Patent Right	Date	October 6, 2021	Court	Intellectual Property High Court, Third Division
	Case number	2020 (Gyo-Ke) 10103		
- A case in which the court ruled that, concerning whether a person skilled in the art could have easily conceived of the invention by applying the secondary prior art to the primary prior art, if the technology fields of the primary prior art and the secondary prior art cannot be said to be completely consistent but are only closely related, there must be a reasonable motivation for adopting the secondary prior art for the primary prior art; and then, the court ruled that the Japan Patent Office (JPO) erred in finding problems of the primary prior art and that it is not found that the primary prior art shares problems with the secondary prior art and a motivation for adopting the latter for the former cannot be found; and the court determined that there was an error in the decision of the JPO to the effect that a person skilled in the art could have easily conceived of the invention by applying the secondary prior art to the primary prior art.				

Case type: Rescission of Trial Decision of Invalidation
Result: Granted
References: Article 29, paragraph (2) and Article 123, paragraph (1), item (ii) of the Patent Act
Related rights, etc.: Patent No. 5608827. Invalidation Trial No. 2019-800025

Summary of the Judgment

1. The Plaintiff is the patent holder of the patent (Patent No. 5608827; filed on January 27, 2014; establishment of registration on September 5, 2014; Number of claims: 2; hereinafter referred to as the "Patent") related to an invention titled "Multicolor penlight." The Defendant requested a trial for invalidation of the Patent (Invalidation Trial No. 2019-800025) and the Plaintiff requested correction of Claims 1 and 2. The JPO approved the correction and made the decision to invalidate the patents for the inventions related to Claims 1 and 2. Therefore, the Plaintiff filed this lawsuit to seek rescission of this decision of the JPO (the "JPO Decision").
2. In this judgment, the court stated as follows: in the determination on inventive steps, secondary prior art or well-known technical matters corresponding to differences between the invention related to claims and the primary prior art are necessary, and the presence of a motivation or the suggestion to apply the secondary prior art or well-known technical matters to the primary prior art is necessary. For this purpose, first,

there must be a relationship in the technology fields between the primary prior art and the secondary prior art or well-known technical matters. In cases where the technology fields of the primary prior art and the secondary prior art or well-known technical matters are not completely consistent, but are only closely related, since the relationship between the technology fields is relatively weak, it cannot be immediately said that it is easy to adopt the secondary prior art or well-known technical matters for the primary prior art. In order to say that it is easy, there must be reasonable motivation for adopting the secondary prior art or well-known technical matters for the primary prior art.

Then, in this judgment, the court determined as follows: the JPO erred in finding the problem of the Exhibit Ko 1 Invention which serves as a basis for the motivation for adopting the technical matters stated in Exhibit Ko 2 (the secondary prior art) for Exhibit Ko 1 Invention (the primary prior art); in addition, in consideration of the details of the technical matters stated in Exhibit Ko 2 and the relationship of technology fields between Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2, it is not found that Exhibit Ko 1 Invention shares the problem with the technical matters stated in Exhibit Ko 2 and, for this reason, it is not found that there is the motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention; therefore, it is not found that a person skilled in the art could have easily conceived of the configuration of Invention 1 related to the difference between Invention 1 stated in Claim 1 and Exhibit Ko 1 Invention by adopting the technical matters stated in Exhibit Ko 2 and well-known problem for Exhibit Ko 1 Invention; and there is an error in the determination of the JPO Decision to the effect that a person skilled in the art could have easily conceived of the configuration of Invention 1.

Judgment rendered on October 6, 2021
2020 (Gyo-Ke) 10103, Case of seeking rescission of the JPO decision
Date of conclusion of oral argument: July 26, 2021

Judgment

Plaintiff: TurnON co., ltd.

Defendant: Ruifan Japan Ltd.

Main text

1. The decision made by the Japan Patent Office (JPO) on July 28, 2020, concerning Invalidation Trial No. 2019-800025, shall be rescinded.
2. The Defendant shall bear the court costs.

Facts and reasons

No. 1 Claim

Same as the main text.

No. 2 Outline of the case

1. Outline of procedures at the JPO

(1) The Plaintiff is a patent holder of the patent (Patent No. 5608827; filed on January 27, 2014; establishment of registration on September 5, 2014; Number of claims: 2; hereinafter referred to as the "Patent") related to an invention titled "Multicolor penlight" (Exhibit Ko 25).

(2) The Defendant filed a request for a trial for invalidation of the Patent with the JPO on March 19, 2019, and the JPO examined it as Invalidation Trial No. 2019-800025 (hereinafter referred to as the "Invalidation Trial").

The Plaintiff requested correction of Claims 1 and 2 based on the written request for correction dated March 23, 2020.

The JPO rendered a trial decision on July 28, 2020 with the following conclusion: "Correction of the claims of Patent No. 5608827 to Claims [1, 2] after correction as stated in the claims attached to the written request for correction shall be approved. The patents for the inventions related to Claims 1 and 2 of Patent No. 5608827 shall be invalidated. The demandee shall bear the trial costs." (hereinafter this decision is

referred to as the "JPO Decision"; the JPO Decision is as indicated in the Attachment, Trial Decision (copy)) and a certified copy was delivered to the Plaintiff on August 6, 2020 (hereinafter the correction approved by the JPO Decision is referred to as the "Correction").

(3) The Plaintiff filed this lawsuit to seek rescission of the JPO Decision on September 4, 2020.

2. Statement of the claims

The statements of Claims 1 and 2 after the Correction are as shown below (hereinafter the invention stated in Claim 1 after the Correction is referred to as "Invention 1"; the invention stated in Claim 2 after the Correction is referred to as "Invention 2"; and Invention 1 and Invention 2 are correctively referred to as the "Invention").

(1) Claim 1

A multicolor penlight characterized as follows:

where it consists of a light emitting unit covered with a cover for illuminating emission colors and a grip unit,

where the aforementioned grip unit consists of

a light source comprised of a red light-emitting diode, a green light-emitting diode, a blue light-emitting diode, a yellow light-emitting diode and a white light-emitting diode and

a control means to singly control the light emission of each light-emitting diode of the light source;

where the grip is configured to obtain a specific emission color by activating any single light emitting diode or multiple light emitting diodes using the aforementioned control means;

where more than one of the aforementioned specific emission colors can be obtained,

where the aforementioned number of specific light emission colors greater than one include at least an emission color obtained from light singly emitted from the white light-emitting diode, an emission color obtained by mixing the aforementioned light emitted from the white light-emitting diode and light emitted from one or two of the other light-emitting diodes, an emission color obtained from light singly emitted from the yellow light-emitting diode, or an emission color obtained by mixing the aforementioned light emitted from the yellow light-emitting diode and light emitted from one or two of the other light-emitting diodes;

where the aforementioned emission colors obtained from the white light-emitting diode are a white emission color obtained through single emission of the white light-

emitting diode, and an emission color obtained by mixing light emitted from the white light-emitting diode and light emitted from one or two of the other light-emitting diodes;

where the aforementioned emission colors obtained from the yellow light-emitting diode are a yellow light emission color obtained through single emission of the yellow light-emitting diode, and an emission color obtained by mixing light emitted from the yellow light-emitting diode and light emitted from one or two of the other light-emitting diodes;

where an emission color auxiliary means for condensing light emitted from each of the aforementioned light-emitting diodes, mixing their colors, and illuminating the sides and entire top of the cover with the obtained emission color is installed near the aforementioned light source in order to cover the light source;

and where a dry cell or a button cell is used as a power source.

(2) Claim 2

The multicolor penlight stated in Claim 1, wherein the aforementioned light source has light-emitting diodes of colors other than the aforementioned light-emitting diodes.

3. Summary of the JPO Decision

(1) Reason for invalidation

In the Invalidation Trial, the Defendant alleged the following reasons for invalidation (No. 4, 1. (1) through (4) of the JPO Decision [pages 7 and 8 of the JPO Decision]).

A. Grounds for Invalidation 1

Invention 1 could have been made by a person skilled in the art based on the invention stated in Exhibit Ko 1 and technical matters stated in Exhibits Ko 2 through 20, and therefore, a patent cannot be granted to Invention 1 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act and the patent falls under Article 123, paragraph (1), item (ii) of said Act and should be invalidated.

B. Grounds for Invalidation 2

Invention 1 could have been made by a person skilled in the art based on the invention stated in Exhibit Ko 1 or the invention stated in Exhibit Ko 1 and technical matters stated in Exhibits Ko 21 and 22, and therefore, a patent cannot be granted to Invention 1 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act and the patent falls under Article 123, paragraph (1), item (ii) of said Act and should be invalidated.

C. Grounds for Invalidation 3

Invention 2 could have been made by persons skilled in the art based on the

invention stated in Exhibit Ko 1 and technical matters stated in Exhibits Ko 2 through 20, and therefore, a patent cannot be granted to Invention 2 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act and the patent falls under Article 123, paragraph (1), item (ii) of said Act and should be invalidated.

D. Grounds for Invalidation 4

Invention 2 could have been made by a person skilled in the art based on the invention stated in Exhibit Ko 1 or the invention stated in Exhibit Ko 1 and technical matters stated in Exhibits Ko 21 and 22, and therefore, a patent cannot be granted to Invention 2 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act and the patent falls under Article 123, paragraph (1), item (ii) of said Act and should be invalidated.

(2) Findings of the prior arts and comparison with the Invention

A. Exhibit Ko 1 Invention

The invention stated in Exhibit Ko 1 that is found by the JPO Decision (hereinafter referred to as "Exhibit Ko 1 Invention") is as described below (No. 6, 1. (1) C of the JPO Decision [pages 25 and 26 of the JPO Decision]).

A button cell-type penlight consisting of:

a cylinder producing colors and a grip, where the cylinder is attached to the grip;

where the grip consists of

a light source equipped with four LEDs with White color in addition to three primary colors, R (Red), G (Green), and B (Blue) and

a push switch, which turns lights on and off if it is held down and which changes emission colors whenever it is pressed in order from red, dark red, blue, light blue, aqua blue, yellow, light yellow, orange, green, light green, emerald green, pink, peach, cherry pink, violet, lavender purple, and white and then starts again from red, and which is placed on the side surface of the grip; where all colors including R (Red), G (Green), B (Blue) and White turn on for white color, and the White LED turns on for light blue, aqua blue, light yellow, light green, emerald green, peach, and cherry pink;

when mixing emission colors, in cases of producing red color, green color, or blue color, at least the R (Red) LED, G (Green) LED, or B (Blue) LED is lit brighter than the other three LEDs, respectively; and in cases of producing white color, all four LEDs are lit;

where the penlight is configured so that it condenses four LED lights, mixes their colors, and covers the light source with a lens and diffusion sheet;

and where a button cell is used as a power source.

