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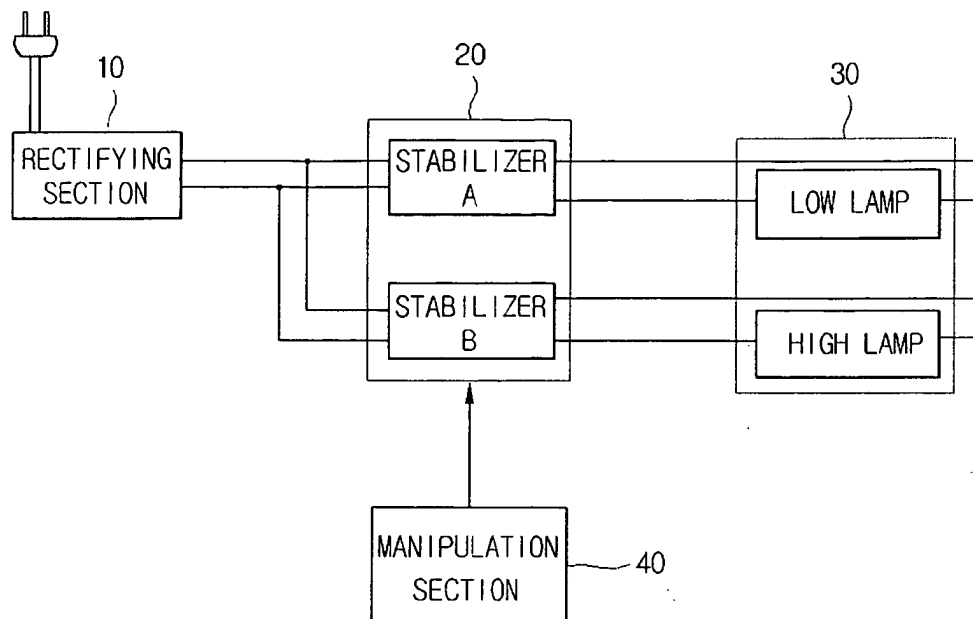
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(54) **Lighting device capable of adjusting brightness and color of light**

(57) Lighting device that can diversely adjust brightness and color of the light in accordance with a user's taste. The lighting device includes an external power supply, a rectifying section (10), a stabilizing section (20), and an adjustment section for lighting at least two lamps having different color temperature in the range of about 1600-2700°K and 5000-10000°K respectively, so that color and brightness of the emitted light are adjusted by manipulation of the adjustment section. The two

lamps are tubes having multiwaves by mixing three or more fluorescent powders to change the brightness and the color. The tubes represent a tube section (30). The lighting device further includes a manipulation section (40) composed of a display for displaying an adjustment state of the brightness and the color of the light within a predetermined range, and an adjustment switch for adjusting the brightness and the color within the predetermined range.

FIG. 1



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a lighting lamp capable of adjusting brightness and color of light, and more particularly, to a lighting lamp that can diversely adjust brightness and color of light in combination in accordance with a user's taste or a used state of the lamp.

Description of the Related Art

[0002] Generally, a lighting lamp used in the home or office is monochromatic and has a constant brightness or color temperature.

[0003] Recently, with the development of industry, an economic three-wave (i.e., RGB) lamp, which has an environmental affinity, can provide light almost identical to a natural light, and can be used for a long time period with a low power consumption. has been developed, and its use has been increasing gradually.

[0004] However, even in case of the three-wave lamp, there exists no lighting lamp whose brightness of light can be adjusted in accordance with a place where the lamp is used or the color of light to match the user's taste.

[0005] For instance, the users' tastes in color and brightness of light are slightly different from one another. On the assumption that the proper brightness in the morning, afternoon, and evening are 4000K, 6000K, and 3000K, respectively, it is necessary to automatically or manually adjust the brightness of the lighting lamp, but the conventional lighting lamp cannot realize such adjustment.

[0006] To solve the above-described problem, United States Patent No. 5,384, 519 discloses a method of mixing respective colors in the lighting lamp, which forms respective single-wave tubes by applying three color elements of red (R), green (G), and blue (B) and a white color (W), and adjusts a desired brightness and color of light by adjusting outputs of tubes of R, G, B, and W.

[0007] This type of adjustment, which applies the most classic and commonsense light-mixing principle, got used in television receivers (TVs) from about 50 years ago.

[0008] Specifically, since picture cells used in a color TV have a size of about 0.5m/m² or less, a user who is 4~5 meters distant from the TV can see the mixed color. However, in case of a large-sized electric sign standing on a gymnasium or street, the cell size of the sign is about 10m/m², and thus only a user who is over 100 meters apart from the sign can see the somewhat mixed color.

