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Datasheet for the decision of 17 January 2009

Case Number: T 0139/07 - 3.2.03

Application Number: 97941217.8

Publication Number: 0878720

IPC: F21V 8/00

Language of the proceedings: EN

Title of invention:
Illuminating device and display using the device

Patentee:
Seiko Epson Corporation

Opponent:
Hydrometer GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 107, 100(a)(c), 56

Keyword:
"Parties to appeal - entitlement to appeal - adversely affected (yes)"
"Admissibility of main request (yes)"
"Extension of subject-matter - Main request (yes) - Auxiliary request (no)"
"Auxiliary request - inventive step (yes)"

Decisions cited:
T 0386/04

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0139/07 - 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 17 January 2009

(Opponent) Hydrometer GmbH
Industriestrasse 13
D-91522 Ansbach (DE)

Representative: Tergau & Pohl Patentanwälte
Mögeldorfer Hauptstrasse 51
D-90482 Nürnberg (DE)

Respondent: Seiko Epson Corporation
(Patent Proprietor) 4-1, Nishi-shinjuku 2-chome
Shinjuku-ku
Tokyo 163 (JP)

Representative: Kenyon, Sarah Elizabeth
Miller Sturt Kenyon
9 John Street
London
WC1N 2ES (GB)

Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 20 November 2006 concerning maintenance of European patent No. 0878720 in amended form.**

Composition of the Board:

Chairman: U. Krause
Members: G. Ashley
I. Beckedorf

Summary of Facts and Submissions

I. European patent EP-B-0 878 720 concerns an illumination device arranged at the front face of an illuminated object, such as a liquid crystal display. Grant of the patent was opposed on the grounds of lack of novelty and inventive step (Article 100(a) EPC), insufficiency of disclosure (Article 100(b) EPC) and added subject-matter (Article 100(c) EPC). The Opposition Division concluded that the set of claims filed during the oral proceedings as the second auxiliary request "B'" met the requirements of the EPC, and thus decided that the patent should be maintained on the basis of these claims.

II. The decision was posted by the Opposition Division on 20 November 2006. The Appellant (patent proprietor) filed notice of appeal on 22 January 2007, paying the appeal fee on the same day. A statement containing the grounds of appeal was filed on 23 March 2007. Oral proceedings were held on 17 February 2009.

III. Requests

The Appellant requests that the decision under appeal be set aside and a that the patent be maintained as granted (main request) or in amended form on the basis of the set of claims filed as auxiliary A' during the oral proceedings.

The Respondent (opponent) requests that the appeal be dismissed.

IV. Claims

(a) Claim 1 of the granted patent (main request) reads as follows:

"1. An illumination device arranged at the front face of an illuminated object, comprising:

a light-guide plate (11) of transparent flat plate shape formed with point-form optical extraction structures (11A, 11B); and
a light source (2) arranged facing an end face (16) of this light-guide plate, said light source being a point light source, characterised in that:

said point-form optical extraction structures are formed at the face (17) opposite an optical output face (13) facing said illuminated object (6); and
said point-form optical extraction structures have a constant slope of less than about 30 degrees with respect to said face (17) opposite the optical output face (13)."

Dependent claims 2 to 9 concern preferred embodiments of the illumination device of claim 1.

(b) Claim 1 of auxiliary request A' is as follows:

"1. An illumination device arranged at the front face of an illuminated object (6), comprising:

a light-guide plate (11) of transparent flat plate shape formed with point-form optical extraction structures (11A, 11B); and

a light source (2) arranged facing an end face (16) of this light-guide plate, said light source being a point light source, wherein

said point-form optical extraction structures have a conical shape, a pyramidal shape or a shape based on a conical shape and are formed at the face (17) opposite an optical output face (13) facing said illuminated object (6); and
said point-form optical extraction structures have a constant slope of less than about 30 degrees with respect to said face (17) opposite the optical output face."

Dependent claims 1 to 9 read as those of the granted patent.

