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(54) GRATING SHADE FOR REFRACTING BEAM IN A LAMP CASE

(57) The invention relates to a grating shade for refracting beam in a lamp case. The grating shade is disposed between a lamp tube and a uniform light plate, it is a transparent or opacity refractive body. The refractive body has a symmetrical face (4), the symmetrical face (4) and the central axis of lamp tube are within in a same plane. One surface of the refractive body, which faces lamp tube, is a refractive surface that is convex, and the other surface, which faces the uniform light plate, is a reflective surface. The transverse width of the refractive body is smaller than that of the lamp tube. In the use of the invention, the beam which is emitted from the lamp tube to the refractive surface is reflected by the refractive surface to a cover of the lamp case, and then a part of the beam is reflected by the cover to the uniform light plate far away from the lamp tube. The beam which is directed from lamp tube to the uniform light plate is reflected by the uniform light plate to the refractive surface of the refractive body, then is reflected by the refractive body to the uniform light plate. Thus, the invention may not only increase the illumination of the uniform light plate, but also make the illumination uniform, and further reduce the volume of the lamp case, and enhance the availability of the beam.

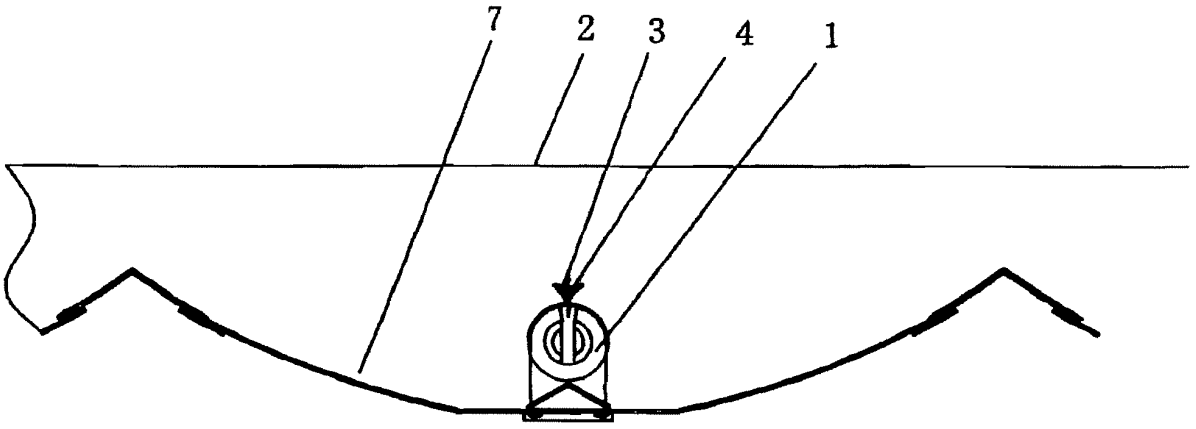

Fig. 1

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Description

Technical Field

[0001] The invention relates to a refracting grating shade for a lamp case.

Technique Background

[0002] How to avoid the costate veins on a soft-light board which are caused by the lighting tube in lamp case has always been a problem to the person skilled in the art. The inventor concentrated on the lamp case study, and carried on various improvements to the lamp case successively. The improvements are as follows:

1: Disposing an arc light barrier between a lighting tube in the lamp case and a backboard.

2: An angle of reflection is disposed between two neighboring arc light barriers, and links said two neighboring arc light barriers to form a reflecting shade.

3 A small angle of reflection, whose cross section is in the shape of V, is disposed between the lighting tube and the arc light barrier. The small angle of reflection is located behind of the lighting tube; and the plane of symmetry of the angle of reflection is in one plane with the centre line of the lighting tube.

[0003] After adopting above-mentioned projects of the improvement, the lighting effects in the lamp case gain a certain improvements. The method can reduce or remove the costate veins, can increase the degree of the photometric brightness of the soft-light board; however, the inventor believes that, basing on the existing scheme, there is still a leeway of the improvement. After a long term study, the inventor thought up a contrivance which can improve the brightness and the uniformity of illumination of a lamp case to a further degree.

Summary of the Invention

[0004] The purpose of the invention is to provide a kind of refracting grating shade in a lamp case, which can increase the degree of illumination and uniformity on the soft-light board in a lamp case.