B. Comparison between Invention 1 and Exhibit Ko 1 Invention

The common features and differences between Invention 1 and Exhibit Ko 1 Invention found by the JPO Decision are as described below (No. 6, 2., 2-1, (1) of the JPO Decision [pages 45 and 46 of the JPO Decision]).

(A) Common features

A multicolor penlight consisting of:

a light emitting unit covered with a cover for illuminating emission colors and a grip unit,

where the aforementioned grip unit consists of

a light source comprised of a red light-emitting diode, a green light-emitting diode, a blue light-emitting diode and a white light-emitting diode and

a control means to singly control the light emission of each light-emitting diode of the light source;

where the grip is configured to obtain a specific emission color by activating any single or multiple light emitting diodes using the aforementioned control means;

where more than one of the aforementioned specific emission colors can be obtained,

where the aforementioned multiple light emission colors include at least an emission color obtained by mixing light emitted from the white light-emitting diode and light emitted from one or two of the other light-emitting diodes;

where the emission colors obtained from the white light-emitting diode are emission colors obtained by mixing light emitted from the white light-emitting diode and light emitted from one or two of the other light-emitting diodes;

where an emission color auxiliary means for condensing light emitted from each of the light-emitting diodes, mixing their colors, and illuminating the cover with the obtained emission color is installed near the light source in order to cover the light source;

and where a dry cell or a button cell is used as a power source.

(B) Difference 1

Invention 1 is composed as follows: it consists of "a red light-emitting diode, a green light-emitting diode, a blue light-emitting diode, a yellow light-emitting diode and a white light-emitting diode"; "includes at least all of the following: an emission color obtained from light singly emitted from the white light-emitting diode, an emission color obtained by mixing light emitted from the white light-emitting diode and light emitted from one or two of the other light-emitting diodes, an emission color obtained from light singly emitted from the yellow light-emitting diode, or an emission color obtained by mixing light emitted from the yellow light-emitting diode and light emitted from one or two of the other light-emitting diodes"; and "where the emission

colors obtained from the white light-emitting diode are a white emission color obtained through single emission of the white light-emitting diode and an emission color obtained by mixing light emitted from the white light-emitting diode and light emitted from one or two of the other light-emitting diodes and the emission colors obtained from the yellow light-emitting diode are a yellow light emission color obtained through single emission of the yellow light-emitting diode and an emission color obtained by mixing light emitted from the yellow light-emitting diode and light emitted from one or two of the other light-emitting diodes."

On the other hand, Exhibit Ko 1 Invention is composed as follows: it is "equipped with four LEDs with White color in addition to three primary colors, R (Red), G (Green), and B (Blue)"; "changes emission colors whenever it is pressed in order from red, dark red, blue, light blue, aqua blue, yellow, light yellow, orange, green, light green, emerald green, pink, peach, cherry pink, violet, lavender purple, and white"; "all colors including R (Red), G (Green), B (Blue) and White turn on for white color, and the White LED turns on for light blue, aqua blue, light yellow, light green, emerald green, peach, and cherry pink, and when emission colors are mixed, in cases of emitting at least red color, R (Red) LED lights brighter than other colors of LED, in cases of emitting green color, G (Green) LED, and in cases of emitting blue color, B (Blue) LED as well; and in cases of producing red color, green color, or blue color, at least the R (Red) LED, G (Green) LED, or B (Blue) LED is lit brighter than the other three LEDs, respectively; and in cases of producing white color, all four LEDs are lit."

(C) Difference 2

Invention 1 constitutes the emission color auxiliary means for illuminating the cover to illuminate "the sides and entire top" of the cover, while Exhibit Ko 1 Invention has not specified it in that way.

C. Comparison between Invention 2 and Exhibit Ko 1 Invention

The common features and differences between Invention 2 and Exhibit Ko 1 Invention found by the JPO Decision are as described below (No. 6, 2., 2-3, (1) of the JPO Decision [pages 58 and 59 of the JPO Decision]).

Invention 2 includes all particulars for identifying the invention of Invention 1 and identifies the invention by adding other particulars for identifying the invention. When comparing Invention 2 and Exhibit Ko 1 Invention, it can be seen that both inventions share the common features stated in B. (A) above and they are different in Difference 1 stated in B. (B) above, Difference 2 stated in B. (C) above, and in Difference 3 below.

Difference 3

Concerning the light source unit, in Invention 2, "the light source has light-emitting

diodes of colors other than the aforementioned light-emitting diodes"; however, in Exhibit Ko 1 Invention, "a light source is equipped with four LEDs with White color in addition to three primary colors, R (Red), G (Green), and B (Blue)."

(3) Summary of the grounds for the JPO Decision

A. Grounds for Invalidation 1

Invention 1 could have been made by a person skilled in the art based on Exhibit Ko 1 Invention, technical matters stated in Exhibit Ko 2, and the well-known problem (Exhibit Ko 10), and therefore, a patent cannot be granted to Invention 1 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act (No. 6, 2., 2-1, (3) of the JPO Decision [page 52 of the JPO Decision]).

B. Grounds for Invalidation 2

Invention 1 could have been made by a person skilled in the art based on Exhibit Ko 1 Invention, or based on Exhibit Ko 1 Invention and technical matters stated in Exhibits Ko 21 and 22, and therefore, a patent cannot be granted to Invention 1 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act (No. 6, 2., 2-2, (3) of the JPO Decision [page 58 of the JPO Decision]).

C. Grounds for Invalidation 3

Invention 2 could have been made by a person skilled in the art based on Exhibit Ko 1 Invention, technical matters stated in Exhibit Ko 2, and the well-known problem (Exhibit Ko 10), and therefore, a patent cannot be granted to Invention 2 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act (No. 6, 2., 2-3, (4) of the JPO Decision [page 60 of the JPO Decision]).

D. Grounds for Invalidation 4

Invention 2 could have been made by a person skilled in the art based on Exhibit Ko 1 Invention, or based on the Exhibit Ko 1 Invention and technical matters stated in Exhibits Ko 21 and 22, and therefore, a patent cannot be granted to Invention 2 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act (No. 6, 2., 2-4, (3) of the JPO Decision [page 62 of the JPO Decision]).

4. Grounds for rescission alleged by the Plaintiff

(1) Grounds for Rescission 1

Error in the determination of Difference 1 concerning Grounds for Invalidation 1 (related to Grounds for Invalidation 1)

(2) Grounds for Rescission 2

Ineligibility as cited documents for Exhibit Ko 1 and ineligibility as primary prior art for Exhibit Ko 1 Invention (related to Grounds for Invalidation 1 and 2)

(3) Grounds for Rescission 3

Error in findings in differences between Exhibit Ko 1 Invention and Invention 1 (related to Grounds for Invalidation 1 and 2)

(4) Grounds for Rescission 4

Error in the determination of Difference 2 concerning Grounds for Invalidation 1 (related to Grounds for Invalidation 1)

(5) Grounds for Rescission 5

Error in the determination of Grounds for Invalidation 2 (related to Grounds for Invalidation 2)

(6) Grounds for Rescission 6

Error in the determination of Grounds for Invalidation 3 and 4 (related to Grounds for Invalidation 3 and 4)

(omitted)

No. 4 Judgment of this court

1. Grounds for Rescission 1 (Error in the determination of Difference 1 concerning Grounds for Invalidation 1 (related to Grounds for Invalidation 1))

(1) Technical matters stated in Exhibit Ko 2

Concerning Difference 1, whether the configuration of Invention 1 related to Difference 1 could have been easily conceived of by a person skilled in the art by adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention becomes an issue, and therefore, the technical matters stated in Exhibit Ko 2 are examined below.

A. Matters stated in Exhibit Ko 2

Exhibit Ko 2 includes the statements as shown in Attachment 1.

B. Technical matters stated in Exhibit Ko 2

According to the statements of Attachment 1, it is found that the following technical matters are stated in Exhibit Ko 2. No. 6, 2., 2-1, (2), (2-1), B, (A), a. of the JPO Decision [page 49 of the JPO Decision] states publicly-known technical matters where an LED lighting device is comprised of white and yellow light-emitting diodes in addition to three primary colors, R (Red), G (Green), and B (Blue) as details of the abbreviated "technical matters stated in Exhibit Ko 2" ((3), B, (A) below). The technical matters stated in Exhibit Ko 2 that were found by the JPO Decision include the aforementioned matters stated in the JPO Decision, but not limited thereto, as stated below.

Exhibit Ko 2 is related to an LED lighting device using a card-type LED

illumination light source on which multiple LEDs are mounted and a card-type LED illumination light source that is preferably used with this LED lighting device (paragraph [0001]). LEDs have the important advantage of having a longer lifespan than incandescent light bulbs, fluorescent lamps, high-pressure discharge lamps, and other lamps. However, since a single LED element has a small luminous flux, it is necessary to compose an LED illumination light source by arranging multiple LED elements to obtain the same level of luminous flux as incandescent light bulbs and fluorescent lamps (paragraph [0002]). However, there are the following problems: if a current larger than a current for regular use other than illumination flows in each LED bare chip 22 in order to increase the luminous flux of each LED bare chip as much as possible, the calorific value generated from LED bare chips increases, the temperature of LED bare chip 22 (bare chip temperature) rises to the high level, which has a significant effect on the lifespan of the LED bare chips; and when the bare chip temperature increases with an increase in the calorific value, the light emission efficiency of the LED bare chips also decreases (paragraphs [0011] through [0013]). For these reasons, the LED lighting device stated in Exhibit Ko 2 and its card-type LED illumination light source are found as follows: LED bare chips with a light emitting unit on their element substrate are installed on a heat radiation substrate; the peripheral part of the light emitting surface of the element substrate of the LED bare chips is formed as an inclined surface having a lower height than the central part (paragraph [0022]); the light source unit of the lighting device is constituted by a detachable card-shape structure, and the effect of smoothly radiating the heat generated in each LED is enhanced; and by making it possible to replace only light sources whose lifespan has expired with new light sources, the structure other than the light source of the LED lighting device can be used for a long period of time (paragraph [0059]).

