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D E C I S I O N
of 18 November 1997

Case Number: T 0325/95 - 3.4.2
Application Number: 84300845.9
Publication Number: 0121305
IPC: G02F 1/137, G02F 1/133

Language of the proceedings: EN

Title of invention:
A multicolor liquid crystal display

Patentee:
Xerox Corporation

Opponent:
Diehl GmbH & Co

Headword:
-

Relevant legal provisions:
EPC Art. 123(3), 56, 69

Keyword:
"Inadmissible extension of the protection conferred (no)"
"Inventive step (confirmed)"

Decisions cited:
G 0002/88, BGH "Formstein"

Catchword:
The "protection conferred" by a claim in the sense of Article 123(3) EPC is defined by the terms of the claim (see Article 69(1) EPC), and is not dependent on the actual validity of the claim in view of the prior art.



Case Number: T 0325/95 - 3.4.2

DECISION
of the Technical Board of Appeal 3.4.2
of 18 November 1997

Appellant:
(Opponent)

Diehl GmbH & Co
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Representative:

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Respondent:
(Proprietor of the patent)

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Representative:

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Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office posted 22 February
1995 concerning maintenance of European patent
No. 0 121 305 in amended form.

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
L. C. Mancini

Summary of Facts and Submissions

- I. European patent No. 0 121 305 granted on the basis of European patent application No. 84 300 845.9 was maintained in amended form by an interlocutory decision of the Opposition Division.

In the Opposition Division's opinion the subject-matter of claim 1 as granted lacked an inventive step in the sense of Article 56 EPC in view of the contents of the paper

D6: "Transflective TN-Zellen zur farbigen Informationsdarstellung", M. E. Becker et al., presented at the meeting "13. Freiburger Arbeitstagung Flüssigkristalle" held from 23 to 25 March 1983 in Freiburg, Germany.

The Opposition Division however held that the additional feature introduced into an amended independent claim 1, according to which the colour mask had coloured patches and a grey surround area luminance-balanced so that the coloured patches all had substantially equal lamination transmission, could not be derived in an obvious way from the available state of the art.

- II. The appellant (opponent) filed an appeal against the interlocutory decision.
- III. Oral proceedings were held before the Board of Appeal on 18 November 1997.
- IV. The appellant requested that the decision under appeal be set aside and that the European patent be revoked.

- V. The respondent (patentee) requested that the appeal be dismissed and that the patent be maintained in amended form on the basis of claims 1 to 9 filed with his letter of 11 November 1997.

Claim 1 of this set of claims reads as follows:

"A multicolor liquid crystal display device (300) selectively capable of being in the 'on' or 'off' state and providing a uniformly-dark output panel (330) when in the 'off' state, comprising:

a liquid crystal cell (320) including two transparent, parallel, substrates of insulation material each with a confronting surface bearing at least one transparent electrode (73), a layer of twisted nematic liquid crystal material between the substrates, the cell being capable of transmitting light in the vicinity of the electrodes upon the application of an electric field across the layer when a potential difference of appropriate magnitude is applied between the electrodes;

a light source (314) for directing light towards one of the substrates;

a high extinction ratio polarizer (324,326) located on each substrate surface remote from the confronting surfaces, the polarizers being of the type which enables the attainment of a contrast ratio of greater than 100 from the multicolor display, and having polarising axes which are parallel with or orthogonal to the director of the liquid crystal molecules adjacent the surface nearer to the light source;

a relatively-small amount of dichroic dye mixed with the liquid crystal material to form a guest- host mixture therewith for the purpose of absorbing, and thus preventing the buildup and subsequent passage of, the orthogonal vector component of polarized light created by imperfect rotation of the polarized light by

the orientation of the twisted nematic liquid crystal molecules when no electric field is present;

means for applying a voltage across the electrodes (73) to change the orientation of the molecules of the mixture, and to enable the passage of light when desired, and

a luminance-balance color mask (317) having colored patches and a gray surround area, the coloured patches being luminance-balanced with each other and the gray surround area in order that the colored patched and gray surround area are of substantially equal luminous transmission located between the light source and the polariser on the input substrate of the liquid crystal cell, so that the twisted nematic liquid crystal cell with the dichroic dye added, and the two polarisers in combination with the luminance-balanced color mask, cause the output panel to appear uniformly dark to an observer when the multicolor liquid crystal display device is in its 'off' state."

