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D E C I S I O N
of 18 January 2002

Case Number: T 0018/99 - 3.2.3
Application Number: 95114791.7
Publication Number: 0691508
IPC: F21V 7/00, F 21V 8/00,
G09F 13/04

Language of the proceedings: EN

Title of invention:

Illuminating device having non-absorptive variable
transmissivity cover

Applicant:

MINNESOTA MINING AND MANUFACTURING COMPANY

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 83, 84

Keyword:

"Disclosure - sufficiency (no)"
"Claims - clarity (no)"

Decisions cited:

-

Catchword:

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Boards of Appeal

Chambres de recours

Case Number: T 0018/99 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 18 January 2002

Appellant: MINNESOTA MINING AND MANUFACTURING COMPANY
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 3 June 1998
refusing European patent application
No. 95 114 791.7 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: C. T. Wilson
Members: U. Krause
J. P. B. Seitz

Summary of Facts and Submissions

- I. The appeal was filed on 28 July 1998 by the Applicant of European patent application No. 95 114 791.7 against the decision of the Examining Division dated 3 June 1998 refusing this application for lack of clarity and insufficient disclosure of the invention. The appeal fee was also paid on 28 July 1998 and a statement setting out the grounds of appeal was submitted on 8 October 1998.
- II. In response to a communication in which the Board of Appeal set out its provisional opinion that the application did not meet the requirements of Articles 83 and 84 EPC the Applicant submitted an amended independent claim 1 and an auxiliary request for oral proceedings. In an annex to the summons for oral proceedings to take place on 9 January 2002 the Board maintained its objections under Articles 83 and 84 EPC. With letter of 11 December 2001 the Applicant withdrew the request for oral proceedings.
- III. Claim 1 as submitted with letter of 5 April 2001 reads as follows (two typing errors and an erroneous reference sign in feature (b) having been corrected):
- "1. An illuminating device, comprising:
- (a) a light source (22,32) having a longitudinally specular light reflector; and
 - (b) a light escapement port (36) having a substantially non light absorptive cover (38) separate from said reflector, the transmissivity of said cover (38) at any point on said cover varying as a function of

the position of said point, whereby light escaping through said cover at said point has a selected luminous exitance as a function of said position;

characterized in that said reflector (24,34) comprises:

- (i) a partially transmissive, substantially longitudinally specularly reflective material; and
- (ii) one or more internal dielectric interfaces."

IV. The following prior art was taken into consideration:

- (D1) a copy of a brochure issued by 3M on September 1989 and denoted "3M Scotch Optical Lighting film Application Bulletin - Photometrics"
- (D2) McGraw-Hill Encyclopedia of Science & Technology, 1992, Vol.19, pages 375 to 377
- (D3) C.Yeh, Handbook of Fiber Optics, Academic Press, 1990, pages 38 and 39
- (D4) EP-A-0 167 721

Reference was also made by the Applicant to an affidavit of Dr Hardy which was submitted with letter of 21 April 1998 during the procedure before the first instance.

V. The Appellant requests to set aside the impugned decision and to remit the case to the Examining Division for further examination of the application as

to novelty and inventive step on the basis of the original application documents and claim 1 submitted with letter of 5 April 2001.

In support of his request the Appellant essentially argues that there was no problem of clarity and insufficient disclosure with respect to the term "longitudinally specularly reflective material" since the application mentioned, in lines 21 to 23 of page 8, a prism light guide material as an example for such a material, which material was known and sold by the Applicants prior to the application date, for example in the form of the 3M Scotch optical lighting film described in D1. The term "dielectric interface" had a clear meaning in the field of electromagnetic radiation, including light, defining for example the surface of a transparent plastics material as confronting layers of other materials. Thus, no further explanation was required.

Reasons for the Decision

1. The appeal meets the requirements of Articles 106 to 108 EPC and of Rules 1(1) and 64 EPC and is, therefore, admissible.

2. The amended claim on file differs from the original claim 1 by the insertion of the word "internal" in feature (ii). This amendment is supported by the reference to "multilayer" dielectric interfaces, implying one or more internal dielectric interfaces, on page 8, lines 18 to 20, of the original application. The amended claim 1 therefore complies with Article 123(2) EPC.

3. In the impugned decision the Examining Division held that the expressions "longitudinally specularly reflective material" and "one or more dielectric interfaces" were unclear and not sufficiently explained in the application whereby a skilled person would be unable to carry out the invention. Indeed, there is no evidence for the allegation of the Appellant that the expression "longitudinally specularly reflective material" has a well-defined meaning in the art. It is used neither in standard textbooks on optics nor in specific documents such as D1 concerning light distribution and propagation by combined transmission and reflection. The statement made in point 5 of the affidavit of Dr Hardy is seen as further evidence that the term was not normally used in the art. However, it cannot be disregarded that the description defines, on page 2, lines 37 to 39 of the published application, the essential characteristic of this material as being that "each reflected light ray has the same component of motion in a preferred direction relative to the material". The resulting effect of increasing the light distribution distance (see page 2, lines 39 to 42, and the text bridging pages 2 and 3 of the published application) makes clear that, in the above essential characteristic, the reflected light rays are the portions of a light ray after each total internal reflection in the reflector in a longitudinal direction thereof. It can be concluded that the longitudinally specularly reflective material is a material having a longitudinal dimension, such as a plate or rod, and propagating light in this longitudinal direction by internal specular reflections. A material having these properties is well-known in the field of electro-magnetic radiation as being a waveguide or lightguide, and described in documents D2, D3 and D4. According to

D2 this waveguide consists of one dielectric material, called the core, surrounded by a different dielectric, called the cladding, having a lower refractive index or dielectric constant than the core. Thus, the core material has at least two dielectric interfaces extending along the longitudinal sides thereof in order to ensure a total reflection of the light within this material.

