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D E C I S I O N
of 12 September 2002

Case Number: T 0652/01 - 3.4.2

Application Number: 93306536.9

Publication Number: 0588504

IPC: G02F 1/1335; F21V 8/00; G02B 5/02

Language of the proceedings: EN

Title of invention:
A backlight device for a liquid crystal display device

Patentee:
International Business Machines Corporation

Opponent:
Mannesman VDO AG

Headword:
-

Relevant legal provisions:
EPC Art. 54(3), 56, 102(3)

Keyword:
"Inventive step - no"

Decisions cited:
T 0952/92

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0652/01 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 12 September 2002

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 26 April 2001 concerning maintenance of European patent No. 0 588 504 in amended form.**

Composition of the Board:

Chairman: E. Turrini
Members: A. G. M. Maaswinkel
B. J. Schachenmann

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal, received on 7 June 2001, against the interlocutory decision of the opposition division, dispatched on 26 April 2001, on the maintenance in amended form of the European patent No. 0 588 504. The fee for the appeal was paid on 7 June 2001. The statement setting out the grounds of appeal was received on 30 August 2001.

Opposition had been filed against the patent as a whole on the basis of Article 100(a) EPC, and in particular on the grounds that the subject-matter of the patent was not patentable within the terms of Articles 52(1), 54 and 56 EPC.

The opposition division held that the grounds of the opposition did not prejudice the maintenance of the patent on the basis of the set of claims according to the single request then on file, having regard *inter alia* to the following documents:

(D2) GB-A-619 084

(D4) Database WPI Section Ch, Week 9219, Derwent Publications Ltd., London, GB; Class A32, AN 92-154889 & JP-A-4 091 905 (Asahi Chem) 25 March 1992

(D5) IBM Technical Disclosure Bulletin. vol.33, no.1B, June 1990, New York US, pages 143-144, "Polarized backlight for liquid crystal display"

(D6) EP-A-0 534 140

(D7) WO-A-92/04648

(D8) EP-B-0 500 960 (*post-published family member of the Japanese PCT-application in document D7; document D8 had already been used during the opposition proceedings for the interpretation of the prior art in D7*).

II. Oral proceedings were held on 12 September 2002 at the requests of the parties.

III. The appellant (opponent) requested that the decision under appeal be set aside and that the European patent 0 588 504 be revoked.

IV. The respondent (patentee) requested that the appeal be dismissed and that the patent be maintained in amended form as by the opposition division in its decision of 26 April 2001.

V. The wording of independent claim 1 reads as follows:

"A backlight device (6) for use in a liquid crystal display device having a display panel, the backlight device comprising:

a light source (7);

light guide means (8) having a first surface to face a back surface of a liquid crystal display panel when the backlight device is incorporated in a liquid crystal display device and a side surface positioned to receive light from the light source (7);

a reflector means provided at a second surface of the light guide means (8); and

an optical film (9) of transparent material

positioned adjacent the first surface of the light guide means wherein the optical film (9) is of a transparent material comprising:
a first surface having grooved structure including a plurality of isosceles triangle prisms arranged side-by-side; and
a second surface having an optically rugged structure for performing diffuse transmission;
wherein
each isosceles triangle prism has a top angle of between 95 degrees and 120 degrees."

Independent claim 2 reads as follows:

"A backlight device (6) for use in a liquid crystal display device having a display panel, the backlight device comprising:
a light source (2);
light guide means (8) having a first surface to face a back surface of a liquid crystal display panel when the backlight device is incorporated in a liquid crystal display device and a side surface positioned to receive light from the light source (7);
a reflector means provided at a second surface of the light guide means (8); and
an optical film (9) of transparent material positioned adjacent the first surface of the light guide means wherein the optical film (9) is of a transparent material comprising:
a first surface having a structure including a plurality of quadrangular prisms arranged side-by-side; and
a second surface having an optically rugged structure for performing diffuse transmission;

wherein
each quadrangular prism has a top angle of between 95 degrees and 120 degrees."