It is found to be stated as Embodiment 1 of Exhibit Ko 2 that LEDs mounted on the card-type LED illumination light source 10 may be replaced with those for low correlated color temperature or high correlated color temperature, or those with individual light colors, such as blue, red, green, yellow, etc. (paragraph [0080]); a light source with a low color rendering property but with high efficiency is feasible in cases of a 2-wavelength type using two types of light colors and it is preferable to adopt a combination of red and blue-green (green) light emission when the correlated color temperature is low and a combination of blue and yellow (orange) light emission when the correlated color temperature is high; it is preferable to adopt a combination of blue, blue-green (green), and red light emission in cases of a 3-wavelength type using three types of light colors and to adopt a combination of blue, blue-green (green), yellow

(orange), and red light emission in cases of a 4-wavelength type using four types of light colors; and in particular, in cases of a 4-wavelength type, a light source with a high color rendering where the average color rendering index exceeds 90 can be realized (paragraph [0081]).

In addition, it is found to be stated as Embodiment 2 of the Exhibit Ko 2 that a white card-type LED illumination light source is preferably used for the lighting device shown in Figure 3 (paragraph [0089]), in which four types of LED elements, including LED bare chips emitting blue color light, LED bare chips emitting red color light, LED bare chips emitting green color light, or LED bare chips emitting yellow color light, are arranged in a mixed manner, and white light and light with variable colors are provided by controlling the light distribution of those color emitting lights (paragraph [0125])).

Furthermore, it is found to be stated as Embodiment 3 of Exhibit Ko 2 that in the case of installing the same number of anode and cathode electrodes for constant current driving, it is possible to install 6 pieces (3 routes) of backup terminals after assigning feed electrodes to blue, green (blue-green), yellow (orange), red, and white, respectively (paragraph [0189])

On the other hand, although there are statements that a card-type LED light source and LED lighting device stated in Exhibit Ko 2 are used to singly drive blue, green (blue-green), yellow (orange), red, and white LEDs for illumination (paragraph [0065]) and that a feed electrode is assigned respectively as mentioned above (paragraph [0189]), there are no statements in paragraphs [0065] and [0189] concerning whether the light source equipped with five color LEDs provides white light or light with variable colors and it is not clearly stated either that each color LED is made to emit light singly.

C. Definition of color rendering property

(A) The term "color rendering property" is used in paragraph [0081] of Exhibit Ko 2.

Color rendering property is generally explained as follows.

"If spectral distribution of light emitted by a light source is different, the color of the illuminated object looks different. This character is called the color rendering property of the light source. For example, warm color objects, such as meat, look brighter if they are illuminated by incandescent light bulb emitting high levels of red and yellow lights, and look dark if they are illuminated by a fluorescent lamp emitting high level of blue light. Therefore, the average color rendering index is used to show the color rendering property level and is used as an index of illumination light source performance." (Encyclopædia Britannica Micropedia; Exhibit Ko 40)

"Characteristics of how the color of an object looks under illumination. It is said that

color rendering property is better when the color is closer to the color under natural light." (Digital Dai-ji-sen; Exhibit Ko 40)

(B) Paragraph [0081] of Exhibit Ko 2 states that "a light source with a low color rendering property but with high efficiency is feasible in cases of a 2-wavelength type using two types of light colors" and "[it is preferable] to adopt a combination of blue, blue-green (green), yellow (orange), and red light emission in cases of a 4-wavelength type using four types of light colors; and in particular, in cases of a 4-wavelength type, a light source with a high color rendering where the average color rendering index exceeds 90 can be realized; the present invention can be applied to cases where an LED bare chip to be mounted emits a single color or ultraviolet rays or where white light is emitted by exciting a phosphor or phosphorescent materials with an LED bare chip." In light of these statements, it is found that the term "color rendering property" as stated in Exhibit Ko 2 is used in the general meaning of color rendering property, that is, whether an illuminated object's color is closer to the color under natural light ((A) above).

(2) Relationship between technology fields and motivation for adopting technical matters

The second photograph from the top on page 1 of Exhibit Ko 1 is a photograph of a penlight whose entire cylinder is emitting light in each of 17 colors. There is a statement on the top and bottom of the photograph that "You can carry as many as 17 colors" "with single Colorful Pro." There is a statement at the bottom of the fifth photograph from the top on page 5 that "Color-Pro's LED is equipped with White color in addition to the three primary colors of RGB. It has four LEDs in total." There is a statement on top of the first photograph on page 7 of Exhibit Ko 1 that says "*Do not bring a dismantled or modified penlight into a live venue since the safety of such penlight cannot be guaranteed." Therefore, it is found that Exhibit Ko 1 Invention is related to a full-color penlight to be used in a live (concert) venue, on which 4 LEDs: white color and three primary colors of red, green and blue (RGB) are mounted as a light source and is related to a technology where the entire cylinder emits light in various colors.

On the other hand, the technical matters stated in Exhibit Ko 2 are as described in (1) above are related to illumination to show an object by exposing it to light, are related to an LED lighting device using a card-type LED lighting device to which multiple LEDs are mounted and a card-type LED illumination light source that is preferably used with this LED lighting device, and are related to technology to provide white light or light with variable colors.

Incidentally, in the determination on inventive steps, secondary prior art or well-

known technical matters corresponding to differences between the invention related to claims and the primary prior art are necessary, and the presence of motivation or the suggestion to apply the secondary prior art or well-known technical matters to the primary prior art is necessary. For this purpose, first, there must be a relationship in the technology fields between the primary prior art and the secondary prior art or well-known technical matters. In cases where the technology fields of the primary prior art and the secondary prior art or well-known technical matters are not completely consistent, but are only closely related, since the relationship between the technology fields is relatively low, it cannot be immediately said that it is easy to adopt the secondary prior art or well-known technical matters for the primary prior art. In order to say that it is easy, there must be reasonable motivation for adopting the secondary prior art or well-known technical matters for the primary prior art. In this regard, Exhibit Ko 1 and the technical matters stated in Exhibit Ko 2 share the point that both are related to a device emitting light using LEDs as the light source; however, they are different in the points that Exhibit Ko 1 Invention is related to a penlight whose entire cylinder emits light with various colors and that the technical matters stated in Exhibit Ko 2 are related to a lighting device providing white light or light with variable colors. Therefore, it can be said that Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2 are close technologies, but it cannot be said that their technology fields are completely consistent. For this reason, in order to say that it is easy for a person skilled in the art to conceive of a new invention by adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention, there must be reasonable motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention.

(3) Determination of findings by the JPO Decision

A. Findings regarding problems of Exhibit Ko 1 Invention

(A) The JPO Decision found as a problem of Exhibit Ko 1 Invention that there is an issue concerning the production of the yellow color and that the difference in the colors, "yellow" and "light-yellow," cannot be clearly distinguished and this "can be considered to suggest the existence of an underlying issue in producing the yellow color, which is called 'yellow,' in itself." (No. 6, 2., 2-1, (2), (2-1), A., (A) of the JPO Decision [page 47 of the JPO Decision]) and the JPO Decision positioned it as a problem on the assumption of installing a yellow light-emitting diode in order to increase color rendering property (No. 6, 2., 2-1, (2), (2-1), B., (A), a. of the JPO Decision [lines 17 through 23 on page 49 of the JPO Decision]).

(B) The JPO Decision stated concerning a problem of Exhibit Ko 1 Invention that "it is pointed out concerning Exhibit Ko 1 Invention that when the power voltage of the

power source (cell) decreases, an imbalance in color production occurs and the entire cylinder does not emit light neatly, and it is clear that a problem of increasing color rendering property in an underlying issue in Exhibit Ko 1 Invention" (No. 6, 2., 2-1, (2), (2-1), A., (C) of the JPO Decision [page 48 of the JPO Decision]). According to this statement, the JPO Decision is found to have determined that the improvement of "color rendering property" means to prevent an imbalance in color production and make the entire cylinder emit light neatly and that the problem of Exhibit Ko 1 Invention is to improve "color rendering property" in this regard.

(C) The JPO Decision stated concerning a problem of Exhibit Ko 1 Invention that "as Exhibit Ko 10 ('1. (10)' above) states that '(...) In other words, many color options can be provided both in cases of three colors and in cases of seven colors.' (paragraph [0012]), at least in a lighting device using three color LEDs, red, green, and blue, the improvement of color rendering property can be said to be a well-known problem in said technology field" (No. 6, 2., 2-1, (2), (2-1), A., (C) of the JPO Decision [page 48 of the JPO Decision]). This statement shows that the JPO Decision found that providing many color options is the improvement in color rendering property and the JPO Decision also found that the problem of Exhibit Ko 1 Invention is to improve "color rendering property" in this regard.

B. Findings of technical matters stated in Exhibit Ko 2 by the JPO Decision

(A) The JPO Decision found concerning the technical matters stated in Exhibit Ko 2 as stated in paragraphs [0065] and [0189] of Exhibit Ko 2 that "comprising a 'LED lighting device' of white and yellow light-emitting diodes in addition to LEDs of three primary colors of light, R (Red), G (Green), and B (Blue), is one of the publicly-known technical matters in said technology field (hereinafter referred to as "technical matters stated in Exhibit Ko 2" in some cases)" (No. 6, 2., 2-1, (2), (2-1), B., (A), a. of the JPO Decision [page 49 of the JPO Decision]). According to (1) above, the aforementioned findings of the JPO Decision are found to be reasonable.

(B) In addition, the JPO Decision found that "as Exhibit Ko 2 states 'Furthermore, by mounting LEDs of multiple light colors (two or more types of light colors) on the card-type LED illumination light source 10, it is possible to control the light emission colors by a single card-type LED illumination light source 10 from light colors with low correlated color temperature to light colors with high correlated color temperature. In this case, a light source with a low color rendering property but with high efficiency is feasible in cases of a 2-wavelength type using two types of light colors and it is preferable to adopt a combination of red and blue-green (green) light emission when the correlated color temperature is low and a combination of blue and yellow (orange)

light emission when the correlated color temperature is high.' (paragraph [0081]), the aforementioned technical matters stated in Exhibit Ko 2 can be said to be a configuration that also intends to improve color rendering property" (No. 6, 2., 2-1, (2), (2-1), B. (A), a. of the JPO Decision [page 49 of the JPO Decision]). According to (1) above, the aforementioned findings of the JPO Decision can be found to be reasonable. According to (1) above, it is found that the term "color rendering property," which was found to be technical matters stated in Exhibit Ko 2 as mentioned above, is "color rendering property" in the general meaning, that is, whether an illuminated object's color is closer to the color under natural light.