Thus, a technically meaningful interpretation of the objected expressions in claim 1 can be found by a skilled person consulting the description and general technical literature, both also providing sufficient information for a skilled person to select the appropriate material with the dielectric interfaces. This finding is in conformity with the statements made in the affidavit of Dr Hardy.

4. It is noted that the reflector material is defined in claim 1 by the further features (i) and (ii) included in the characterising portion of claim 1. According to feature (i) the material is not only longitudinally specularly reflective but also partially transmissive. This combined property is mentioned in the description (on page 2, lines 56 and 57, and page 4, lines 52 and 53 of the published application) without further explanations. However, the Board can accept the argument of the Appellant that a skilled person was aware of examples for a typical light guide material which is partially transmissive, for example a standard transparent or translucent dielectric core, as shown in documents D2, D3 and D4, in air as the surrounding dielectric. It was further correctly pointed out by the Appellant that the application on page 8, lines 21 to 23 (corresponding to page 4, lines 37 and 38, of the

published application) refers to a prism light guide material as an example for such a transparent longitudinally specular material. Apparently, a material having these properties is shown in D1 and was commercially available. In this context, the feature (ii) defines a multilayer dielectric material consisting of at least two layers of a transparent or translucent dielectric core with at least one internal dielectric interface therebetween. Thus, the multilayer dielectric material has at least one internal dielectric interface in addition to the two outer dielectric interfaces ensuring the total reflection within the material.

The Board therefore concludes that the skilled person was in a position to identify and acquire a material having the characteristics of being partially transmissive, substantially longitudinally specularly reflective and having one or more internal dielectric interfaces.

5. In the Board's view, however, this material leads to further unresolved problems giving rise to objections under Articles 83 and 84 EPC.

As explained in the chapters headed "Background of the Invention" and "Summary of the invention" on page 2 of the published application, the desired distribution of the luminous exitance from an illuminating device requires a means for distributing the light from a light source, and conventional means for this purpose were either unsatisfactory with regard to the light distribution distance (the diffuse reflecting devices) or able to distribute light over great distances but too expensive (the longitudinally specular reflective

materials). The invention is supposed to solve this problem by combining a longitudinally specularly reflecting material with a partial transmissivity of this material. It follows that the illuminating device must be set up to make use of both characteristics of the reflector, viz. the partial transmissivity and the capability of the longitudinally specularly reflecting material to increase the light distribution distance. It is unclear how this can be achieved by the illuminating device as claimed and described in the application.

In fact, the longitudinally specularly reflecting capability requires, in a standard light guide material as shown in documents D2 and D4, light to enter from the short front side of the material (from the left in Figure 4 of D2 and in the figures of D4), and in the prism light guide of D1 (Figure 3 for example) the light entering through the smooth long side leaves the light guide, after several internal reflections, on the same smooth long side.

Thus, the arrangement of the light source and reflector shown in Figure 1 of the application would, when using a standard light guide material for the reflector, be unable to make use of the longitudinally specularly reflective capability of the reflector and, when using a prism light guide material, reflect the light to the inner side facing the light source, with no light arriving at the diffusely reflecting cover material. Even a modification of the arrangement by locating the light source at a short side of the light guide material so as to take advantage of the longitudinally specularly reflective capability of a standard light guide material would not help. In this case the light

rays reflected within the light guide material would exit at the short front side opposite to the light entrance side and could not, therefore, arrive at the diffuse reflecting layer overlying the specularly reflecting layer.

As to the embodiment of Figure 2, no clear relationship between the light source and the reflector seems to be derivable from the figure and the associated description. It seems that the light rays from the light source 32 could arrive, after some internal reflections in the reflector 34, at the cover 38 only if further conditions are met, for example the reflector being a prism light guide and the light source 32 being located on the same side of the reflector as the cover. However, in this case the light guide material would work as a purely specularly reflecting material and its partial transmissivity would be irrelevant.

6. Since the application gives no further information as to how to achieve the desired object by using the specified reflector material, the skilled person will conclude that either the type of reflector derived from the application is not a suitable one, throwing doubts on the correct understanding of the application, and of the definition of the reflector in claim 1, in this respect, or that there is a lack of information in the application about additional measures necessary for the use of this type of reflector in the illuminating device so as to achieve the desired object of obtaining a selected luminous exitance by distributing and reflecting the light from the light source. Hence, the requirements of Articles 84 and 83 EPC, respectively, are not met and the request for grant of a patent

cannot be allowed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

A. Counillon

C. T. Wilson