[0009] Many attempts to use the above-described method of mixing colors of a lighting lamp in an interior illumination field have been made, but unfortunately

they have turned out fruitless because lights are not mixed well.

[0010] At present, in order for a human being to see the mixed color and light from single-wave tubes for R, G, B, and W with a size of the currently used incandescent or fluorescent lamp grade, he/she should be about thousands of meters apart from the lamp. and thus it is almost impossible to use the above-described technique for the lighting lamp.

SUMMARY OF THE INVENTION

[0011] Accordingly, the present invention is directed to a lighting lamp capable of adjusting brightness and color of light that substantially obviates one or more problems due to limitations and disadvantages of the related art.

[0012] It is an object of the present invention to provide a lighting lamp that enables a user to freely adjust the brightness and color of light of the lighting lamp in combination in accordance with a used state and purpose of the lamp or an environment and taste of the user.

[0013] To achieve the above object, there is provided a lighting lamp including two or more lamps having different luminous colors, an external power supply, a rectifying section, a stabilizing section, and an adjustment section for lighting the respective lamps, so that color and brightness of a light source are adjusted by manipulation of the adjustment section, the lighting lamp comprising a lamp section composed of a pair of different color temperature tubes having multiwaves by mixing three or more fluorescent powders to change the brightness and the color. one of the color temperature tubes having a Kelvin temperature in the range of about 1,600~2,700 °K and the other of the color temperature tubes having a Kelvin temperature in the range of about 5,000~10,000 °K, and a manipulation section composed of a display for displaying an adjustment state of the brightness and the color of the lamp within a predetermined range, and an adjustment switch for adjusting the brightness and the color within the predetermined range.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The above object and other features of the present invention will become more apparent by describing the preferred embodiment thereof with reference to the accompanying drawings, in which:

FIG. 1 is a schematic block diagram illustrating the construction of a lighting lamp capable of adjusting brightness and color according to the present invention.

FIG. 2 is a view illustrating the range where the brightness and the color are adjustable according to the present invention.

FIGs. 3A and 3B are views illustrating the used state

of the lighting lamp according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] FIG. 1 is a schematic block diagram illustrating the construction of a lighting lamp capable of adjusting brightness and color according to the present invention.

[0016] Referring to FIG. 1, the lighting lamp according to the present invention includes a pair of different color temperature tubes having multiwaves by mixing three (for example, R, G, and B) or more fluorescent powders to change the brightness and the color. One of the color temperature tubes has a Kelvin temperature in the range of about 1,600~2,700 °K. and the other of the color temperature tubes has a Kelvin temperature in the range of about 5,000~10,000 °K. The different color temperature tubes (or a lamp section) 30 operate by an external power supply AC, and the power supply is connected to provide a bias power supply to a rectifying section 10, a stabilizing section 20, and an adjustment section 40.

[0017] Meanwhile, the lighting lamp capable of adjusting brightness and color may be constructed as follows in accordance with its installation state. Stabilizers in the stabilizing section 20, which are connected to the tubes 30 having the different Kelvin temperatures, respectively, are also connected to the manipulation section 40 for controlling outputs of the stabilizing section 20 as shown in the drawing. The respective stabilizers may be controlled individually or in combination, or may have diverse types in accordance with an automatic operation in a predetermined manipulation range or a manual operation.

[0018] For instance, in case of applying the lighting lamp to a desk lamp widely used, the color and the brightness of the lamp can be adjusted to be most suitable for study in addition to the basic turn-on/off operation of the lamp by manipulation of a plurality of buttons for adjusting the brightness and the color.

[0019] Specifically, as shown in FIGS. 2 and 3, the manipulation section 40 for adjusting the brightness and the color of the lighting lamp is provided with a display section 42 and a plurality of adjustment buttons. The buttons are for adjusting the brightness and the color of the lamps 30, for example, for adjusting the color of the light to a high color temperature (i.e., the color of the sunrise) or to a low color temperature (i.e., the color of the sunset), and/or adjusting the brightness of the light to a bright light or a dark light. The display section 42 includes light-emitting diodes (LEDs) for indicating the adjustment grade of the brightness and the color on X/Y axes as shown in FIG. 2.

[0020] The manipulation section 40 enables the adjustment within the predetermined brightness and color ranges. For instance, in a high color temperature region, it makes an alpha wave (in the range of 8~ 12Hz) be

generated, while in a low color temperature region, it makes a theta wave (in the range of 4~7Hz) be produced. Also, in a bright region, it makes a beta wave (in the range of 13~30Hz) be produced, while in a dark region, it makes a delta wave (in the range of 1~3Hz) be produced. In consequence, it heightens the brightness and the color of the lamp during the study that requires a logical thinking (See FIG. 3A), while it lowers the brightness and the color of the lamp during the study that requires an emotional thinking, thereby improving the efficiency of the study (See FIG. 3B).