Claims 2 to 7 are apended to claim 1.

Independent claim 8 defines a method of providing a multicolor liquid crystal display device which comprises the same features as independent claim 1, expressed in terms of a manufacturing method.

Independent claim 9 reads as follows:

"A xerographic reprographic machine with a multicolor liquid crystal display device as claimed in any of claims 1 to 7".

VI. In support of his request the appellant submitted that the amendments brought to the description and claims offended against the provisions of Article 123(2) and

(3) EPC, and that the subject-matter of independent claim 1 lacked an inventive step in view of the contents of document D6.

In particular, the amending of the statement in the first paragraph of the description that the invention related to multicolour liquid crystal displays using "a rich-in-red light source" to define instead "a selected light source, for example a rich-in-red light source" extended the contents of the patent beyond the content of the application as originally filed, which was specifically dedicated to the use of a rich-in-red light source. For this reason also, claim 1 should include the use of a red light source as a necessary feature.

The appellant further submitted that the additional features introduced into the claim as granted to define coloured patches and a grey surround area luminance-balanced with each other resulted in an inadmissible extension of the protection conferred. In his view, the subject-matter of claim 1 as granted lacked an inventive step and the claim, which was therefore invalid, did not confer any protection whatsoever. Since the features added to claim 1 were not set out in any of the dependent claims as granted, the subject-matter now covered by amended claim 1 was not covered by any of the claims as granted and the protection conferred was extended, accordingly.

The appellant in this respect admitted that he could not produce any case law of the Boards of Appeal of the EPO, in which the above reasoning had been followed. He however submitted that amending a claim in such a way

as to cover embodiments which were not effectively covered earlier was not permissible according to German practice as evidenced by the so-called "Formstein" decision.

Concerning the issue of inventive step, the reason why document D6 did not explicitly disclose luminance-balanced coloured patches was simply that it consisted in a scientific paper summarizing the knowledge available to the skilled person at the date of its publication, rather than in an usual patent document describing the technical details of specific embodiments. The document in relation in particular to Figure 2 addressed the light absorption of a coloured liquid crystal cell over the whole visible spectrum. It was thus clear that its teaching applied as well to multicolour displays, for which the coloured filter foils referred to in the last paragraph of the document as a means to achieve an acceptable uniformity of colour impression, could only be formed by luminance-balanced colour patches. Since document D6 thus taught the skilled person to provide luminance-balanced colour patches, selecting grey as an adequate colour for the areas surrounding the luminance patches would not involve any inventive step, because grey was obviously the most neutral colour available.

- VII. The respondent with respect to appellant's objections under Article 123(2) and (3) EPC pointed at various passages of the original application documents which referred to red light sources only as a preferred option of a selected light source. The fact also that a light source with a high red light content was not set out in claim 1 as originally filed, but only in dependent claim 6, clearly showed that such specific light source had not been disclosed as a necessary feature of the claimed invention.

Concerning the alleged inadmissible extension of the scope of protection, introduction in an independent claim at the opposition stage of features disclosed only in the description was constant practice in the procedures before the EPO, which could not be questioned by mere reference to German case law.

Finally, document D6 did not even relate to multicolour liquid crystal displays, nor did it address the technical problem underlying the invention. The short reference in the document to different coloured filters was merely directed to the possibility of placing colour filters at different locations of the illuminating system. Document D6 did not therefore provide any hint at the claimed subject-matter.

Reasons for the Decision

1. The appeal is admissible.
2. *Compliance of the amendments brought to the description and claims with the provisions of Article 123(2) and (3) EPC*
 - 2.1 The features of present independent claims 1 and 8, including those of the luminance-balanced colour mark, were in substance already defined in independent claim 1 as originally filed, except for the statement that a contrast ratio of greater than 100 is attained. This threshold value was disclosed originally in Figure 5.

Apart from a number of corrections of merely editorial nature, the description has been adapted to the wording of the independent claims as amended and supplemented

with a short summary of the relevant content of document D6, in compliance with Rule 27(1)(b) and (c) EPC.

In particular, the first paragraph of the description has been amended to make it clear that a rich-in-red light source, which was originally disclosed there as a necessary component of the invention, only represented an example of an adequate light source. This amendment is supported in particular by the second and third paragraphs on page 19 of the original description, which state that the invention can be used with a variety of light sources of which those with a high output in the red portion are only examples. Since furthermore original claim 1 did not comprise any limitation to rich-in-red light sources, which were defined only in original dependent claim 6, the original application documents cannot be considered to have disclosed such source as an essential feature of the invention, as was alleged by the appellant.