Claims 3 - 9 are dependent claims.

VI. The appellant's arguments may be summarised as follows.

Novelty

Document D6, which is a document to be considered under Art. 54(3) EPC, discloses a backlight device for use in a liquid crystal device with all features of the device according to claim 1 with the exception that in the claimed device the optical film (9) with a grooved first surface has an optically rugged structured second surface. The optical film (7) in the device disclosed in document D6 has also a grooved first surface comprising raised structures, the disclosure being silent on the second surface of this film. However, according to document D6, this device comprises a light diffusing plate (2) arranged adjacent to the optical film (7) and having the same optical function as the rugged second surface of the optical film according to claim 1. Document D6, see column 6, lines 28 - 31, refers to the possibility of forming the raised structures on the optical film (7) from different materials as their support layer, or -alternatively- that the sheet may also be composed from the same material as the raised structures. Upon reading this passage the skilled person concludes that the same applies to the rugged surface, which therefore could also be implemented as the second surface of the optical film carrying the raised structures at its front surface. Therefore the *information* that the

optical film in the device known from document D6 can have a first grooved surface and a second rugged surface is *available* from D6 and is *derivable* from its contents, whence the subject-matter of claim 1 lacks novelty. This is analogous to case T 0952/92 (OJ 1995, 755), in which the board decided that whatever the means for disclosure (written description, oral description, use by sale, etc.), availability in the sense of Article 54(2) EPC involves two separate stages: availability of the means of disclosure, and availability of information which is accessible and derivable from such means.

Inventive step

Document D8, see Figure 4, discloses a backlight device which only differs from the subject-matter of claims 1 and 2 in that the film-like diffusing member (3) does not include a grooved prism-like structure. This grooved structure solves the technical problem of enhancing the amount of light to be emitted in predetermined directions after its passage through the diffusing member. Optical films or laminates with such light directive properties are known from document D2 (structure including isosceles triangle prisms) and from document D4 (structure with conical projections), and their inclusion in the backlight device of document D8 in order to enhance its luminosity would be obvious to the skilled person. Furthermore the isosceles triangle prisms of the optical film disclosed in document D2 have top angles between 95 degrees and 120 degrees, as can be seen from the examples in Figures 5 to 9. Therefore by inclusion of the light guiding structures known from documents D2 or D4 in the device shown in Figure 4 of document D8 the skilled person

would arrive at the subject-matter of claims 1 and 2 without an inventive step being involved.

Furthermore document D5, Figure 1, discloses a backlight device, in which at the output side of a light guide a diffusing sheet (3) and a second sheet (4) with prismatic indentations are arranged. The subject-matter of claim 1 differs from this prior art device in that the diffuser and the indented prismatic layer are included in a single sheet; and in the selection of the top angle of the prisms between 95 degrees and 120 degrees, whereas in the embodiment of document D5 the indentation angle is 90 degrees. The combination of the two elements (diffuser and prismatic layer) into one element solves the problem of simplifying the number of optical elements. This is an obvious aim for the skilled person in this technical field. In case of the device disclosed in document D5 such a simplification is straightforward, because the diffuser (3) and the prismatic sheet (4) consist of the same material (acrylic), which makes a combination of their optical properties in a single sheet simple. It is pointed out that the skilled person is aware of combining these optical properties in one film, as is, for instance, documented in document D4. The argument that the diffuser effect in the diffuser sheet from document D5 would be based on a *volume* effect which would render a combination of this sheet with the prism sheet nonobvious cannot be accepted, because Figure 1 of document D5 is only schematic and according to line 3 of the last paragraph on page 143 the diffuser is "acrylic translucent". Furthermore every diffusing surface involves a volume effect since ruggedness is caused by oblique portions of the diffusing surface, which is illustrated in Figure 5 of the patent in suit.

