2

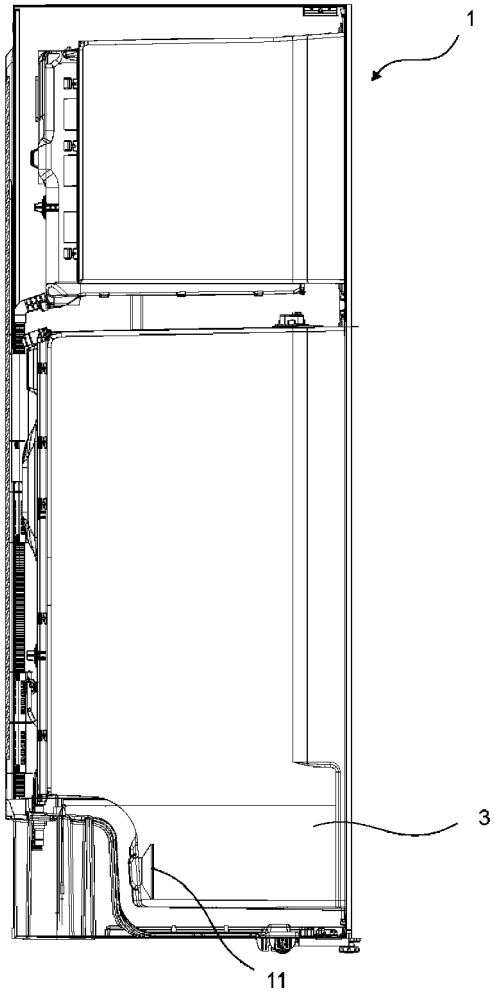
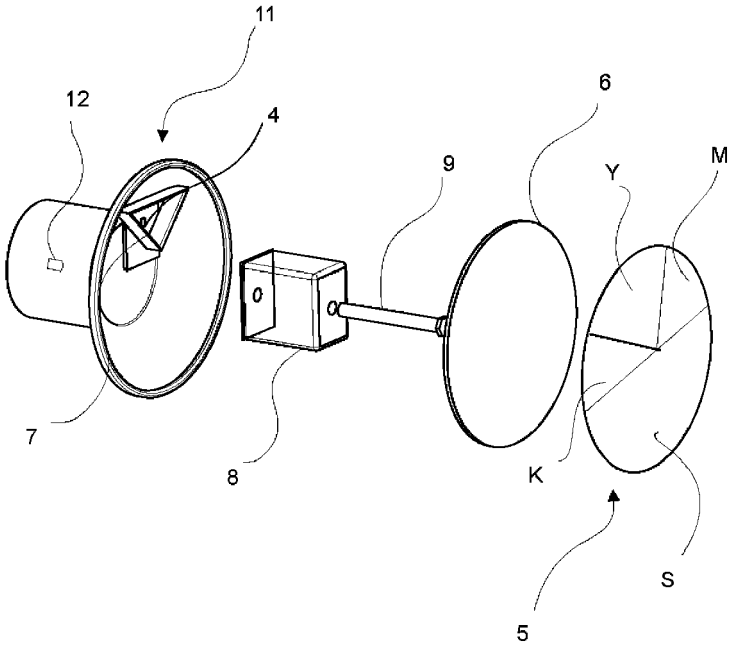


Figure 3



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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 5718

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 September 2021	Canköy, Necdet

CATEGORY OF CITED DOCUMENTS

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REFERENCES CITED IN THE DESCRIPTION

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