C. Determination of whether a person skilled in the art could have easily conceived of the "yellow light-emitting diode" and its "emission color" in the configuration of Invention 1 related to Difference 1

(A) The JPO Decision determined concerning whether a person skilled in the art could have easily conceived of the "yellow light-emitting diode" and its "emission color" in configuration of Invention 1 related to Difference 1 that "therefore, the difference in the colors, 'yellow' and 'light yellow,' cannot be clearly distinguished; in Exhibit Ko 1 Invention where there is an underlying issue at least in producing the yellow color, which is called 'yellow,' in itself, it is not significantly difficult for a person skilled in the art to install a yellow light-emitting diode in addition to 'four LEDs' of 'R (Red),' 'G (Green),' 'B (Blue),' and 'White' in order to improve its color rendering property in reference to the aforementioned technical matters stated in Exhibit Ko 2" (No. 6, 2., 2-1, (2), (2-1), B., (A), a. of the JPO Decision [page 49 of the JPO Decision]).

(B) According to (A) above, it is found that the JPO Decision determined as follows: Exhibit Ko 1 Invention has the problem of an underlying issue in producing the yellow color, which is called "yellow," in itself (A. (A) above); there is also an underlying problem of improving color rendering property (A. (B) above); publicly-known technical matters to configurate an LED lighting device by including white and yellow light-emitting diodes are stated in Exhibit Ko 2 (B. (A) above); and technical matters to improve color rendering property are stated in Exhibit Ko 2 (B. (B) above); accordingly, there is the motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention and a person skilled in the art could have easily conceived of installing a yellow light-emitting diode by adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention.

(4) Whether there are errors in the determination of findings by the JPO Decision

A. Findings regarding problems of Exhibit Ko 1 Invention

(A) Producing the yellow color

Exhibit Ko 1 contains statements, "yellow-based" and "the difference between yellow and light yellow cannot be defined clearly" (at the top and bottom of the fifth photograph from the top on page 4). According to these statements, it is found that there is an issue with Exhibit Ko 1 Product in that it is difficult to distinguish the difference in colors of "yellow" and "light yellow." However, as an assumption of the aforementioned statements, this "yellow" is only compared with the "light yellow" of a penlight, but not with a color chart, etc. (see the photograph above) and the issue of relative distinguishing of colors and the issue in producing colors in terms of how close the produced color is to the color that is generally considered to be a standard color (corresponding to the color in the color chart) are different. Therefore, the aforementioned issue that the difference in color between "yellow" and "light yellow" is difficult to distinguish is different from the issue of how close the produced "yellow" is to the color generally considered to be a yellow color.

The JPO Decision stated that "examining those colors, 'yellow' and 'light yellow,' in photographs on pages 4 and 5, in addition to four penlights placed at the center of the photographs, four other penlights in total (two penlights on the left ('Ami/Mami' and 'Kotori') and two penlights on the right ('Lumistick' and 'Daidenkokai')) are placed for a comparison of colors; the 'yellow' color of four penlights (Exhibit Ko 1 Invention) at the center of the aforementioned photographs is different from the yellow color of the four other penlights, but are rather close to orange as shown in the photographs on pages 4 through 6 ((shown in (1q))" (No. 6, 2., 2-1, (2), (2-1), A., (A) of the JPO Decision [page 47 of the JPO Decision]). Then, the JPO Decision found that the production of the yellow color, which is called "yellow," of Exhibit Ko 1 Product is an issue in itself. Whether the JPO made the aforementioned findings by accessing Exhibit Ko 1 website and referring to the photographs (images) shown on the display or whether the JPO made the aforementioned findings based on the photographs printed on a sheet cannot be immediately defined based on the statements of the JPO Decision. However, in the former case, colors shown on the display depend on the performance and adjustment of the display itself, and in the latter case, colors printed on a paper sheet depend on the paper quality or performance and adjustment of the printer. Moreover, colors may differ by the performance and adjustment of the camera that took the photographs. In any case, the actual colors of Exhibit Ko 1 Product and the colors shown on the display or printed are not always the same. In addition, there is no objective evidence to support the argument that the penlights of other companies that are used for comparison with Exhibit Ko 1 Product have colors closer to the color generally considered to be standard yellow than Exhibit Ko 1 Product. For this reason, it is impossible to judge how much

the "yellow" is closer to the color that is generally considered to be standard yellow based on the photographs of Exhibit Ko 1 and therefore, it cannot be found that the production of the yellow color, which is called "yellow," itself is an issue based on the photographs of Exhibit Ko 1.

Also based on other statements in Exhibit Ko 1, it cannot be found that Exhibit Ko 1 presents the problem that there is an underlying issue in producing the yellow color, which is called "yellow," in itself.

Consequently, the determination of the JPO Decision that the issue that the difference of the colors, "yellow" and "light-yellow," cannot be clearly distinguished can be considered to suggest the existence of an underlying issue in producing the yellow color, which is called "yellow," in itself ((3), A, (A) above) is incorrect.

(B) Color rendering property

"Color rendering property" found by the JPO Decision in relation to the problem of Exhibit Ko 1 Invention is to prevent an imbalance in color production, to make the entire cylinder emit light neatly ((3), A., (B) above), and to provide many color options ((3), A., (C) above; the JPO Decision found in No. 6, 2., 2-1, (2), (2-1), A., (C) [page 48 of the JPO Decision] that it can be said to be a well-known problem as stated in Exhibit Ko 10). It is different from "color rendering property" found as the technical matters stated in Exhibit Ko 2, in other words, "color rendering property" in the general meaning, that is, whether an illuminated object's color is closer to the color under natural light ((3), B., (B) above).

B. Findings of technical matters stated in Exhibit Ko 2

As stated in (3), B., (B) above, it is found that the term "color rendering property" found to be the technical matters stated in Exhibit Ko 2 as mentioned above is "color rendering property" in the general meaning, that is, whether an illuminated object's color is closer to the color under natural light.

C. Whether a person skilled in the art could have easily conceived of the "yellow light-emitting diode" and its "emission color" in the configuration of Invention 1 related to Difference 1

As stated in (2) above, it cannot be said that the technology fields of Exhibit Ko 1 Invention and those of the technical matters stated in Exhibit Ko 2 are completely consistent but rather are only closely related. Therefore, in order to say that it is easy for a person skilled in the art to conceive of Invention 1 by adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention, there must be reasonable motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention.

As an assumption to determine that there was the motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention and that Invention 1 could have been easily conceived of by a person skilled in the art by adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention, the JPO Decision found that Exhibit Ko 1 Invention has the problem where there is an underlying issue in producing the yellow color, which is called "yellow," in itself ((3), A., (A) above) and shares the common problem with Exhibit Ko 2 to improve color rendering property ((3), A., (B) and (C) above). However, as stated in A., (A) above, there is an error in the findings by the JPO Decision that Exhibit Ko 1 Invention has the problem that there is an underlying issue in producing the yellow color, which is called "yellow," in itself, and the "color rendering property" that the JPO Decision found in relation to the problem of Exhibit Ko 1 Invention (including the matters that the JPO Decision found to be a well-known problem as stated in Exhibit Ko 10 in No. 6, 2., 2-1, (2), (2-1), A., (C) of the JPO Decision [page 48 of the JPO Decision]) is different from the "color rendering property" that was found as the technical matters stated in Exhibit Ko 2, in other words, "color rendering property" in the general meaning, that is, whether an illuminated object's color is closer to the color under natural light (A (B) above).

Then, the JPO erred in finding the problem of Exhibit Ko 1 Invention which serves as a basis for the motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention. In addition, in consideration of the details of the technical matters stated in Exhibit Ko 2 ((1) above) and the relationship of technology fields between Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2 ((2) above), it is not found that Exhibit Ko 1 Invention shares the problem with the technical matters stated in Exhibit Ko 2 and, for this reason, it is not found that there is the motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention.

Consequently, it is not found that a person skilled in the art could have easily conceived of installing a yellow light-emitting diode by adopting the technical matters stated in Exhibit Ko 2 and the well-known problem (Exhibit Ko 10) for Exhibit Ko 1 Invention. The determination of the JPO Decision that a person skilled in the art could have easily conceived of it ((3), C., (A) above) is incorrect.

The JPO Decision made a determination, based on the assumption of the determination that a person skilled in the art could have easily conceived of installing a yellow light-emitting diode ((3), C., (A) above) by adopting the technical matters stated in Exhibit Ko 2 and the well-known problem (Exhibit Ko 10) for Exhibit Ko 1 Invention, that a person skilled in the art could have easily conceived of the "yellow

light-emitting diode" and its "emission color" out of the configuration of Invention 1 by adopting the technical matters stated in Exhibit Ko 2 and the well-known problem (Exhibit Ko 10) for Exhibit Ko 1 Invention (No. 6, 2., 2-1, (2), (2-1), B., (A) of the JPO Decision [page 48 through 50 of the JPO Decision]). However, since the determination which serves as an assumption, is incorrect, the JPO Decision that a person skilled in the art could have easily conceived of the "yellow light-emitting diode" and its "emission color" out of the configuration of the Invention 1 is also incorrect.

D. Whether a person skilled in the art could have easily conceived of a single emission color and mixed emission color of a yellow light-emitting diode

As stated in C. above, there are no common problems between Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2 and it is not found that there is the motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention. However, to be sure, assuming that there is such motivation, this court examines whether a person skilled in the art could have easily conceived of the configuration of Invention 1 related to Difference 1 wherein a yellow emission color is obtained through single emission of the yellow light-emitting diode and an emission color is obtained by mixing light emitted from the yellow light-emitting diode and light emitted from one or two of the other light-emitting diodes, by adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention.