The further difference related to the selection of the top angles of the prisms is not inventive, because the prior art, for instance document D2, already shows that top angles between 95 degrees and 120 degrees are well known in these illumination enhancing members; moreover the difference to the angle of 90 degrees disclosed in D5 is very small, and the selection of the particular top angle would be dependent on the refractive index of the optical material of the prism sheet.

VII. The respondent's arguments may be summarised as follows.

Novelty

The objection that document D6 would anticipate the subject-matter of claims 1 or 2 is unfounded, because, contrary to the appellant's allegations, this document does neither explicitly nor implicitly teach the feature that the optical film positioned adjacent the light guide means has a first surface having a grooved structure and a second surface which is optically rugged as defined in claims 1 and 2. With respect to the cited passage in column 6, lines 28 - 31 of document D6, this relates to the base film for the raised or grooved structure. It does not disclose anything concerning the reverse surface of this base film and in particular does not mention "ruggedness" or any equivalent term.

Inventive step

The assertion that the subject-matter of claims 1 and 2 would be obvious by the combination of the teachings of document D8 and respectively documents D2 or D4 has not

been substantiated, because the appellant failed to prove why the skilled person *would* carry out that combination. As discussed by the opposition division in its decision, document D8 discloses a backlight arrangement with a diffusing plate (3) for ensuring that the light leaving the patterned light guide is evenly diffused and the main purpose of this arrangement is to obtain a *uniform* backlighting over a wide viewing range. Since document D8 does not disclose an optical plate incorporating ridges or prisms between the light guide and the liquid crystal display and since the disclosed arrangement provides the desired uniform illumination for the display there is no reason why the skilled person would contemplate introducing a plate provided with prisms on one side and a rugged structure on the other side as disclosed in document D4 or a plate as shown in document D2. Specifically, any explanation of where and with which orientation relative to a light source the disclosed optical plate is to be used is missing in D8.

Document D5 discloses a backlight device for a liquid crystal display. At the output surface of the light guide (2) a translucent diffuser (3) is provided for scattering the output light for the purpose of uniform luminance. Adjacent to the diffuser an acrylic sheet (4) with an indented cross-section is arranged. The subject-matter of claim 1 differs from the device disclosed in document D5 in that the claimed device comprises only a single optical film in which the diffusing layer and the grooved structure are included in its respective surfaces. The problem addressed in the patent is to optimise the illumination pattern for a portable liquid crystal display and at the same time to reduce the size of the backlight device. In document

D5 the diffuser and the indented sheets are disclosed as two separate items. Neither is there any suggestion in D5 of combining these items in one element, nor is the problem of reducing the height of the backlight device disclosed. Hence, there is no reason why the skilled person would wish to modify anything in this device. Furthermore, whereas in the claimed device the diffusing function is obtained by a diffusing *surface*, which has therefore a minimum thickness, thereby contributing to solving the problem of reducing the thickness of the apparatus, it appears that in the device disclosed in document D5 the diffusing effect is a *volume* effect, see the thickness of layer (3) in Figure 1, and also line 3 of the last paragraph on page 143, which discloses that the diffuser 3 is "translucent", in contrast to the light guide (2) which is said to be "transparent".

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

In its decision the opposition division had found that the claims as amended meet the requirements of Articles 123(2) and (3)EPC. This finding is not in dispute between the parties. The board sees no reasons to arrive at a different conclusion.

3. *Novelty*

3.1 In the decision under appeal the opposition division concluded that, having regard to the date of filing and

publication of document D6 in relation to the patent in dispute, it is considered as comprised in the state of the art within the meaning of Article 54(3) and (4) EPC for contracting states DE GB, IT and NL. The Board can agree with this finding, which is moreover not controversial between the parties.