V. Prior Art

The following documents are of relevance for this decision:

D1: JP-A-6 324 331, together with the computer-generated English translation, as supplied by the Opposition Division with its communication of 5 July 2006.

D15: JP-A-5 150 237, together with the computer-generated English translation, as supplied by the Respondent with its letter of 09 October 2008.

VI. Submissions of the Parties

A summary of the arguments of the parties arguments is as follows.

(a) Admissibility of the Main Request

The Respondent submits that the main request of the Appellant, to have the patent maintained on the basis of the claims as granted, is inadmissible. The reason being that the Appellant's main request before the Opposition Division was to have the patent maintained in amended form. Had this request been granted, the Appellant would have not been in a position to appeal, since he would not have been adversely affected, as is required by Article 107 EPC. The subsequent request to have a patent based on the granted claims is an even less adverse situation, and consequently does not meet the requirements of Article 107 EPC.

The Appellant argued that the granted claims were restricted in an attempt to overcome a clarity objection raised by the Opposition Division. The Appellant had considered this objection to have been unfounded, and there had never been any intention to abandon the subject-matter of the granted main claim.

(b) Article 100(b) EPC

The Respondent did not pursue the objection that the disputed patent does not disclose the invention in a manner sufficiently clear for it to be carried out by a person skilled in the art.

(c) Main Request - Article 100(c) EPC

Claim 1 was amended during examination proceedings to define the slope of the optical extraction structures as being constant. The Respondent submits that the only disclosure in the original application of structures having constant slopes is given in Figures 16A and 16B, which show conical and pyramidal shapes respectively. Since the definition in granted claim 1 includes other shapes, such as structures based on a tetrahedral shapes, those in the form of rings, or hipped roof shapes, the subject-matter of the patent has been extended beyond that disclosed in the original application.

The Appellant referred to page 10, lines 1 to 3 of the published application as providing support for the contested feature. This passage provides the general teaching that a constant slope, such as shown in Figures 16A and 16B, is advantageous, since the angle of the surface can be fixed and the directionality of the surface direction is eliminated. It is clear to the skilled person that this advantage applies to structures of any shape, and is not limited to the specific embodiments shown in the Figures.

(d) Auxiliary Request A' - Inventive Step

The Respondent argues that the claimed illumination device differs from that disclosed in document D1 in that:
- the point-form optical extraction structures are formed on the opposite face of the light-guide plate, and

- they have a constant slope of less than about 30 degrees.

The requirement of claim 1 that the light source is a point light source is not seen by the Respondent as providing a difference, since the patent specification (paragraph [0043]) gives a fluorescent tube as an example of an appropriate source, which is also indicated in D1.

Starting from D1, the objective problem is how to improve the efficiency in directing reflected light towards the object to be illuminated. The solution is provided by D15, which teaches that more efficient light emission from a light-guide is achieved when the surface opposite to the optical output face is provided with structures having constant slope of 30°.

It would be straight-forward for the skilled person to adapt the illumination device of D1 in accordance with the teaching of D15, particularly as the light-guide of D15 does not have a reflective layer. The Respondent also drew attention to the fact that claim 1 is directed to an illumination device *per se*, which merely has to suitable for arrangement at the front face. Although D15 discloses an illuminating device situated at the back face of the object to be illuminated, it too is suitable for positioning at the front face.

The Appellant referred to Figure 8 of D1 as showing that the optical extraction structures may be provided with a constant slope, but this must be 80 to 90 degrees, as compared with less than about 30 degrees, as required by claim 1. The reason being that in the

light-guide of D1, a surface sloping at less than 80 degrees results in a blurred image.

It would not be possible for the skilled person to combine the teachings of D1 and D15 and arrive at the invention. In particular, D15 requires that one surface is provided with slopes of 30 degrees and the other with slopes of 45 degrees. This is in contradiction with D1 which teaches that slopes of less than 80 degrees are detrimental to the quality of the image.

