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**Datasheet for the decision
of 28 November 2006**

Case Number: T 0318/05 - 3.4.02

Application Number: 98908477.7

Publication Number: 0960353

IPC: G02F 1/1335

Language of the proceedings: EN

Title of invention:

Illumination system with light recycling to enhance brightness

Applicant:

Honeywell International Inc.

Opponent:

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Headword:

-

Relevant legal provisions:

EPC Art. 52(1), 54

Keyword:

"Novelty (yes - after amendment)"

Decisions cited:

-

Catchword:

-



Case Number: T 0318/05 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 28 November 2006

Appellant: Honeywell International Inc.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 9 July 2004
refusing European application No. 98908477.7
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. G. Klein
Members: F. J. Narganes-Quijano
C. Rennie-Smith

Summary of Facts and Submissions

I. The appellant (applicant) has lodged an appeal against the decision of the examining division refusing European patent application No. 98908477.7 (based on the International patent application No. PCT/US98/02264 published as WO 98/36315).

II. In the decision under appeal the examining division referred to documents

D1: US-A-5521725

D2: EP-A-0573268

D3: EP-A-0588504

and held that claim 1 of the requests then on file did not define novel subject-matter (Articles 52(1) and 54 EPC) over the disclosure of document D1 as well as over that of each of documents D2 and D3.

III. With the grounds of appeal the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of one of the sets of claims amended according to different requests submitted with the grounds of appeal. The appellant also requested oral proceedings on an auxiliary basis.

IV. In response to the preliminary opinion expressed by the Board in a communication annexed to summons to oral proceedings, the appellant filed with its letter dated 10 November 2006 an amended set of claims 1 to 9 and amended description pages 3 to 7, 9, 10, 12, 19, 26, 32, 36, 37 and 39 replacing the corresponding application documents as published. In its letter the appellant

also stated that the request for oral proceedings was only maintained in the event that the Board would not be minded to allow the grant of a patent on the basis of the amended application documents.

After consideration of the amendments made to the application documents according to the request of the appellant, the Board cancelled the oral proceedings.

V. Claim 1 of the sole request of the appellant reads as follows:

"An optical illumination system (400), comprising:

(a) a light source means (420) for generating light rays (460), and a light reflecting means (340) having a light reflecting surface (345) partially surrounding the light source means, where the light source means has a reflective emitting surface (425);

(b) a partially light reflecting and partially light transmitting optical component (440) for receiving light rays from the light source means and the light reflecting surface, wherein said optical component is selected from the group consisting of an: an array of lenticular prisms (500), an array of tapered optical waveguides (600), and an array of lenticular tapered optical waveguides, wherein a portion (464) of the light rays from the light source means is reflected by said optical component and is recycled to the light reflecting surface and reflected at the light reflecting surface back to said optical component and another portion of the light rays is transmitted through the optical component;

(c) a light transmitting means (430) for receiving the portion of the light rays transmitted through said

optical component and directing the transmitted light rays through an input surface (435) of the light transmitting means for further directing the light rays through the light transmitting means; and

(d) a light extracting means to extract a portion of the light in said light transmitting means, said light extracting means comprising:

(i) a light input surface in optical contact with one surface of said light transmitting means; and

(ii) a light output surface through which the extracted light is directed."

Claims 2 to 9 all refer back to claim 1.

VI. In support of its request the appellant submitted that the partially light reflecting and partially light transmitting optical component of the claimed optical illumination system transmits some of the light from the light source to the light transmitting means, and the light that is not transmitted is recycled back to the light reflecting means to be reflected back to the optical component. As a consequence, little or no light emitted by the light source escapes the system without passing through the optical component into the light transmitting means, thus improving the output luminance of the optical illumination system. None of documents D1, D2 and D3 discloses or suggests these features.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

After due consideration of the amendments made to the application documents according to the appellant's request, the Board is satisfied that the amended application documents comply with the formal requirements of the EPC, and in particular with those set forth in Article 123(2) EPC. In particular, claim 1 is based on claims 1 and 10 as published together with the embodiment disclosed with reference to Figures 4 to 6 (page 32, line 4 *et seq.*) and modified as disclosed in page 36, lines 8 to 11 of the application as published; and dependent claims 2 to 9 are based on the features defined in claims 2 to 8 and 11 as published.

Furthermore, the description has been appropriately amended and brought into conformity with the invention as defined in the claims (Article 84 EPC, second sentence and Rule 27(1)(c) EPC).

3. *Novelty*

Each of documents D1, D2 and D3 considered by the examining division in the decision under appeal discloses an optical illumination system comprising a light source optically coupled to a light transmitting means arranged to receive light from the light source and to direct the light towards a light extracting means having a light output surface through which light

extracted from the transmitting means is directed out of the illumination system (see in particular the disclosure of documents D1, D2 and D3 with reference to Figure 4B, Figure 20 and Figure 1, respectively).

Document D1 further specifies that the light source is a fluorescent tube or a light emitting diode (column 4, lines 13 to 15) both of which, as acknowledged in the description of the application (page 10, lines 8 to 14), generally have a reflective emitting surface (column 7, lines 60 to 64), but the document fails to specify a light reflecting means partially surrounding the light source as well as the provision between the light source and the light transmitting means of an optical component having partially light reflecting and partially light transmitting characteristics as defined in claim 1. Each of documents D2 and D3 discloses a light reflecting means partially surrounding the light source (Figure 20, and Figures 15 and 16, respectively), but none of them disclose the provision of a component having partially light reflecting and partially light transmitting characteristics as mentioned above and defined in claim 1.

In view of the above, claim 1 as well as dependent claims 2 to 9 all define novel subject-matter (Articles 52(1) and 54 EPC) over the disclosure of each of documents D1, D2 and D3. In addition, none of the remaining documents on file anticipates the claimed subject-matter either.

Accordingly, the set of claims 1 to 9 amended according to the appellant's request overcomes the reasons on

which the examining division based the refusal of the application (point II above).

4. *Other requirements*

During the first-instance examination proceedings the examining division did not have the opportunity to comment on the patentability of the combination of features of present claim 1. Notwithstanding, the Board is satisfied that the subject-matter of claim 1 and dependent claims 2 to 9 involve an inventive step over the available prior art (Articles 52(1) and 56 EPC). In particular, none of the documents on file discloses or suggests the provision of a partially light reflecting and partially light transmitting optical component as claimed between the light source and the light transmitting and extracting means of an illumination system of the type disclosed in documents D1, D2 and D3, nor the technical effects achieved therewith, namely the improved efficiency of the input of the light from the light source into the light transmitting and extracting means, and the resulting improvement in the output luminance of the illumination system (page 34, line 6 to page 35, line 14 of the description of the application and point VI above).

The Board is also satisfied that the patent application as amended according to the present request of the appellant and the invention to which it relates meet the remaining requirements of the EPC within the meaning of Article 97(1) EPC.

5. In view of the above conclusions and considerations, the decision under appeal is to be set aside. In addition, the Board, in accordance with Article 111(1) EPC, considers it appropriate to exercise favourably the power within the competence of the examining division to order grant of a patent.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent in the following version:
 - claims 1 to 9 as filed with the letter dated 10 November 2006,
 - description pages 1, 2, 8, 11, 13 to 18, 20 to 25, 27 to 31, 33 to 35, 38 and 40 as published and pages 3 to 7, 9, 10, 12, 19, 26, 32, 36, 37 and 39 as filed with the letter dated 10 November 2006, and
 - drawing sheets 1/6 to 6/6 as published.

The Registrar:

The Chairman:

S. Sánchez Chiquero

A. G. Klein