3.2.1 Document D6 discloses a backlight device comprising: a light source (4, *see Figure 4*); light guide means (1) having a first surface to face a back surface of a liquid crystal display panel when the backlight device is incorporated in a liquid crystal display device and a side surface positioned to receive light from the light source (4); a reflector means (3) provided at a second surface of the light guide means (4); and an optical film (7) of transparent material positioned adjacent the first surface of the light guide means wherein the optical film (7) is of a transparent material comprising a first surface having a grooved structure including a plurality of isosceles triangle prisms arranged side-by-side (*Figure 5a*) wherein each isosceles triangle prism has a top angle of between 95 degrees and 120 degrees (*column 6, line 52; column 7, line 2*).

3.2.2 With respect to the feature that the optical film defined in independent claims 1 and 2 has "a second surface having an optically rugged structure for performing diffuse transmission" the appellant has reasoned that, although document D6 does not explicitly mention a particular ruggedness of the second surface of optical film (7), a light diffusing arrangement (2) adjacent to optical film (7) is disclosed having the same function as the claimed surface. Furthermore he referred to the passage in column 6, lines 18 - 31,

which discloses the alternatives of forming the raised structures on the optical film (7) from the same or from different materials as their support layer. Upon reading this passage the skilled person would conclude that the same applies to the rugged surface, which therefore could also be implemented as the second surface of the optical film carrying the raised structures at its front surface.

3.2.3 With respect to this passage of document D6, in the board's understanding it addresses the composition of the optical sheet (7) but is silent about sheet (2). According to this paragraph, the sheet should consist of light-transmissive material, and it could be made out of the same material as the raised structures, or, alternatively, the carrier film and the structures could be composed of dissimilar material. At least from this passage no information about the possible composition of sheet (2) is obtainable. Rather it would appear, that in all embodiments of document D6 (column 10, line 30; column 13, line 7 and line 54; column 15, line 10; column 16, line 21 and line 53) this diffusing film (2) is a commercial product, which does not support the view that document D6 would implicitly suggest that this film is combined with and part of the optical sheet (7).

3.3.1 The jurisprudence of the boards of appeal is based on a *narrow concept of novelty*, see "Case Law of the Boards of Appeal of the European Patent Office", 2th edition 2001, I.C.2.5, page 59, "Taking equivalents into account". This jurisprudence is reflected in the Guidelines, Section C-IV, 7.2, stating that "A document takes away the novelty of any claimed subject-matter derivable directly and unambiguously from that document

including any features implicit to a person skilled in the art in what is expressly mentioned in the document...".

3.3.2 From the assessment in point 3.2.3 *supra* it follows that the arrangement disclosed in document D6 including the diffusing sheet (2) and the sheet with raised structures (7) could optically be seen as an *equivalent* to the optical film (9) as defined in claim 1 or claim 2 of the patent. According to the established jurisprudence an *equivalent* to claimed subject-mater does not, however, *anticipate* this subject-matter.

3.3.3 The appellant has referred to decision T 0952/92, which in its first Headnote states that "availability" in the sense of Article 54(2) EPC does not only involve availability of the disclosure (*in the present case: document D6*) but also "availability of information which is *accessible and derivable*" from the disclosure. The term "derivable", if used in isolation, could *inter alia* indeed be interpreted as "*capable of being obtained or drawn as a conclusion, deduction, or inference*" (Oxford English Dictionary (Second Edition), on Compact Disc), which would suggest that "*derivable equivalents*" were included. However, when reading the cited phrase from T 0952/92 in the context of this Decision (*see point 2.1, last three paragraphs, of the Reasons*), it is clear that the term "*derivable*" has been employed in the sense of "*obtainable by chemical analysis of a sample*" and that, furthermore, it is used with the same restriction as expressed in the Opinion G1/92 of the Enlarged Board of Appeal, namely that it must be "*directly and unambiguously derivable*", which is therefore in agreement with the established

jurisprudence of the Boards of Appeal.

3.4 In conclusion, the board is convinced that document D6 does not anticipate the subject-matter of claims 1 and 2 within the meaning of Article 54(3) EPC.

3.5 No objection pertaining to lack of novelty based on any other of the documents on file had been put forward.

The subject-matter of claims 1 and 2 is therefore considered to be new (Article 54(1) EPC).