The light-guide according to the invention increases the amount of light going towards the object without having the 45 degree knurled output surface as shown in D15. Given the increase in light output, the amount of blurring associated with point-form structures having a constant slope of 30 degrees or less, as defined in the claim, does not have an adverse effect, despite the teaching of D1.

The Appellant also argued that the definition of a point light source in claim 1 indicates that the light source is small and references to a fluorescent tube have been omitted from the patent specification. There is no clear indication in either D1 or D15 that their respective light-guides would be suitable for use with a point light source.

Reasons for the Decision

1. Admissibility of the Main Request

1.1 The Respondent argued that, had the Appellant's main request before the Opposition Division been granted, the Appellant would have not been adversely affected. The subsequent request to have a patent based on the granted claims is even less adverse, and consequently does not meet the requirements of Article 107 EPC.

1.2 Article 107 EPC states that "any party to proceedings adversely affected by the decision may appeal". In the present case the Opposition Division concluded that the patent should be maintained in amended form, and hence it is clear that the patent proprietor was in a worse situation as a result of the opposition proceedings. The requirements of Article 107 EPC are thus met, and the appeal is admissible.

1.3 However, the question remains as to whether, during the appeal proceedings, an Appellant-Proprietor may file a request for the patent to be maintained on the basis of the granted claims, when the main request during opposition proceedings was maintenance in a more restricted form.

In numerous cases (reviewed in T 386/04, paragraph 1 of the Reasons), the Boards of Appeal have permitted an appellant-proprietor in such a situation to seek maintenance of the patent as granted. The underlying reason for this is that in opposition proceedings a patentee cannot surrender his patent either in whole or part, but only request that the patent be amended.

Consequently, it is the view of this Board that the Appellant is allowed to file its main request.

2. Main Request - Article 100(c) EPC

2.1 Compared with claim 1 of the application as originally filed, claim 1 of the granted patent further defines the point-form optical extraction structures as having a constant slope of less than about 30 degrees with respect to the face opposite the optical output face. The Respondent submits that this amendment results in subject-matter of the patent being extended beyond the content of the application as filed.

2.2 The original application discloses an embodiment (fourth embodiment on page 9 of the published application and in Figures 15 and 16A to 16D) in which the optical extraction structures are in the form of convex projections having faces with angles of less than 30 degrees. A similar embodiment (fifth embodiment on page 11) involving indentations or concave shapes is shown in Figures 24 and 25A to 25D.

There is no explicit reference in the description to the projections (or indentations) having a constant slope, and indeed, Figures 15 and 16C show that the slope may vary, providing that it remains at about 30 degrees or less. However, Figure 16A shows a conical projection, Figure 16B shows a pyramidal projection with four faces, and there is no doubt that both of these projections have a constant slope.

2.3 Claim 1 of the main request is, however, not limited to optical extraction structures having the shapes shown

in Figures 16A or 16B (or the concave equivalents, as shown in Figures 25A and 25B). The Respondent has shown that projections other than conical or pyramidal can have constant slopes of less than 30 degrees, for example, projections based on a tetrahedral shapes, in the form of rings or hipped roof shapes. The question facing the Board is therefore whether there is a clear disclosure in the application of point-form optical extraction structures of all shapes with a constant slope, and not just those expressly shown in the Figures.

2.4 The Appellant submits that the broader application of a constant slope is disclosed by the statement (at page 10, lines 1 to 3) that "conical faces as shown in Fig. 16A or a shape based on this are advantageous since the angle of the surface can be fixed and directionality of the surface direction is eliminated". This, according to the Appellant, provides the general teaching that a structure having a constant slope should be selected.

The statement indicates that conical forms or shapes based on cones are particularly advantageous, and then gives the reason why. There is, however, no indication that such an advantage extends to other shapes. Since it is not apparent that the statement concerns anything other than conical-type projections, claim 1 of the main request contains subject-matter extending beyond the content of the application as originally filed. The objection of the Respondent under Article 100(c) EPC to this claim is thus upheld.

