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D E C I S I O N
of 14 October 1999

Case Number: T 0525/95 - 3.4.1

Application Number: 90306219.8

Publication Number: 0402146

IPC: G09F 9/35

Language of the proceedings: EN

Title of invention:
Prismatic illuminator for flat panel display

Applicant:
General Electric Company

Opponent:
-

Headword:
Prismatic illuminator/GENERAL ELECTRIC COMPANY

Relevant legal provisions:
EPC Art. 56

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

Decisions cited:
-

Catchword:
-

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Case Number: T 0525/95 - 3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 14 October 1999

Appellant: General Electric Company
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NY 12345 (US)

Representative: Goode, Ian Roy
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 22 November 1994 refusing European patent application No. 90 306 219.8 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: G. Davies
Members: H. K. Wolfrum
M. G. L. Rognoni

Summary of Facts and Submissions

I. European patent application 90 306 219.8 (publication No. 0 402 146) was refused by a decision of the examining division dated 22 November 1994, on the ground that the requirements of Article 123(2) were not met.

II. The appellant lodged an appeal against the decision on 12 December 1994 and paid the prescribed fee on the same day. A statement of grounds of appeal was filed on 31 March 1995.

III. In a communication dated 21 July 1999, accompanying a summons to oral proceedings, the Board made reference *inter alia* to the following documents:

P2: EP-A-0 006 450 and

P4: US-A-3 464 133.

IV. Oral proceedings were held on 14 October 1999.

V. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 6, pages 1, 1A, 1B and 2 to 5 of the description and drawing sheets 1/2 to 2/2 filed in the oral proceedings.

VI. Independent claim 1 reads as follows:

"1. An illuminator for substantially uniformly illuminating a flat panel display, comprising:
at least one light source having an elongated light

producing region, and
at least one elongated prism member having a front external surface substantially parallel to the flat panel display, wherein
the light source is located within the elongated prism member and extends longitudinally in the same direction as the prism member,
the cross-sectional shape of the at least one prism member is that of an isosceles triangle with the rear corner opposite the front external surface being inverted about an inversion line so that the cross-sectional shape of the prism member is substantially W-shaped and symmetric about a prism member centerline orthogonal to said front external surface,
the prism member has an aperture formed there through, symmetric about said centerline, for receiving the associated light source, and
all of said other external surfaces of the prism member are coated with a reflecting coating so as to provide total reflection effectively internally of the prism member of all of the light from the light source which is incident on said other external surfaces of said prism member, restricting light output to said front external surface."

VII. The appellant's submission in support of its request may be summarized as follows:

The invention was based on the desire to devise an illuminator for a flat panel display of reduced size which made efficient use of the light from a light source and provided a highly uniform illumination of the display. By locating the light source within a prism member, the cross-sectional shape of which was

that of an isosceles triangle with the rear corner opposite to the light emitting front surface being inverted about an inversion line so as to be substantially W-shaped and symmetric about the prism member's centerline orthogonal to said front external surface, not only could the thickness of the illuminator be reduced but also light emitted from areas of the light source facing away from the front surface was efficiently reflected back toward the front surface. Since there was no indication in the cited prior art of these features, the claimed illuminator involved an inventive step.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. *Amendments*

The amendments made to claim 1 are based on original claims 4, 12 and 13 in combination with information disclosed on originally-filed page 4, lines 21 to 29. The additional features given in claim 2 are based on information disclosed on originally-filed page 3, lines 12 to 15. Dependent claims 3 to 5 correspond to original claims 6, 7, 14 and 15, respectively. The Board is thus satisfied that the amendments comply with the requirements of Article 123(2) EPC.

3. *Novelty and inventive step (Articles 52(1), 54(1) and*

(2) and 56 EPC)

3.1 Of all the available prior art documents, only documents P2 (cf. in particular Figures 1 and 2 with the corresponding description and page 5, last sentence) and P4 (cf. in particular Figure 6 with the corresponding description) disclose an illuminator the light source of which is located within an aperture of an associated prism member. In these known illuminators, the light emitted from the light source is guided (by reflection at external prism surfaces coated with a reflecting film as well as by total internal reflection at these surfaces) to an uncoated front external surface where the light is output to illuminate a flat panel display.

3.2 The subject-matter of claim 1 differs from the prior art according to P2 or P4 in that

(a) the cross-sectional shape of the prism member is that of an isosceles triangle with the rear corner opposite the front external surface being inverted about an inversion line so as to be substantially W-shaped and symmetric about a prism member centerline orthogonal to said front external surface, and

(b) the aperture for receiving the light source is symmetric about the centerline.

3.3 In the light of the aforementioned differences between the claimed illuminator and the prior art, the objective problem underlying the present invention can be seen in reducing the size of the illuminator and in

making efficient use of the light emitted from the light source.

3.4 Whereas the problem as such concerns tasks the skilled person is routinely confronted with, the claimed solution is not hinted at in any one of the available prior art documents.

In the majority of the embodiments shown by document P4 (cf. Figures 1 and 6 to 21), the prism member is in the form of a slab of varying thickness resulting in a cross-section which is basically an elongated (non-symmetric) triangle. The light source is either arranged outside the prism member in front of the short side of the triangle or located within the prism member in the vicinity of the short side. Only one embodiment of P4 makes use of prism members the cross-section of which is an isosceles triangle. In this case, however, four of these prism members are combined to form a body of square cross-section. The combined prisms are surrounded by a single light source. In embodiments for which the light source is outside the prism, the slab-shaped prism members may be bevelled or faceted at the short side of the triangle at the corner opposite the front external surface for the purpose of more evenly distributing the light output through the front external surface (cf. P4, Figures 16 and 18 to 20 and column 5, lines 8 to 66).

Although, in the Board's opinion, the person skilled in the relevant technical field is able to recognize that the provision of a bevelled corner opposite the front external surface of a prism member implies a reduction in the thickness of the illuminator, neither the

teaching of P4 nor that of any other available prior art document hints at the idea of locating the light source symmetrically within an associated prism member, the basic cross-section of which is an isosceles triangle, nor does the prior art hint at the provision of additional reflecting surfaces by inverting the corner opposite the front external surface so as to obtain a prism member of W-shaped cross-section. Thus, in the Board's opinion, the skilled person could have devised the claimed illuminator only with the benefit of hindsight.

3.5 Therefore, the subject-matter of claim 1 defines novel and inventive subject-matter so that claim 1 complies with the requirements of Article 52(1) EPC.

Dependent claims 2 to 6 relate to specific embodiments of the illuminator and also comply with the requirements of the EPC.

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 the first instance with the order to grant the patent on the basis of the documents filed in the oral proceedings (cf. point V above).

The Registrar: The Chairman:

M. Beer G. Davies