As stated in the findings in (1) above, Exhibit Ko 2 states that LEDs mounted on the card-type LED illumination light source 10 may be replaced with those for low correlated color temperature or high correlated color temperature, or those with individual light colors, such as blue, red, green, yellow, etc. (paragraph [0080]). However, even looking at the entire statements of paragraphs [0076] through [0080] related to Embodiment 1 regarding said matters, it is not clear whether it means that an LED light source equipped only with any single color LED, from among blue, red, green, yellow, or other colors, emits any single color of blue, red, green, yellow, or other colors, or that an LED light source equipped with multiple colors controls to singly emit blue, red, green, yellow, or other colors. In light of the fact that there is a statement that "Furthermore, by mounting the LEDs of multiple light colors (two or more types of light colors) on the card-type LED illumination light source 10, ... In this case, ... in cases of a 2-wavelength type using two types of light colors" in the first half of paragraph [0081] following paragraph [0080], the aforementioned statement in paragraph [0080] can be understood as the former meaning, in other words, it means a single-wavelength type using a single type light color and that it has a yellow color by the LED light source equipped with a single yellow LED. However, Invention 1 is

comprised of a red light-emitting diode, a green light-emitting diode, a blue light-emitting diode, a yellow light-emitting diode and a white light-emitting diode and it must obtain more than one specific light emission colors including at least an emission color obtained from light singly emitted from the yellow light-emitting diode and an emission color obtained by mixing light emitted from the yellow light-emitting diode and light emitted from one or two of the other light-emitting diodes (Difference 1). If it is under the former meaning, it cannot be said that a person skilled in the art could have easily conceived of the emission color obtained by the aforementioned mixing. On the other hand, assuming it is under the latter meaning, since Exhibit Ko 2 has no direct statement that a yellow LED is included in the LED light source with multiple colors, the possibility that a yellow light color is obtained from an LED light source other than yellow cannot be denied and therefore, it cannot be said that a person skilled in the art could have easily conceived of a single emission color of a yellow LED.

Furthermore, as it was found in (1), B. above, Exhibit Ko 2 states that it is preferable to adopt a combination of blue, blue-green (green), and red light emission in cases of a 3-wavelength type using three types of light colors and to adopt a combination of blue, blue-green (green), yellow (orange), and red light emission in cases of a 4-wavelength type using four types of light colors; and in particular, in cases of a 4-wavelength type, a light source with a high color rendering where the average color rendering index exceeds 90 can be realized (paragraph [0081]). It also states that in order to improve color rendering property, four types of LEDs, RGBY (red, green, blue, and yellow), are used. These statements are related to the improvement of color rendering property in the general meaning. Therefore, it is not found, based on these statements, that it is understood objectively and concretely that a lighting device using four types of LEDs, RGBY, causes single emission of a yellow LED.

In addition, Exhibit Ko 2 states that five types of LEDs, RGBWY (red, green, blue, white, and yellow) are used in paragraphs [0065] and [0189]; however, there is only an explanation related to power sources as a concrete statement. Therefore, based on these statements, it cannot be understood objectively and concretely that a lighting device using five types of LEDs, RGBWY, causes single emission of a yellow LED or controls the emission colors by mixing with other colors.

Then, even if there was the motivation for adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention, and if the technical matters stated in Exhibit Ko 2 were adopted for Exhibit Ko 1 Invention and a yellow light-emitting diode was installed in Exhibit Ko 1 Invention, it is not found that a person skilled in the art could have easily conceived of the configuration of Invention 1 related to Difference 1

wherein a yellow emission color is obtained through single emission of the yellow light-emitting diode and an emission color is obtained by mixing light emitted from the yellow light-emitting diode and light emitted from one or two of the other light-emitting diodes.

In addition, Invention 1 can keep the balance of color production under a low electric voltage by adding a yellow LED and by adopting a configuration wherein an emission color is obtained by mixing light emitted from a white LED and light emitted from one or two of the other LEDs and an emission color is obtained by mixing light emitted from a yellow LED and light emitted from one or two of the other LEDs (paragraphs [0007], [0009], [0010], [0013] through [0017], [0021], [0033], and [0034] in the descriptions of the Patent). It cannot be said that these effects of the invention can be predicted based on Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2. Also in this regard, it cannot be found that a person skilled in the art could have easily conceived of Invention 1 by adopting the technical matters stated in Exhibit Ko 2 for Exhibit Ko 1 Invention.

(5) Allegation of the Defendant

A. Commonality in problems of Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2

The Defendant alleged that Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2 share problems of obtaining various emission colors stably (No. 3, 1., (2), B., (D), a. above).

However, as stated above, there is an error in the findings by the JPO Decision that Exhibit Ko 1 Invention has the problem that there is an underlying issue in producing the yellow color, which is called "yellow," in itself ((4), A., (A) above) and the "color rendering property" that the JPO Decision found in relation to the problem of Exhibit Ko 1 Invention is different from "color rendering property" that was found as the technical matters stated in Exhibit Ko 2, in other words, the "color rendering property" in the general meaning, that is, whether an illuminated object's color is closer to the color under natural light ((4), A., (B) above). Therefore, there is an error in the findings by the JPO Decision concerning the problem of Exhibit Ko 1 Invention ((4), C. above). In addition, in consideration of the details of the technical matters stated in Exhibit Ko 2 ((1) above) and the relationship of technical fields between Exhibit Ko 1 Invention and the technical matters stated in Exhibit Ko 2 ((2) above), it is not found that Exhibit Ko 1 Invention shares a problem with the technical matters stated in Exhibit Ko 2.

Consequently, the aforementioned allegation of the Defendant cannot be accepted.

B. Whether a person skilled in the art could have easily conceived of Invention 1 based

on Exhibit Ko 1 Invention and well-known art

In addition, the Defendant alleged that a person skilled in the art could have easily conceived of the configuration of Invention 1 related to Difference 1 based on Exhibit Ko 1 Invention and well-known art stated in Exhibits Otsu 5-1 through 5-9 and Exhibits Otsu 6-1 through 6-13 (No. 3, 1., (2), B., (E) above). Therefore, it is examined below.

(A) Exhibits Otsu 5-1 through 5-4

a. There are the following statements concerning televisions and other products in Exhibit Otsu 5-1 through 5-4 that were distributed before the filing date of the application for the Patent.

(a) Exhibit Otsu 5-1 (Unexamined Patent Application Publication No. 2001-209047)

"[Claim 1] A liquid crystal display characterized by the following:
equipped with a liquid crystal panel;
a signal processing unit for converting the input color video signal into a drive signal for the liquid crystal panel;
an irradiation light for generating an image by irradiating the liquid crystal panel; and
a color filter that is constituted of a fine filter of four or more colors corresponding to individual pixels of the liquid crystal panel and that changes the image formed by the liquid crystal panel into full color by additive color mixing,
wherein the fine filter has four colors corresponding to the R-B axis and B-Y axis reflecting an opposite color which is a human visual characteristic;
wherein the irradiation light irradiates white light having a peak in the wavelength region of the fine filter;
and wherein the signal processing unit converts an input color video signal into a color component signal of the fine filter."

"[0020] The present invention (...) is to provide (1) a liquid crystal display capable of displaying a wide color reproduction range, (...) and, (4) the liquid crystal display further capable of outputting a white color at a constant level."

(b) Exhibit Otsu 5-2 (a printed document containing a web page titled "What is awesome about 'AQUOS Quattron'?")

"What is 'Quattron,' an innovative four-primary color liquid-crystal technology to which 'the color yellow' is added?" (page 1)

"The core of the four-primary color liquid-crystal technology, 'Quattron,' is the addition of a yellow (Y) filter to a color filter that divides light transmitted from the backlight into each color. Lights visible to human eyes are generally produced by mixing RGB colors corresponding to 'red,' 'green,' and 'blue' that are also called the three primary colors of light. Colors produced by mixing these three primary colors are

indicated in the form of a color chart that is expressed as the range of a triangle with colors, R, G, and B, respectively as a vertex. Conventional liquid crystal televisions have not always covered the reproduction range of all colors." (page 1)

"'Quattron' covers a wider color reproduction range, centering on yellow, that cannot be expressed only with the three primary colors by adding yellow (Y) to RGB, and it also succeeded in expanding the range of cyan by slightly shifting the primary color point of green." (page 2)

(c) Exhibit Otsu 5-3 (Unexamined Patent Application Publication No. 2001-306023)

"[0001]

[Technical field of the invention] The present invention relates to an image display device that comprises an image display region by arranging pixels consisting of sub-pixels of multiple colors in a matrix and forms color images by combining colored lights emitted from each sub-pixel by the additive color mixing method in the image display region, and can be used for CRT, liquid crystal, and other display devices, front projectors, rear projectors, and other projection displays."

"[0006] The object of the present invention is to provide an image display device capable of displaying a wide range of colors and, in particular, capable of displaying colors equivalent to those of a print."

[0009] In addition, the pixel for displaying a predetermined color includes at least three types of sub-pixels for emitting red, green, and blue color light. Furthermore, it is preferable for it to be comprised of four or more types of sub-pixels, including at least one or more sub-pixels emitting a color light specified as a point on the chromaticity diagram outside the triangle shaped range that is formed by connecting each vertex of red, green, and blue on the chromaticity diagram. Moreover, it is preferable that the sub-pixels of other colors are any one of the three primary colors, cyan, magenta, and yellow, in the subtractive color mixing method, and in particular, at least cyan."

(d) Exhibit Otsu 5-4 (Publication of Japanese Translation of PCT International Application No. 2004-529396)

"[Claim 1]

A liquid color display (LCD) device for displaying a color image using at least four different primary colors, ... equipped with an array of color sub-pixel filter elements, including at least four types of color sub-pixel filter elements that pass at least the aforementioned four primary color lights respectively.

[Claim 2]

The device stated in Claim 1 where at least the aforementioned four primary colors include red, green, blue, and yellow."

"[0008]

Many colors visible to humans cannot be seen on standard red-green-blue (RGB) monitors. The reproducible color range of a display can be expanded by using a display using four or more primary colors."

b. According to the statements in Exhibits Otsu 5-1 through 5-4 in a. above, before the filing date of the application for the Patent, it is found to have been known that the liquid crystal display of a television and other products is comprised of four primary colors, including yellow in addition to red, green, blue (the well-known art that the Defendant alleged to be found based on Exhibits Otsu 5-1 through 5-9 is found to the aforementioned extent).

(B) Exhibits Otsu 6-1 and 6-2

a. There are the following statements concerning televisions and other products in Exhibit Otsu 6-1 and 6-2 that were distributed before the filing date of the application for the Patent.

(a) Exhibit Otsu 6-1 (Unexamined Patent Application Publication No. 1990-118521)

"2. Patent Claims

A liquid crystal display device comprised of a pair of substrates each having an electrode formed thereon, a liquid crystal layer sandwiched between the pair of substrates, and multiple color filters, that is characterized by the following: where the multiple color filters are comprised of four types of color filters, namely, a red filter, green filter, blue filter, and white filter; where the four types of color filters constitute one block, and a multiple number of such blocks are aligned in a matrix."