[0021] The adjustment buttons in the manipulation section for adjusting the brightness and the color of the lighting lamp may have diverse forms such as slide switches, joysticks, etc.

[0022] The lighting lamp can produce optimum illumination effects by diversely adjusting the brightness and the color of light in accordance with the purpose of use of general desk lamps, lighting fixtures, exhibition lamps, etc.

[0023] As described above, the present invention has the advantage that it can automatically or manually adjust brightness and color of light in accordance with a used state and purpose of a lighting lamp by employing different color temperature tubes mixed with three or more fluorescent powders to change the brightness and the color of the lamp.

[0024] While the present invention has been described and illustrated therein with reference to the preferred embodiment thereof, it will be understood by those skilled in the art that the forgoing embodiment is merely exemplary, and various changes in form and details may be made therein without departing from the spirit and scope of the invention.

Claims

1. A lighting lamp including two or more lamps having different luminous colors, an external power supply, a rectifying section, a stabilizing section, and an adjustment section for lighting the respective lamps, so that color and brightness of a light source are adjusted by manipulation of the adjustment section, the lighting lamp comprising:

a lamp section composed of a pair of different color temperature tubes having multiwaves by mixing three or more fluorescent powders to change the brightness and the color, one of the color temperature tubes having a Kelvin temperature in the range of about 1,600~2,700 °K and the other of the color temperature tubes having a Kelvin temperature in the range of about 5,000~10,000 °K; and
a manipulation section composed of a display for displaying an adjustment state of the brightness and the color of the lamp within a prede-

terminated range, and an adjustment switch for adjusting the brightness and the color within the predetermined range.

2. The lighting lamp as claimed in claim 1, wherein the adjustment section is predetermined to have regions of an alpha wave, a theta wave, a beta wave, and a delta wave according as the brightness and the color are heightened or lowered within a predetermined range.