3. Claim 1 of Auxiliary Request A' - Inventive Step (Articles 100(a) and 56 EPC)

3.1 Claim 1 of auxiliary request A' defines the point-form optical extraction structures as having a conical shape, a pyramidal shape or a shape based on a conical shape. Therefore the objection under Article 100(c) no longer applies.

3.2 The Respondent submits, however, that the illumination device of claim 1 lacks an inventive step in light of documents D1 and D15.

3.3 D1 discloses an illumination device arranged at the front face of an illuminated object, namely a liquid crystal display. Although a light source is indicated in D1, it not unambiguously stated that it is a point light source. The illumination device comprises a transparent light-guide plate (11) with point-form optical extraction structures (projections (13), as shown in Figures 5(b) and 6(a) of D1), which can be clearly seen in the Figures as having sides of constant slope, albeit greater than 30 degrees.

The disclosure of D1 thus forms an appropriate starting point for the assessment of inventive step.

3.4 The illumination device of claim 1 differs from that of D1 in that:
(i) the light source is defined as being a point light source;
(ii) the optical extraction structures are formed on the face opposite to the optical output face;

(iii) the slope of the optical extraction structures is 30 degrees or less.

3.5 Starting from D1, the objective problem to be solved is to improve the efficiency in emitting light. According to the Respondent, the solution is to be found in D15.

3.6 The same objective problem is indeed addressed in D15 (see paragraph [0004] and [0005]). The solution according to D15 is to provide the optical output face of the light guide with a knurled surface having at 45 degree slopes, and to provide the opposite surface with serrations have constant slopes of 30 degrees (see Figure 1). This ensures total internal reflection and the maximum emission of light in the direction of the object to be illuminated (paragraph [0012]).

3.7 It is, however, necessary to consider whether the solution taught in D15 would be realistically adopted by the skilled person faced with the problem of improving the light-guide of D1.

3.7.1 Firstly, the illumination device of D15 is arranged at the rear face of the object (a liquid crystal display, as in D1) in order to provide back lighting. The skilled person would have to realise that the proposed solution of D15 would also work when the light-guide plate is placed in front of the object to be illuminated, as in D1. This is not immediately apparent for the following reason.

D1 teaches (paragraph [0022]) that the slope of the extraction structures should not have an angle of less than 80 degrees with respect to the optical output face,

since this reduces the visibility, which the Appellant has explained to result from a blurring of the image. It is thus not obvious to situate the light-guide of D15 at the front face, as the skilled person would expect that this would lead to a deterioration in the quality of the image, despite it appearing brighter. The plausible explanation given by the Appellant as to why this disadvantage is not of detriment to the illumination device of the contested patent is that, although some blurring does occur, the increased efficiency in light emission is such that the overall image is improved, especially with a slope in the range 25 to 30 degrees.

3.7.2 Secondly, D15 also requires that the optical output face 4b is also knurled, with a serration angle of 45 degrees, in order to prevent internal reflection and improve light output from this surface (paragraph [0011] of D15). In the context of the invention of D15 there is no disclosure of a flat surface for the optical output face. Thus D15 teaches away from having a flat face adjacent to the object to be illuminated.

3.7.3 Thirdly, there is no explicit mention in D15 of the use a point light source, or any indication that satisfactory results could obtained when such a light source is used. References to fluorescent light tubes, which clearly could not be considered to be a point light source, have been deleted from the patent specification.

3.8 In summary, even with the teaching of D15 that the emission of light is improved when the face opposite the optical output face is provided with surfaces at 30

degrees, it is not apparent that this would work for an illumination device having a point light source when the illumination device is arranged in front of the object. None of the features (i) to (iii) set out above is obvious in light of the teachings of D1 and D15 alone without knowledge of the invention. Consequently, the illumination device of claim 1 and dependent claims 2 to 9 has an inventive step.

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 maintain the patent with claims 1 to 9 filed during the oral proceedings as auxiliary request A', and a description and figures to be adapted.

The Registrar: The Chairman:

A. Counillon U. Krause