[0005] In order to carry out an above-mentioned purpose, the invention adopts the following revolutions:

A refracting grating shade in a lamp case, disposed between a lighting tube and a soft-light board, is characteristics in:

Said refracting grating shade is a euphotic or lighttight body. Along the axis direction, the refracting body has a plane which is located in one plane with the centre line of the lighting tube. Two sides of the refracting body are symmetrical along the plane. The sides of the refracting body, facing the lighting tube, are refracting surface, while the sides of the refracting body, which face the soft-light board, are reflecting surface. The refracting surface is a convex and the transverse width of the refracting body is smaller than the diameter of the lighting tube.

[0006] According to another aspect of the invention, the reflecting surface of the refracting body is a concave, caving inwardly.

[0007] According to further aspect of the invention, the refracting surface of the refracting body is a convex, bulging outwardly.

[0008] According to a possible embodiment, the surface of the refracting body is plated by the reflecting film completely. The reflecting film is the aluminum plating film or the decorative chrome plating film.

[0009] According to a possible embodiment, the whole surface of the refracting body is coated by the reflecting film.

[0010] According to a possible embodiment, the cross section of the refracting surface of the refracting body is in the shape of V, and the cross section of the reflecting surface of the refracting body has the V shape too.

[0011] According to a possible embodiment, the cross section of the refracting surface of the refracting body is in the shape of the arc, and the reflecting surface of the refracting body has an arc shape too.

[0012] According to a possible embodiment, the cross section of the refracting surface of the refracting body is jointed by two concave arcs, and the cross section of the reflecting surface of the refracting body is in the arc shape.

[0013] According to a possible embodiment, the cross section of the refracting surface of the refracting body has an arc shape and the cross section of the reflecting surface of the refracting body has an arc shape too. The refracting surface and the reflecting surface of the refracting body shape a columned face.

[0014] The invention has the following advantages: In the use of the invention, the refracting surface of the refracting body reflects the beam which is emitted directly from the lighting tube to the reflecting shade of the lamp case; and then, the beam further is reflected by the reflecting shade to the soft-light board which is far away from the lighting tube in order to supply lighting; meanwhile, the brightness of the part of the soft-light board (The part is obstructed by the refracting body from the lighting tube's direct beam) will not be weaker than the other section of the soft-light board because that part of beam which will be directly emitted by the lighting tube to the soft-light board is reflected by the soft-light board to the reflecting surface of the refracting body; then the beam is reflected by the reflecting surface of the refracting body to the section which is obstructed from the direct

lighting. By adopting the technique we mentioned above, the invention, the refracting grating shade in a lamp case, can enhance the soft-light board's brightness, can equalize the illumination on the soft-light board, as a result, by increasing the utilization ratio of the lighting, the invention can reduce the cubage of the lamp case.

[0015] The invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings

In the drawings

[0016]

Figure 1 shows a sectioned view of the structure according to the present Invention.

Figure 2 shows a sectioned view of refracting grating shade according to one embodiment of the present invention.

Figure 3 shows a sectioned view of refracting grating shade according to another embodiment of the present invention.

Figure 4 shows a sectioned view of refracting grating shade according to further one embodiment of the present invention.

Figure 5 shows a sectioned view of refracting grating shade according to further one embodiment of the present invention.

Embodiments

[0017] Referring to fig.1 of the drawings, a refracting grating shade in a lamp case is disposed between the lamp 1 and the soft-light board 2, and characteristics in

[0018] Said refracting grating shade is a euphotic or lighttight refracting body 3. the refracting body 3 has a plane of symmetry 4 along the axis of the refracting body 3; the plane of symmetry is within the same plane with the centre line of the lighting tube 1, and the side of the refracting body 3 which faces the lamp is a refracting surface 5, while the side of the refracting body 3 which faces the soft-light board 2 is a reflecting surface 6. The refracting surface 5 is a convex, bulging outwardly; the transverse width B of the refracting body 3 is smaller than the diameter of the lighting tube 1.

[0019] According to a possible embodiment, the reflecting surface 6 of the refracting body 3 is a concave, caving inwardly.

