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[Title of the Invention]

Surface Light Source Device

[Abstract] (Modified)

[Object]

The present invention improves an edge light type surface light source for uniformly illuminating a relatively large area by receiving light from a linear light source so that the surface light source has a high brightness and small variations in brightness distribution to be used as a backlight of a transmissive liquid crystal display apparatus.

[Constitution]

A surface light source device according to the present invention includes a light diffusing plate 1, a transparent light guide plate 2, and a reflective plate 3 sequentially laminated from a direction of a line of sight. At least one surface of the transparent light guide plate 2 is provided with recesses of conical dots 6 in a form of an embossed pattern, and a linear light source 5 surrounded by a reflector 4 is provided at at least one end edge of the transparent light guide plate 2.

[What is Claimed is]

[Claim 1]

A surface light source device comprising:
a light diffusing plate;
a transparent light guide plate; and
a reflective plate, the light diffusing plate,
transparent light guide plate and reflective plate being
sequentially laminated from a direction of a line of
sight,

wherein at least one surface of the transparent
light guide plate is provided with recesses of conical
dots in a form of an embossed pattern, and

a linear light source surrounded by a reflector is
provided at at least one end edge of the transparent
light guide plate.

[Claim 2]

The device according to claim 1,
wherein an oblique surface area of each of the
conical dots of the transparent light guide plate is
gradually increased according to distance from the linear
light source.

[Claim 3]

The device according to claim 1 or 2,
wherein an oblique surface area A of each of the
conical dots of the transparent light guide plate is

increased according to distance L from the linear light source in accordance with an equation $A = \alpha \times \exp(\beta \times L)$, where α and β are constants.

[Detailed Description of the Invention]

[0001]

[Applicable Industrial Field]

The present invention relates to an edge light type surface light source device for uniformly illuminating a relatively large area by receiving light from a linear light source, and particularly to a surface light source device that has a high brightness and small variations in brightness distribution and which is used as a backlight of a transmissive liquid crystal display apparatus.

[0002]

[Prior Art]

Recently, as display apparatuses are desired to be reduced in thickness and weight, liquid crystal display apparatuses have spread dramatically in place of cathode-ray tubes in the past. An increasing number of such liquid crystal display apparatuses have recently been provided with a back surface illuminating device (hereinafter referred to as a backlight) from a viewpoint of improving the visibility of the liquid crystal display apparatuses. Employed as this backlight at present is an EL (electroluminescence) light emitting body, a plurality

of fluorescent tubes arranged directly under a liquid crystal display panel, or the like. However, the EL light emitting body does not have a sufficiently long life. The fluorescent tubes require a housing box having a thickness equal to or more than the diameter of the fluorescent tubes and a diffusing plate or a dimming sheet for adjusting a brightness distribution. Thus, the fluorescent tubes are difficult to thin, and are not sufficiently satisfactory as a surface light source device considering the complex constitution of the fluorescent tubes.

[0003]

In order to remedy this, a proposition has already been made to use one transparent light guide plate (hereinafter referred to as a light guide plate), introduce light from a linear light source provided at one end edge of the light guide plate, and thereby obtain a surface illumination. However, although substantially uniform brightness is obtained over the entire surface of the light guide plate when incident light from the linear light source travels in parallel with both surfaces of the light guide plate, actual incident light spreads radially, and because of attenuation and the like within the light guide plate, there are a large amount of incident light in the vicinity of the linear light source

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