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FIG. 1

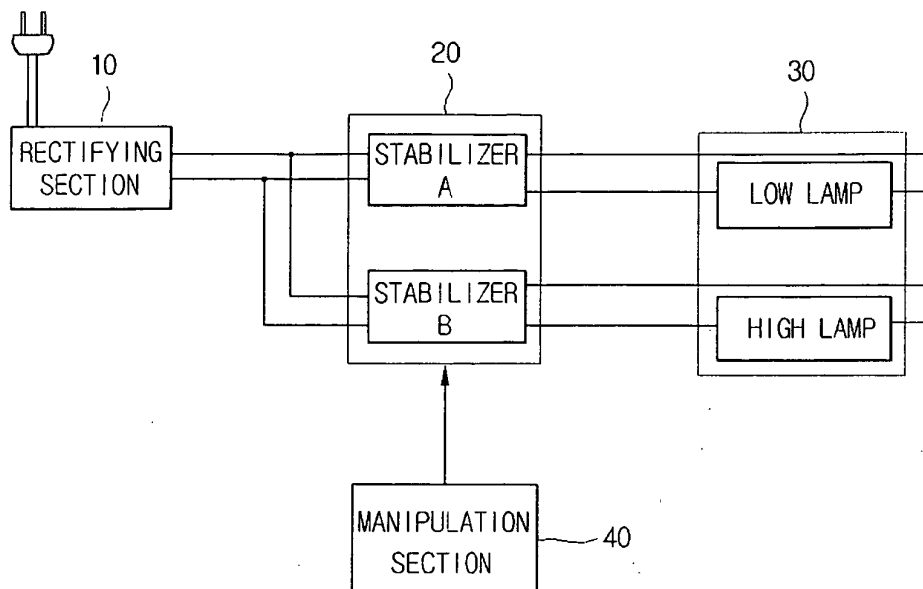


FIG. 2

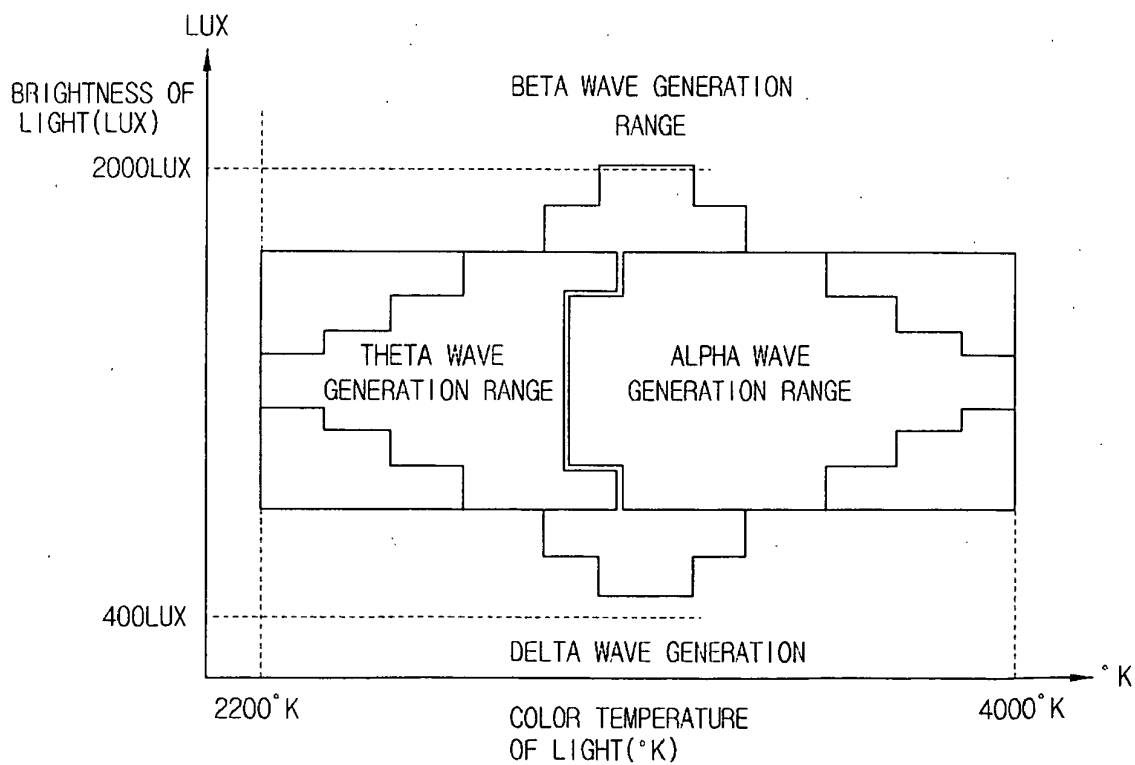
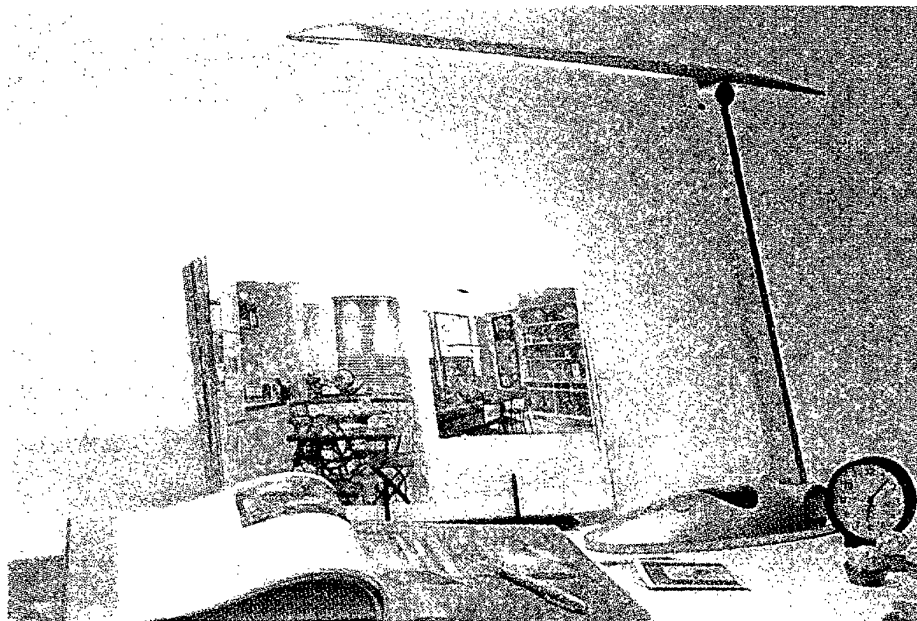


Fig. 3a



Fig. 3b





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 01 5139

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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Y	DAVIS R G ET AL: "CORRELATED COLOR TEMPERATURE, ILLUMINANCE LEVEL, AND THE KRUITHOF CURVE" JOURNAL OF THE ILLUMINATING ENGINEERING SOCIETY, ILLUMINATING ENGINEERING SOCIETY. NEW YORK, US, vol. 19, no. 1, 21 December 1990 (1990-12-21), pages 27-38, XP001057457 ISSN: 0099-4480 * page 27 - page 29; figure 1 *	1,2	
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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 16 October 2002	Examiner Burchielli, M
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	

EPO FORM 1503 03.82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 01 5139

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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