[0020] According to another possible embodiment, the reflecting surface 6 of the refracting body 3 is a convex. bulging outwardly;

[0021] In the use of the invention, the refracting surface 5 of the refracting body 3 reflects the beam which will be emitted directly from the lighting tube 1 to the refracting shade 7 of the lamp case; and then. the beam will be reflected by the reflecting shade 7 to the soft-light board 2 which is far away from the lighting tube 1 in order to supply the light; meanwhile, the brightness of the part of the soft-light board (The part is obstructed by the refracting body 3 from the lighting tube's direct illumination) will not be weaker than the other section of the soft-light board 2 because that some beam which will be emitted directly by the lighting tube 1 to the soft-light board 2 is reflected by the soft-light board 2 to the reflecting surface 6 of the refracting body 3: then the beam is reflected by the reflecting surface 6 of the refracting body 3 to the section where is obstructed from the direct lighting. By adopting the techniques we mentioned above, the invention, the refracting grating shade in a lamp case, can enhance the soft-light board's brightness, and can uniform the illumination on the soft-light board.

[0022] The surface of the refracting body is plated completely by the aluminum plating film or the decorative chrome plating film.

[0023] Alternatively, the surface of the refracting body 3 is coated by the reflecting film.

[0024] As Fig. 2 shown, the cross section of the refracting surface 5 of the refracting body 3 has a V shape, and the cross section of the reflecting surface 6 of the refracting body 3 has the shape of V too.

[0025] As Fig. 3 shown. the cross section of the refracting surface 5 of the refracting body 3 is in the shape of an arc, and the reflecting surface 6 of the refracting body 3 has an arc shape too.

[0026] As Fig. 4 shown, the cross section of the refracting surface 5 of the refracting body is jointed by two arcs which cave inwardly, and the cross section of the reflecting surface 6 of the refracting body 3 is arc too.

[0027] As Fig. 5 shown, the cross section of the refracting surface 5 of the refracting body 3 has an arc shape and the cross section of the reflecting surface 6 of the refracting body 3 has an arc shape too. The refracting surface and the reflecting surface shape a columned surface.

[0028] The information mentioned above is only an explanation for some effective implemental cases of the invention, and it is not a restriction in any form to the invention; so, any modification or change which is under the originality of the invention, should still belong to the scope of the invention intended to protect.

Claims

1. A refracting grating shade in a lamp case, disposed between the lighting tube and the soft-light board, is characteristics in:

   Said refracting grating shade is a euphotic or lighttight refracting body. Along the axis of the refracting body, the refracting body has a plane which is located in one plane with the centre line

of the lighting tube. Two sides of the refracting body are symmetrical along the plane. The side of the refracting body which faces the lamp is a refracting surface, while the side of the refracting body which faces the soft-light board is a reflecting surface. The refracting surface is a convex, bulging outwardly; the transverse width of the refracting body is smaller than the diameter of the lighting tube.

2. The refracting grating shade in a lamp case according to claim 1, in which the reflecting surface of the refractive body is a concave, caving inwardly.

3. The refracting grating shade in a lamp case according to claim 1, in which the reflecting surface of the refracting body is a convex, bulging outwardly;

4. The refracting grating shade in a lamp case according to any one of preceding claims, in which the surface of the refractive body is plated a reflective film completely. The reflective film is the aluminum plating film or the decorative chrome plating film.

5. The refracting grating shade in a lamp case according to any one of preceding claims 1-3, in which the surface of the refracting body is coated by the reflecting film.

6. The refracting grating shade in a lamp case according to claim 2, in which the cross section of the refracting surface of the refracting body has a V shape, and the cross section of the reflecting surface of the refracting body has a V shape too.

7. The refracting grating shade in a lamp case according to claim 2, in which the cross section of the refracting surface of the refracting body has an arc shape, and the reflecting surface of the refracting body has an arc shape too.

8. The refracting grating shade in a lamp case according to claim 2, in which the cross section of the refracting surface of the refracting body is jointed by two arcs which cave inwardly, and the cross section of the reflecting surface of the refracting body is arc which cave inwardly too.

9. The refracting grating shade in a lamp case according to claim 3, in which arc shape of the cross section of the refracting surface and arc shape of the cross section of the reflecting surface of the refracting body form a columned surface.

