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D E C I S I O N
of 15 December 2005

Case Number: T 0725/03 - 3.4.02

Application Number: 98115295.2

Publication Number: 0903593

IPC: G02B 5/02

Language of the proceedings: EN

Title of invention:
Striated light diffuser and method of forming the same

Applicant:
Oyama, Nobuo

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes, after amendment)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0725/03 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 15 December 2005

Appellant: Oyama, Nobuo
1-35-52 Irima-Cho
Chofu-Shi
Tokyo (JP)

Representative: Viering, Jentschura & Partner
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 6 February 2003 refusing European application No. 98115295.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: A. Klein
Members: M. Rayner
M. Vogel

Summary of Facts and Submissions

I. The applicant has appealed against the decision of the examining division refusing European patent application number 98 115 295.2 ("A" publication 903 593) concerning a striated light radiating device comprising an optical panel. In the decision reference was made, amongst others, to the following documents:

D1 Pat. Abstr. Japan vol.8, no.233 (JP-A-59 111604)
D2 US-A-3 829 675
D4 EP-A-0 006 450

II. In its decision, the division remarked that the documents as filed did not disclose a device comprising a surface with striations only. In considering patentability of the subject matter of a claim directed to a light radiating device comprising an optical panel, the division saw a difference over document D1 and D2 resulting from the presence of two flat parallel main faces. However, for example document D1 concerning an optical fibre or bar, document D2 concerning a cylindrical element and document D4 concerning a tapered panel teach that grooves, flutes or bars cause or at least assist in radiating light for illumination purposes. The radiating structure is of secondary importance and can be adapted to specific needs. A skilled person faced with the problem of providing a relatively large and extended light emitting surface would not hesitate to provide the devices of documents D1 and D2 with a structure having the shape of a panel or plate. The difference identified could not therefore be regarded as inventive.

III. The appellant requests that the decision under appeal be set aside and that a patent be granted.

In support of its position, the appellant argued the skilled person would not take document D1 to D2 as closest prior art to the subject matter of claim 1 comprising an optical panel because these prior art documents do not show a relatively large light emitting surface. According to document D4, grooves are taught only in association with a wedge shaped panel, there is no reason to think this shape to be of secondary importance. A skilled person understands the claimed longitudinal grooves as a simple and non-roughened structure, leading to the unforeseeable effect that light is radiated out in a substantially uniform manner. The subject matter claimed is not suggested by any combination of the documents.

IV. Consequent to an auxiliary request of the appellant, the board appointed oral proceeding.

In a communication attached to the summons, the board commented that it could be argued from the disclosure of the application that uniform illumination results from roughening compensated by the striations. The examining division may therefore not have been incorrect in its remark about the original disclosure not disclosing striations only.

V. In reply to the communication of the board and in preparation for the oral proceedings the appellant argued that examples described in the original application demonstrate that the light wave guides are only provided with longitudinal striations, there being

no suggestion that the manufacturing processes described lead to roughened surfaces. Were a roughened surface additionally necessary, the description of the manufacturing the examples would surely have contained a teaching as to how such a roughening was to be achieved. Therefore, a person skilled in the art does not understand the specification in the way indicated by the board. Moreover, the desired increase of the ratio of light outputted can only be achieved if no roughening is present, as roughening would lead to a constant arbitrary scattering of the light both in the presence and absence of the longitudinal striations.

VI. During the oral proceedings, the appellant elaborated arguments in support of the appeal and demonstrated models of the invention to show the effect of the invention in the light of the prior art approaches.

VII. Claim 1 according to the main request of the appellant is worded as follows.

"1. A light radiating device comprising:
an optical panel (40) which has a rectangular cross section centered on a longitudinal axis (42) of the panel (40) and which has two panel surfaces extending parallel to each other and parallel to said longitudinal axis (42), two side faces opposite to each other and two end faces opposite to each other,
a light source (50), and
a light guide (56) for guiding light from the light source (50) into one of said end faces of the optical panel (40) along the longitudinal axis (42) thereof, wherein

a plurality of longitudinal grooves (44) or ridges are integrally formed with one (46) of said panel surfaces and extend parallel to and along said longitudinal axis (42), the longitudinal grooves (44) or ridges having walls which constitute respective portions of the one (46) of said panel surfaces such that light entering the one of said end faces of the optical panel (40) is internally reflected between the walls and the multiple reflections cause the angle of incidence to increase along the longitudinal axis (42) beyond the angle of total internal reflection of the panel, thereby providing the one (46) of said panel surfaces as light radiating surface radiating the light in a substantially uniform manner along said longitudinal axis (42)."