(b) Exhibit Otsu 6-2 (Unexamined Patent Application Publication No. 1992-355722)

"[0003]

[Problems to be solved by the invention] The conventional examples are explained below. Figure 5 is a configuration diagram of conventional picture elements in which 4 pixels are driven by 2 values to display 16 colors, and red (R) pixel 1, green (G) pixel 2, blue (B) pixel 3, and white (W) pixel 4 have the same display area respectively. Figure 4 shows spectral transmittance of each color. In this case, the relationship between the combination of the transmission and non-transmission states of each pixel and the displayed color is as shown in Table 1."

"[0004]

[Table 1]

No.	Displayed color	Pixel status			
		R	G	B	W

1	Red	○			
2	Green		○		
3	Blue			○	
4	White I				○
5	Yellow	○	○		
6	Magenta	○		○	
7	Cyan		○	○	
8	White II	○	○	○	
9	Light red	○			○
10	Light green		○		○
11	Light blue			○	○
12	Light yellow	○	○		○
13	Light magenta	○		○	○
14	Light cyan		○	○	○
15	White III	○	○	○	○
16	Black				

In Table 1, the "○" mark represents the "transmitted" state.

b. According to the statements in Exhibits Otsu 6-1 and 6-2 in a. above, before the filing date of the application for the Patent, it is found to have been known that the liquid crystal display of a television and other products is comprised of four primary colors, including white in addition to red, green, and blue (the well-known art that the Defendant alleged to be found based on Exhibits Otsu 6-1 through 6-13 is found to the aforementioned extent).

(C) As stated in (A) and (B) above, before the filing date of the application for the Patent, it is found to have been known that the liquid crystal display of a television and other products is comprised of four primary colors, including yellow in addition to red, green, and blue, or comprised of four primary colors, including white in addition to red, green, and blue.

Both the penlight of Exhibit Ko 1 Invention and well-known art related to color liquid crystals ((A) and (B) above) share the point of implementing simultaneous additive color mixing of lights emitted from a light source comprised of multiple colors and they can be said to be in closely related fields. However, the specific structure of adding colors and the state of using a light-emitting device are different and their technology fields cannot be said to be the same. Therefore, in cases of adopting the aforementioned well-known art for Exhibit Ko 1 Invention, it should be said that a

specific suggestion, etc. is necessary.

However, it is not found that Exhibit Ko 1 Invention presents the issue of producing yellow color as a problem as stated in (4), A., (A) above. Therefore, there is no motivation for adding a light source of yellow. In addition, Exhibit Ko 1 contains statements, "changes in colors by power source voltage," and "since a full-color penlight expresses colors by combining RGB LEDs, if the power source (cell) voltage decreases, an imbalance in emission colors occurs (this issue cannot be avoided unless a boosting circuit is included)" (on the top of the second photograph from the bottom on page 5). Therefore, it is found that a problem that an imbalance of emission colors occurs due to decreases in power source voltage is presented. However, the power source of a television or other products is stable and the problem of decreases in power source voltage itself does not exist. Also, from this perspective, there is no motivation for adopting the technical matter to add the primary color of yellow, which is a well-known art for televisions and other products, for Exhibit Ko 1 Invention.

Therefore, the aforementioned allegation of the Defendant that a person skilled in the art could have easily conceived of Invention 1 related to Difference 1 based on Exhibit Ko 1 Invention and the well-known art stated in Exhibits Otsu 5-1 through 5-9 and Exhibits Otsu 6-1 through 6-13 cannot be accepted.

(6) Summary

As mentioned above, it cannot be found that a person skilled in the art could have easily invented the configuration of Invention 1 related to Difference 1 based on Exhibit Ko 1 Invention, the technical matters stated in Exhibit Ko 2, and the well-known problem (Exhibit Ko 10), or based on Exhibit Ko 1 Invention and the well-known art stated in Exhibits Otsu 5-1 through 5-9 and Exhibits Otsu 6-1 through 6-13, and there is an error in the determination of the JPO Decision concerning Difference 1 of Grounds for Invalidation 1. Therefore, there is an error in the determination of the JPO Decision concerning Grounds for Invalidation 1 to the effect that Invention 1 could have been made by a person skilled in the art based on Exhibit Ko 1 Invention, the technical matters stated in Exhibit Ko 2, and the well-known problem (Exhibit Ko 10), and therefore that a patent cannot be granted to Invention 1 pursuant to the provisions of Article 29, paragraph (2) of the Patent Act. Consequently, Grounds for Rescission 1 are well-grounded.

2. Grounds for Rescission 5 (Error in the determination concerning Grounds for Invalidation 2 (related to Grounds for Invalidation 2))

(1) Concerning Grounds for Invalidation 2 that, concerning the "yellow light-emitting diode" and its "emission color" out of the configuration of Invention 1 related to

Difference 1, the JPO Decision determined as follows in the item of "(2-1) Whether a person skilled in the art could have easily conceived of Invention 1 based on Exhibit Ko 1 Invention": "Exhibit Ko 1 Invention, as mentioned in '2-1, (2)' above, can be said to include an issue that the difference in the colors, 'yellow' and 'light yellow,' cannot be clearly distinguished, in short, an underlying issue in producing the yellow color, which is called 'yellow,' in itself. Therefore, it is not significantly difficult for a person skilled in the art to additionally install a yellow light-emitting diode in order to solve the relevant issue and improve color rendering property in producing the yellow color." (No. 6, 2., 2-2, (2), (2-1), A., (A), a. of the JPO Decision [page 53 of the JPO Decision]). Then the JPO determined that the configuration of Invention 1 related to Difference 1 could have been easily conceived of by a person skilled in the art based on Exhibit Ko 1 Invention, based on the aforementioned determinations (No. 6, 2., 2-2, (2), (2-1), A., (C) of the JPO Decision [page 54 of the JPO Decision]). In addition, in "(2-2) Whether a person skilled in the art could have easily conceived of Invention 1 based on Exhibit Ko 1 Invention and the technical matters stated in Exhibits Ko 21 and 22," the JPO Decision determined as follows: "As mentioned in '2-1, (2)' above, Exhibit Ko 1 Invention can be said to include an issue that the difference in the colors, 'yellow' and 'light yellow,' cannot be clearly distinguished, in short, an underlying issue in producing the yellow color, which is called 'yellow,' in itself. Therefore, it is not significantly difficult for a person skilled in the art who comes across the technical matters stated in Exhibits Ko 21 and 22 to additionally install a yellow light-emitting diode in order to improve the color rendering property in producing the yellow color." (No. 6, 2., 2-2, (2), (2-2), A., (A), a. of the JPO Decision [page 56 of the JPO Decision]) Then, the JPO determined that the configuration of Invention 1 (including the configuration of Invention 1 related to Difference 1) could have been easily invented by a person skilled in the art based on Exhibit Ko 1 Invention and the technical matters stated in Exhibits Ko 21 and 22, based on the aforementioned determinations (No. 6, 2., 2-2, (2), (2-2), D. of the JPO Decision [page 56 of the JPO Decision]).

(2) However, as mentioned in 1. (4), A., (A) above, there is an error in the findings of the JPO Decision that Exhibit Ko 1 Invention has the problem that there is an underlying issue in producing the yellow color, which is called "yellow," in itself. Therefore, there is an error in the determination of the JPO Decision concerning Grounds for Invalidation 2 as stated in (1) above that is based on those findings. Consequently, Grounds for Rescission 5 are well-grounded.

3. Grounds for Invalidation 6 (Error in the determination concerning Grounds for Invalidation 3 and 4 (related to Grounds for Invalidation 3 and 4))

Invention 2 includes Invention 1. When comparing Invention 2 and Exhibit Ko 1 Invention, they are different at least in Difference 1.

The JPO Decision cited the determination on Difference 1 of Grounds for Invalidation 1 for the determination on Difference 1 of Grounds for Invalidation 3 (No. 6, 2., 2-3, (2), A. of the JPO Decision [page 59 of the JPO Decision]) and cited the determination on Difference 1 of Grounds for Invalidation 2 for the determination on Difference 1 of Grounds for Invalidation 4 (No. 6, 2., 2-4, (2), (2-1), A. of the JPO Decision [page 60 of the JPO Decision]; (2-2), A. of the JPO Decision [page 611 of the JPO Decision]).

However, as mentioned in 1. above, there is an error in the determination on Difference 1 of Grounds for Invalidation 1. As mentioned in 2. above, there is an error in the determination on Difference 1 of Grounds for Invalidation 2. Therefore, the aforementioned determinations of the JPO Decision concerning Grounds for Invalidation 3 and 4 are also incorrect.

Consequently, since there was an error in the determination of the JPO Decision concerning Grounds for Invalidation 3 and 4, Grounds for Rescission 6 are well-grounded.

4. Conclusion

Based on the above, there are illegalities in the JPO Decision to be rescinded without the need to examine Grounds for Rescission 2, 3, and 4.

Consequently, the claim of the Plaintiff shall be upheld, and the judgment is rendered as indicated in the main text.

Intellectual Property High Court, Third Division
Presiding judge: SHOJI Tamotsu
Judge: UEDA Takuya
Judge: NAKADAIRA Ken

Attachment 1 (Matters Stated in Exhibit Ko 2)
"[Detailed explanation of the invention]
[Technical field]
[0001]

The present invention is related to an LED lighting device and a card-type LED illumination light source. More particularly, it is related to an LED lighting device using a card-type LED illumination light source on which multiple LEDs are mounted and a card-type LED illumination light source that is preferably used with this LED lighting device.

[Background art]
[0002]

As a light source of illumination devices and signs, incandescent light bulbs, fluorescent lamps, high-pressure discharge lamps, and other illumination light sources have been used. Studies have been conducted on LED illumination light sources as a new illumination light source to replace these light sources. This LED illumination light source has the excellent advantage of having a longer lifespan than the aforementioned light sources and there are high expectations for it as a next generation illumination light source. However, since a single LED element has a small luminous flux, it is necessary to compose an LED illumination light source by arranging multiple LED elements to obtain the same level of luminous flux as incandescent light bulbs and fluorescent lamps.

[0003]

Traditional LED illumination light sources are explained with reference to the figures below.

[0004]

Figures 1 (a) and (b) show a configuration of a traditional LED illumination light source and Figures 2 (a) and (b) show a cross-sectional configuration of the LEDs in that LED illumination light source.