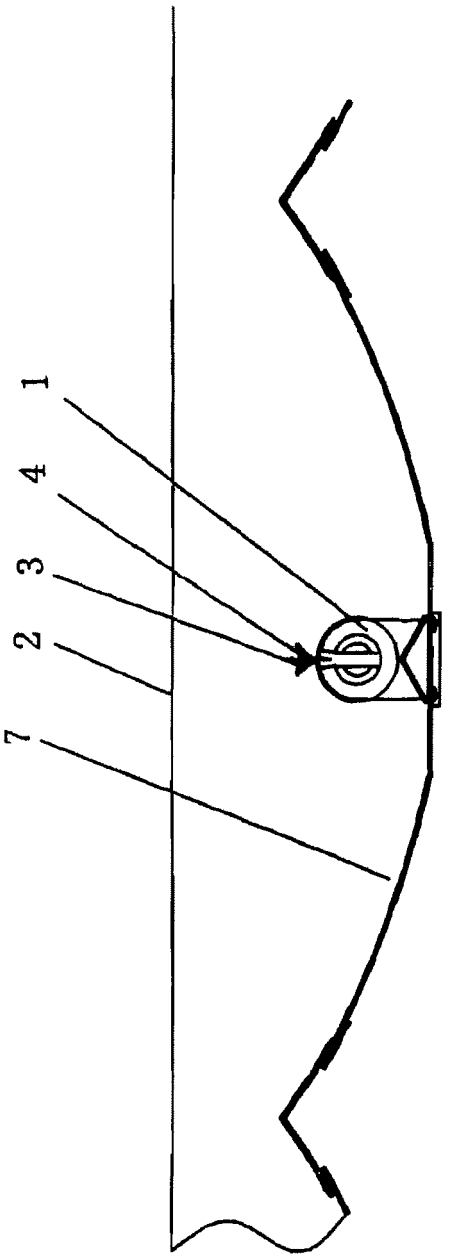

Fig. 1

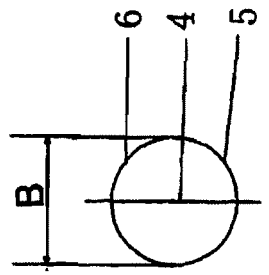

Fig.5

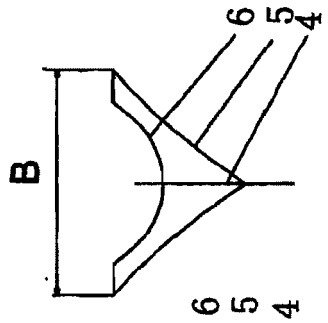

Fig.4

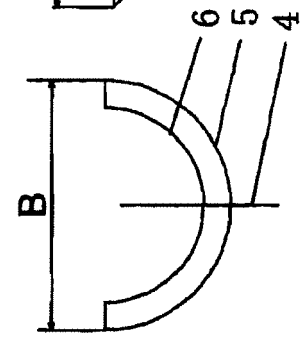

Fig.3

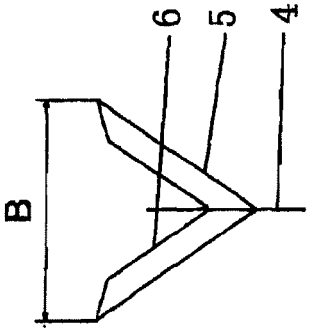

Fig.2

INTERNATIONAL SEARCH REPORT

International application No.

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: F21V7/00,5/00, G09F13/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7]:F21V, G09F, G02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Chinese patent documents

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC,PAJ,CNPAT,CNKI, GRATING,SHADE,REFRACTION,ILLUMINATING,UNIFORMITY

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO97/40313A1 (VAN PUTTEN,Simon,Comelis etc.) 30.Oct.1997 (30.10.97) See pages 4-7, Figs.1-4	1-9
A	CN2650283Y (CHEN yongcheng) 17. Oct. 2004 (17.10.04) See page 4,line19—page 6, line2, Figs. 1-6	1-9
A	CN2549561Y (CAI guozhong) 7.May 2003 (07.05.03) See page 2, Figs.1—3	1-9
A	CN2535888Y (WANG feng) 12.Feb.2003 (12.02.03) See page 2,line 14-page 3,line 8, Figs. 1-3	1-9
A	CN2554658Y (WAIT Science and Technology Co.,Ltd.) 4.Jun.2003(04.06.03) See page 3,line 19 —page 4, Figs.1—8	1-9

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12. Aug. 2005(12.08.2005)	08 · SEP 2005 (08 · 09 · 2005)

Name and mailing address of the ISA/CN	Authorized officer
The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	LI, Lu Telephone No. (86-10)62085818

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2004/001513

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 4105547A1 (Hella KG Hueck & Co) 27.Aug.1992(27.08.1992) whole document	1-9
A	DE4302664A1(Dr.-Ing.Willing GmbH) 4.Aug.1994(04.08.1994) ,whole document	1-9

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2004/001513

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CN2535888Y	12-02-2003	none	
CN2554658Y	04-06-2003	none	
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