VIII. At the end of the oral proceedings the board gave its decision.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The application has been amended in accordance with the Rules so as to acknowledge the prior art and be consistent with the independent claim. With reference to the "A" publication, the subject matter of the independent claim is supported in the documents as filed by, for example, claims 1 and 3, column 2, lines 3-13, 20-26 and 32-39 and figures 2 and 17 and the associated description, for example column 3,

line 49 et seq. and example 4 in column 9 (thickness 3 mm). The board accepts the argument of the appellant that the documents as filed disclose not roughening but radiating light in a substantially uniform manner as specified in the claim.

3. *Patentability*

3.1 The content of the prior art documents considered in the present case can be briefly summarised in the following way. Document D1 concerns gathering outdoor light through an optical fibre for indoor illumination via a scattering bar or fibre. Document D2 concerns an underwater illumination, where light rays are conducted along a first smooth portion of an elongate member and then radiated from a roughened second portion. While a fluted member is shown in, for example figure 6, it is used both for the first and second portion. Document D4 concerns a light panel where a wedge shaped panel is used for uniform illumination light, light entering through the narrow end face and exiting through the large sloping face. A transparent layer and a reflective layer are arranged on the face opposite the exit face. In a second embodiment, a plurality of equidistant microgrooves provides a matt finish to the exit face. The face opposite the exit face is provided with a white paper sheet as scattering reflector. In both embodiments, a uniform illumination consequent to total reflection, scattering and light refraction is said to be achieved.

3.2 Of the prior art documents, it can therefore be concluded that because document D4 relates to panels, it can be considered the closest document. One

difference between the subject matter claimed and the disclosure of document D4 is given by providing parallel panel surfaces, i.e. a panel of constant thickness, rather than the wedge shape taught by document D4. Consequentially a further difference is provided by the features following "such that" in the claim because illumination from the radiating surface of the panel as claimed is provided differently than by the wedge shaped and matt finished panel of document D4. The problem addressed by these novel features of the claim is therefore to provide another construction of panel with uniform illumination.

3.3 Document D4 offers no reason at all to dispense with the wedge shape taught as being important for uniform illumination and cannot therefore alone suggest the novel features claimed. Moreover, even if the examining division were correct in the view that shape were not important, a rather questionable allegation in view of the importance given to the wedge shape in document D4, and that therefore the teaching of document D2 could be directly applied to a panel, the flutes disclosed are not disclosed as particularly relevant to uniform illumination as they are present both in the light radiating and the light conducting portions of the elongate member taught by document D2 and thus cannot suggest the illumination claimed, let alone dispensing with the wedge shape of document D4. A panel is likewise not taught by document D1, where light is guided through a fibre and specified as being scattered by longitudinal and/or lateral grooves. There is therefore no reason to conclude either that shape or illumination as claimed is of secondary importance or obvious in the light of documents D1, D2 and D4.

Whether or not the skilled person could have adapted the known structures to specific needs or whether the skilled person would have hesitated is not relevant to inventive step of the subject matter claimed. The board is therefore satisfied as to inventive step of the subject matter of claim 1 in relation to these documents.

3.4 The remaining prior art documents in the file are less relevant to the claimed subject matter than documents D1, D2 and D4 and do not therefore affect the positive view of the board in relation to inventive step.

3.5 Accordingly, the board is satisfied that the subject matter of claim 1 can be considered to involve an inventive step within the meaning of Article 56 EPC. The same conclusion applies to claim 2 by virtue of its dependence from claim 1.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

   - claims 1-2 (main request) filed with the letter dated 14 November 2005,

   - description, pages 1-3, 3a, 4-13, filed during the oral proceedings,

   - drawings, figures 1-18, as published.

The Registrar: The Chairman:

M. Kiehl A. G. Klein