4. *Inventive step*

4.1 During the oral proceedings the appellant has objected that the subject-matter of claim 1 is obvious in view of the disclosure in document D5; and that it equally lacks an inventive step when starting from document D8 as closest prior art. In the decision under appeal the opposition division had considered document D5 as the closest prior art.

4.2 *Document D5*

4.2.1 As shown in Figure 1 of D5 this document discloses a backlight device including a light source; light guide means; and reflector means as the device defined in claim 1. At the output surface of the light guide means the device according to document D5 comprises an acrylic translucent diffuser (3) and an acrylic sheet (4) which has an indented cross-section, wherein the indentation angle is 90 degrees. The diffuser has the function of scattering the light from the light guide for the purpose of uniform luminance. The indented sheet has *inter alia* the function of optimising the

emission direction of light by varying the indentation angle, which effect is shown in Figure 2, illustrating the luminance enhancement by employing this sheet in a backlight device.

4.2.2 The subject-matter of claim 1 differs from the device disclosed in document D5 in that the claimed device comprises only a single optical film in which the diffusing layer and the grooved (indented) structure are formed on its respective surfaces.

A further difference is in the range of top angles of the indentations, which according to claim 1 should be between 95 and 120 degrees. The value of the top angle disclosed in document D5 is 90 degrees.

4.2.3 The respondent identified the problem addressed in the patent over the prior art in document D5 as reducing the size of the backlight device. According to the appellant, the problem can be defined as simplifying the number of optical elements in the prior art device.

4.2.4 In the opinion of the board, document D5 teaches that for an optimum illumination of the liquid crystal display the beam characteristics of the light emitted by the light guide (2) are modified in two steps: in a first step the light is scattered by a diffuser for the purpose of uniform luminance (*page 143, last paragraph, line 6*). In a second step the diffused light beams pass through an indented sheet for optimising the emission direction (*ibidem, line 7*). In the particular embodiment in Figure 1 of document D5, these beam modifications have been performed by placing two discrete optical elements in cascade. For a skilled person in the field of optical engineering it would be

clear that, instead of carrying out the beam modifications in two overlying optical sheets, a single sheet including the required beam modifying functions (diffuser and indented layer) would produce an illumination beam with equally advantageous characteristics. In practice, the optical engineer would be led by the usual criteria for making his choice (*e.g. commercial availability of two different films, ease of production of a combined film*), these being measures which are within his ordinary skill.

4.2.5 The argument of the respondent that the diffusing effect in the diffuser sheet in document D5 is caused by a *volume* effect, which would discourage the skilled person to replace this volume diffuser by a diffusing *surface* does not convince the board. As discussed in point 4.2.4 *supra*, the relevant teaching obtained by the optical engineer from document D5 involves that in order to obtain the desired light output characteristics the beam has to pass through a diffusing structure and subsequently through a light directing structure. Since the optical materials of the diffuser sheet and the indentation layer sheet are the same (*acrylic*), it would be a normal routine step to combine these sheets in a single (*acryl*ic) sheet. This view is also supported by the fact that optical sheets combining both required functions in a single sheet are known in this technical field, as disclosed in document D4.

4.2.6 The further difference between the subject-matter of claim 1 and the device disclosed in document D5, the selection of the top angle of the prismatic structure of between 95 degrees and 120 degrees compared to the value of 90 degrees disclosed in document D5, cannot

make a contribution to inventive step, because, as shown in document D2, this angle is a function of the refractive index of the optical material of the indented structure and, furthermore, depends on the desired illumination pattern. Therefore the skilled person will select the top angle in dependence of the refractive index of the optical material and the beam characteristics envisaged for the particular liquid crystal display.

4.2.7 It is concluded that the subject-matter of claim 1 does not involve an inventive step within the meaning of Articles 52(1) and 56 EPC.

4.2.8 Since claim 1 of the respondent's single request is not allowable, there is no need to address the further claims.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

P. Martorana E. Turrini