[0005]

As shown in Figures 1 (a) and (b), this LED illumination light source includes a substrate 21 and multiple LED bare chips 22 are mounted on the substrate 21. In this description, the term "LED bare chip" refers to an LED that has not been molded with resin or other materials at the stage before mounting them on the substrate 21. LEDs, which have been molded at the stage before mounting and which are in a state where the light-emitting unit, etc. is not exposed, are distinguished by referring to them as "LED elements." On the substrate 21 shown in Figure 1 (a), a hole 23a that passes the

light emitted from the LED bare chip 22 is provided and a plate 23 is installed. On the other hand, on the substrate 21 shown in Figure 1 (b), a layered resin 24 that passes the light emitted from the LED bare chip 22 is formed and the LED bare chip 22 is covered with the resin 24."

"[0007]

In the configuration shown in Figure 1 (a) and Figure 2 (a), the light generated in the LED bare chip 22 is reflected by the reflecting surface 23a corresponding to the inner periphery of a hole (opening) 23b provided on the plate 23 and is emitted out of the element. The hole 23b on the plate 23 is filled with the resin 24 to mold the LED bare chip 22 and wires 41 and 42. In addition, in the configuration shown in Figure 1 (b) and Figure 2 (b), a light generated in the LED bare chip 22 is emitted out of the element via the mold resin 24.

[0008]

When a forward bias voltage is applied between an electrode 32a of an n-type semiconductor layer 32 and an electrode 34a of a p-type semiconductor layer 34 in the LED bare chip 22, electrons and holes are injected into the semiconductor layer and recombined. By this recombination, light is generated in an active layer 33 and is emitted from the active layer 33. In an LED illumination light source, light emitted from multiple LED bare chips 22 mounted on a substrate is used as illumination light.

[Disclosure of invention]

[Problems to be solved by the invention]

[0009]

However, in the LED illumination light source configured as described above, the LED bare chip 22 generates a large amount of heat accompanying the emission of light. It is intended that the generated heat be dissipated from the substrate 21 via an element substrate 31. However, in the practical use of such LED lighting devices, the following problems remain to be solved.

[0010]

As described above, since light flux from each LED bare chip 22 is small, it is necessary to arrange a substantial number of LED bare chips 22 on the substrate 21 in order to obtain the desired brightness. Therefore, it is necessary to increase the density of the LED bare chip 22 to be mounted so as not to increase the size of the substrate even if a large number of LED bare chips 22 are provided.

[0011]

In addition, in order to increase the luminous flux of each LED bare chip 22 as much as possible, it is necessary to supply to each LED bare chip 22 a current for regular use

other than illumination (for example, assuming approximately 20mA and a 0.3mm square LED bare chip, the current density per unit area of larger than approximately 222.2 [mA / mm^2] (overcurrent: for example, assuming approximately 40mA and the same LED bare chip, the current density per unit area of approximately 444.4 [mA / mm^2]). When a large current is supplied to each LED bare chip 22, the calorific value of the LED bare chip 22 increases, and the temperature of the LED bare chip 22 (bare chip temperature) rises to a high temperature. The bare chip temperature has a significant effect on the lifespan of the LED bare chip. Specifically, when the bare chip temperature rises by 10°C, the lifespan of the LED device embedded with the LED bare chip 22 is said to be halved.

[0012]

For this reason, although it is generally considered that the lifespan of an LED is long, when an LED is used for illumination, this common knowledge is not applicable. Further, when the temperature of the bare chip increases with an increase in the calorific value, there is an issue that the light emission efficiency of the LED bare chip 22 also decreases.

[0013]

For the above reasons, in order to put into practical use an LED lighting device on which a large number of LED bare chips 22 are mounted in a high density, it is necessary to realize higher heat dissipation than before and to keep the bare chip temperature low. In addition, it is also necessary to increase the utilization efficiency of light so that the light emitted from the LED bare chip 22 can be used as the illumination light without waste as much as possible.

[0014]

In order to solve these problems, conventionally, LED illumination light sources into which various LED bare chips are integrated have been proposed, but there has been no LED illumination light source which can sufficiently cope with all of these problems.

[0015]

The issues of conventional LED illumination light sources will be explained in reference to Figures 1 (a) and (b) and Figures 2 (a) and (b). First, there is an issue that, due to continuous lighting of LEDs, the central part of integrated multiple LED substrates becomes hot, and the difference in temperature between the central part and the peripheral part of the LED substrate increases. For example, the configuration shown in Figure 1 (a) and Figure 2 (a) is employed in a dot matrix LED display. In an LED display, the plate 23 functions to enhance the contrast of the emission and non-

emission parts of each LED. In cases of a display, all LEDs do not always reach a lighting state with large output, and heat generation does not become a big issue; however, when it is used as a lighting device, since all of the LEDs maintain a lighting state for a long time, the issue of heat generation becomes apparent.

[0016]

In the above example of a conventional configuration, a resin is used as the material of the substrate 21 and the plate 23, and the substrate 21 and the plate 23 are integrated. Therefore, although the thermal expansion coefficients of the substrate 21 and the plate 23 are substantially equal, the thermal conductivity of the normal resin material is low and heat is easily confined, and therefore, it is not suitable for a lighting device, which is always lit with large output.

[0017]

Moreover, since there is a temperature difference between the central part and the peripheral part of the substrate of the integrated substrate 21 and plate 23, a large stress is generated in the peripheral part of the substrate due to the difference in the thermal expansion coefficient of the materials. When an LED is applied to a lighting device, stress due to heating is generated whenever the LED is turned on and off, and thus, the electrode 32a and the electrode 34a of the LED eventually break."

"[0021]

The present invention has been made in view of such circumstances and aims to provide an LED illumination light source and an LED lighting device capable of simultaneously solving all these problems (achievement of high density, heat dissipation and light utilization efficiency, etc.).

[Means of solving problems]

[0022]

An LED illumination light source of the present invention is an LED illumination light source in which an LED bare chip having a light emitting unit on an element substrate is installed on a heat radiation substrate, wherein the light emitting unit of the LED bare chip is placed on the heat radiation substrate. The peripheral part of the light emitting surface of the element substrate of the LED bare chip is formed as an inclined surface having a lower height than the central part."

"[Effects of the invention]

[0056]

Based on the LED illumination light source of the present invention, most of the light emitted from the light emitting unit is output to the outside without being totally reflected even at the outer edge part of the light emitting side surface, and the light

extraction efficiency is improved.

[Best embodiment of the invention]

[0057]

The LED lighting device of the present invention includes a connector electrically connected to a detachable card-type LED illumination light source, and a lighting circuit electrically connected to the card-type LED illumination light source via the connector, and it can emit illumination light by mounting the card-type LED illumination light source. As will be described in detail later, a card-type LED illumination light source has a configuration in which multiple LEDs are mounted on one side of a substrate having excellent heat dissipation.

[0058]

As was explained concerning conventional LED illumination light sources, if a large number of LED elements are mounted on a substrate in a high density and a large current is supplied to each LED element, the calorific value of the LED reaches an excessive level and the lifespan of the LED is shortened. This issue hinders the practical use of the LED lighting devices.

[0059]

In the present invention, the light source part of the lighting device is constituted by a detachable card-shape structure, and the effect of smoothly radiating the heat generated in each LED is enhanced, and by making it possible to replace a single light source whose lifespan has expired with a new light source, the structure other than the light source of the LED lighting device can be used for a long period of time.

[0060]

From the viewpoint of improving heat dissipation, it is preferable that the LED be mounted on one side of a substrate as a bare chip. This is because heat generated in the LED is transmitted directly to the substrate, and a higher heat dissipation property is exhibited."

"[0065]

As will be described later, when a card-type LED light source and an LED lighting device of the present invention are used to singly drive blue, green (blue-green), yellow (orange), red, and white LEDs for illumination, it is preferable to provide two electrodes for each color LED (a total of 10 electrodes)."

"[0070]

(Embodiment 1)

Figure 3 (a) is a perspective view of part of an LED lighting device based on the present invention, showing a heat sink 19 into which multiple removable card-type LED

illumination light sources 10 are fitted.
[0071]

The card-type LED illumination light source 10 is inserted into a predetermined position through a slot provided on a side surface of the heat sink 19. The heat sink 19 is in thermal contact with the backside of the mounted card-type LED illumination light source 10 and dissipates heat from the backside of the substrate of the card-type LED illumination light source 10 to the outside."
"[0076]

Next, reference is made to Figure 3 (b).
[0077]

The LED lighting device shown in Figure 3 (b) is a lighting device which can be replaced with a publicly-known incandescent light bulb, and includes an adapter 20 which supports a card-type LED illumination light source in a detachable manner and a light-transmitting cover 20a which covers the card-type LED illumination light source in a mounted state. A lighting circuit (not shown) is provided inside the adapter 20. A feed socket (screw socket) for supplying electric energy from outside to an internal lighting circuit is provided at the bottom of the adapter 20. The shape and size of this feed socket is equal to those of the feed socket provided in a conventional incandescent light bulb. For this reason, the LED lighting device shown in Figure 3 (b) can be used as-is mounted on an existing electric appliance in which an incandescent light bulb is fitted. In addition, a pin-type socket may be employed instead of the screw-type socket.
[0078]

In the adapter 20 of the LED lighting device shown in Figure 3 (b), there is a slot to insert a card-type LED illumination light source. A connector (not shown) is placed at the back of the slot, and the card-type LED illumination light source 10 and the lighting circuit are electrically connected via the connector. In the illustrated example, a slot is provided in the adapter 20, and the card-type LED illumination light source 10 is attached and detached via this slot, but the types of attachment and detachment are not limited to this. Embodiments of a non-slotted type will be described later. As described above, since the card-type LED illumination light source 10 shown in Figure 3 (b) has a mechanism where the LED illumination light source can be easily inserted into and removed from the connector, it is possible to remove the LED illumination light source from and replace it in the lighting fixture easily. Thus, since the card-type LED illumination light source 10 is easily removed, there are the following advantages.
[0079]

First, by replacing the card-type LED illumination light source 10 with the one with

a different LED mounting density, it is possible to easily provide a lighting fixture having a different amount of light emission. Second, even if the card-type LED illumination light source 10 deteriorates in a short time and the lifespan as the light source becomes short, the light source unit alone can be replaced by just replacing the card-type LED illumination light source 10, in the same way as the replacement of a normal light bulb or a fluorescent lamp.

[0080]

Third, LEDs mounted on the card-type LED illumination light source 10 may be replaced with those for low correlated color temperature or high correlated color temperature, or those with individual light colors, such as blue, red, green, yellow, etc. If an appropriate one is selected from these card-type LED illumination light sources 10, it is possible to switch and control the colors of the light emitted from the LED lighting device when the selected LED illumination light source is attached to the corresponding LED lighting device.

[0081]

Furthermore, by mounting LEDs of multiple light colors (two or more types of light colors) on the card-type LED illumination light source 10, it is possible to control the light emission colors by a single card-type LED illumination light source 10 from light colors with low correlated color temperature to light colors with high correlated color temperature. In this case, a light source with a low color rendering property but with high efficiency is feasible in cases of a 2-wavelength type using two types of light colors and it is preferable to adopt a combination of red and blue-green (green) light emission when the correlated color temperature is low and a combination of blue and yellow (orange) light emission when the correlated color temperature is high. In addition, when a phosphor (e.g., YAG phosphor, etc.) that is excited by blue and has an emission peak at a wavelength between blue and red- light emissions is added to a combination of LEDs of blue and red- light emissions, a light source with a high efficiency and an average color rendering index of 80 or more can be realized. In addition, it is preferable to adopt a combination of blue, blue-green (green), and red light emission in cases of a 3-wavelength type using three types of light colors and to adopt a combination of blue, blue-green (green), yellow (orange), and red light emission in cases of a 4-wavelength type using four types of light colors; and in particular, in cases of a 4-wavelength type, a light source with a high color rendering where the average color rendering index exceeds 90 can be realized. The present invention can be applied to cases where an LED bare chip to be mounted emits a single color or ultraviolet rays or where white light is emitted by exciting a phosphor or phosphorescent materials with an LED bare chip. In

addition, a phosphor or phosphorescent materials may be contained in the substrate. Furthermore, it is also possible to satisfy high efficiency and high color rendering simultaneously by combining a blue LED, a phosphor or phosphorescent materials that is excited by blue light, and a red LED."

"[0088]

(Embodiment 2)

Next, an embodiment of a card-type LED illumination light source based on the present invention will be described.

[0089]

Figures 4 (a) and (b) show the configuration of the card-type LED illumination light source in this embodiment. The card-type LED illumination light source of the present embodiment is preferably used for the lighting device shown in Figure 3."

"[0125]

In the aforementioned example, a card-type LED illumination light source of blue light using an LED bare chip 2 which emits blue light with a GaN-based semiconductor layer / sapphire element substrate configuration was described. Needless to say, the present invention can be applied to a card-type LED illumination light source using other LED bare chips emitting red light, LED bare chips emitting green light, or LED bare chips emitting yellow light. In addition, it is needless to say that the present invention is applicable to a white card-type LED illumination light source in which these four types of LED elements are arranged in a mixed manner, and white light and light with variable colors are provided by controlling the light distribution of those color emitting lights."

"[0136]

(Embodiment 3)

Next, another embodiment of a card-type LED illumination light source based on the present invention will be described.

[0137]

First, referring to Figure 12, a card-type LED illumination light source of the present embodiment will be described.

[0138]

As shown in Figure 12, the card-type LED illumination light source of the present embodiment includes a metal plate 50, a multilayer wiring substrate 51, and a metal optical reflection plate 52. The metal plate 50 and the multilayer wiring substrate 51 collectively constitute a single "card-type LED illumination light source."

"[0140]

The back surface of the metal plate 50 is flat and can come into contact with the flat surface of a component (not shown) having excellent thermal conductivity."

"[0188]

In this embodiment, the feed electrode is designed to have a substantially quadrangular shape taking into account the mechanical errors in contact with the connector electrode and manufacturing errors of via holes, and is set to have a width of 0.8mm, a length of 2.5mm, and a distance of 1.25mm between centers of the feed electrodes. In order to form as many independent circuits as possible on a substrate of a card-type LED illumination light source, it is preferable that the number of feed electrodes is larger. In the configuration example of the present embodiment, 16 feed electrodes can be provided.

[0189]

In the case of installing the same number of anode and cathode electrodes for constant current driving, it is possible to install 6 pieces (3 routes) of backup terminals after assigning feed electrodes to blue, green (blue-green), yellow (orange), red, and white, respectively."

"[0192]

Figure 16 is a block diagram showing a configuration example of an LED lighting circuit. In the illustrated configuration example, a lighting circuit 70 of the card-type LED illumination light source includes a rectifying/smoothing circuit 71, a voltage dropping circuit 72, and a constant current circuit 73. The rectifying/smoothing circuit 71 is a publicly-known circuit which is connected to a power source of AC 100V and has the function of converting an alternating current into a direct current. The power source is not limited to AC 100V, and a DC power source may be used. When a DC power source is used, a voltage conversion circuit (step-down and step-up circuit) may be used instead of using the rectifying/smoothing circuit 71 where a smoothing circuit and a step-down circuit are combined."

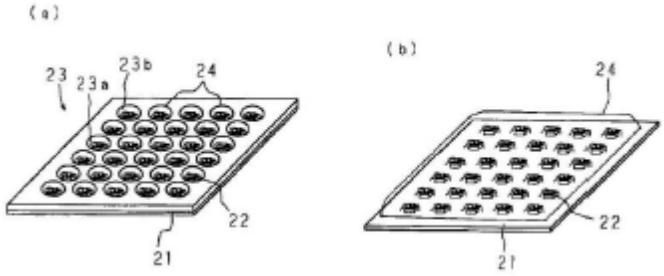
"[0213]

As described above, in the present embodiment, there is no feed electrode on the back surface of the metal plate of the card-type LED illumination light source, and the back surface of the metal plate is flat. Therefore, it is possible to secure a large contact area between the metal plate and a component having excellent thermal conductivity (to be installed on the lighting device), and to promote the dissipation of heat from the card-type LED illumination light source to the outside. It is preferable that the contact area be a size larger than the area in which the LEDs are arranged (light emission area or LED cluster area).

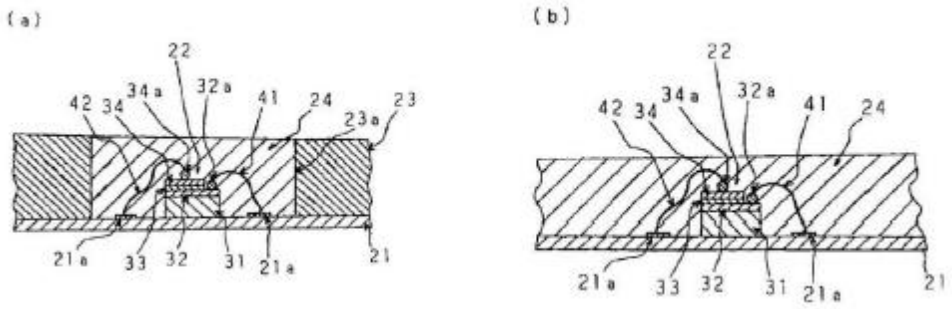
[0214]

In this embodiment, four types of LED bare chips which emit light of different wavelengths are arranged on one substrate, but the present invention is not limited to this. The colors (wavelength bands) of emitted light may be one to three types or five or more types. In addition, LED bare chips that respectively emit multiple lights or an LED bare chip that emits white light by adding a phosphor may be used. Unless the LED bare chip emitting white light is used, it is generally necessary to cover the periphery of an LED bare chip with a phosphor for white light emission. In this case, if the phosphor is enclosed in the space formed by the substrate and the reflector plate, the phosphor can be excited by the LED. Alternatively, a sheet in which a phosphor is dispersed may be affixed to an upper surface of the reflector plate. Furthermore, the sheet in which the phosphor is dispersed may be formed integrally with the card-type LED light source using a transparent resin material."

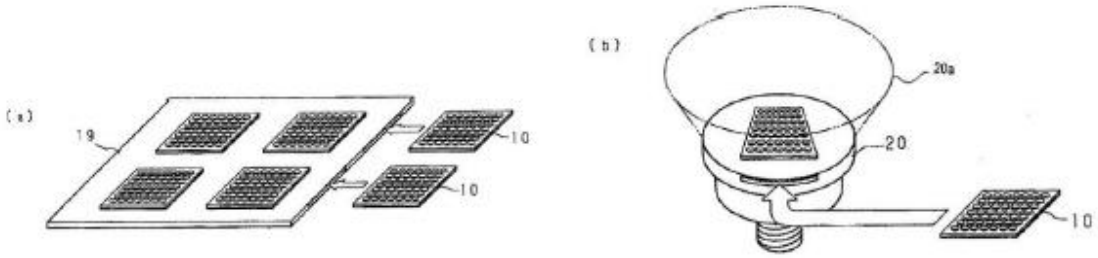
[Figure 1]



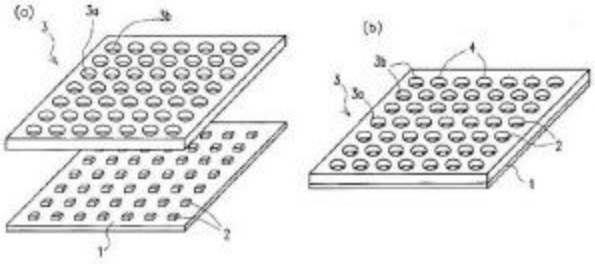
[Figure 2]



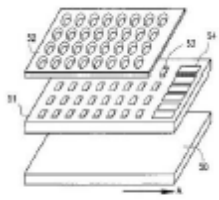
[Figure 3]



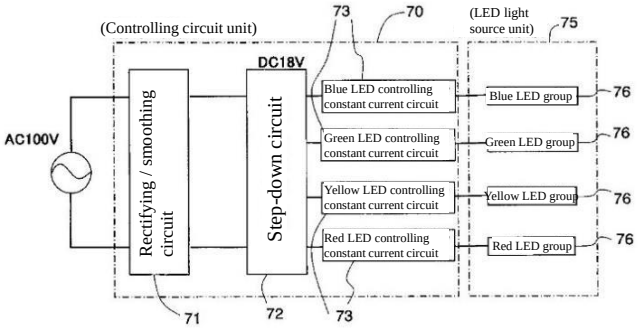
[Figure 4]



[Figure 12]



[Figure 16]



(A copy of the Attachment of the Trial Decision omitted)