A few reference signs and the representation of electrodes 73 and colour patches 319 have also been corrected in Figure 8, in correspondence with the original description.

Accordingly, the amendments brought to the patent do not extend its content beyond the content of the original application documents, in compliance with the provision of Article 123(2) EPC.

- 2.2 As compared to independent claims 1 and 8 as granted, present claims 1 and 8 only comprise the additional features which specify that the luminance-balanced colour mask has coloured patches and a grey surround area, the coloured patches being luminance-balanced with each other and the grey surround area in order that the coloured patches and grey surround area are of

substantially equal luminous transmission. These additional features restrict the scope of the claims, which do not therefore contravene the provisions of Article 123(3) EPC.

In his reasoning to the effect that the scope of the claims had been extended, the appellant considered that claim 1 as granted did not actually afford any scope of protection whatsoever, because the claim was invalid, its subject-matter lacking an inventive step.

This argumentation is thus based on the assumption that the extent of protection referred to in Article 123(3) EPC would depend not only on the actual wording of the claims, but also on their validity in view of the prior art. This assumption however is not supported by the explicit statement in Article 69 EPC that "the extent of the protection conferred by a European patent ... shall be determined by the **terms** of the claims" (emphasis added).

Appellant's submissions in effect also imply that claims amended in opposition proceedings shall always have a counterpart in the set of claims as granted, which is not in line with the consistent case law of the EPO either. Attention is drawn for instance to decision G 2/88 of the Enlarged Board of Appeal (OJ EPO, 1990, 093), which ruled that replacement of a granted claim to a compound or composition, the subject-matter of which had turned out to be devoid of novelty, by a claim directed to a new use of the compound or composition as was actually described in the patent but had not been claimed in the opposed patent, was admissible under Article 123(3) EPC; see points 3 to 5 of the Reasons.

The appellant admitted that the jurisprudence of the Board's of Appeal of the EPO did not support his line of argumentation; he nevertheless submitted that this jurisprudence conflicted with German practice and case law.

The appellant did not however in this respect produce convincing evidence that limitation of a granted claim by the introduction of features disclosed only in the description was actually barred by German patent law, jurisprudence or practice. The only case law referred to by the appellant, the "Formstein" decision of the Bundesgerichtshof (see OJ EPO, 1987, 551) does not actually address the admissibility of such limitation. The ruling in this decision that the scope of protection afforded by a claim cannot be extended, by an allegation of equivalency, to an embodiment which was obvious in view of the prior art (see point 5.8) can hardly be considered to mean that limitation of a granted claim by way of features disclosed only in the description is generally inadmissible.

For these reasons, the amendments brought to independent claims 1 and 8 are not considered to offend against the provisions of Article 123(3) EPC.

3. *Patentability*

- 3.1 According to the description of the present patent the invention relates to a multicolour transmissive liquid crystal display of the type in which differently colored display areas are defined by colour patches of a filter provided between a light source and the input side of the liquid crystal cell (see e.g. page 2, lines 49 to 51).

In existing multicolour transmissive liquid crystal displays of this type the underlying colour patches would still be visible in the off-state condition of the display, which resulted in an unattractive aspect. Accordingly the object of the invention is to overcome this bleed-through problem (see page 2, lines 51 to 56).

In order to solve this problem the invention as defined in present claim 1 provides a series of features directed to the construction of the liquid crystal cell, polarisers and colour mask, which together aim at causing the output panel to appear uniformly dark to an observer when the multicolour liquid crystal display device is in its off-state. The colour mask in particular has coloured patches and a grey surround area luminance-balanced with each other so that the coloured patches all have substantially equal luminous transmission.

- 3.2 The Opposition Division in the appealed interlocutory decision held that, apart from the specific definition of the luminance-balanced colour mask with the coloured patches and grey surround area luminance-balanced with each other, the remaining features of the liquid crystal cell light source, polariser and drive means as set out in claim 1 were obvious from document D6, considered as disclosing the nearest prior art (see points 2 and 3 of the Reasons). This opinion, which is shared also by the Board, has not been contested by the parties, and the present decision will therefore concentrate on the contribution to inventive step of the above-mentioned additionally features of the luminance-balanced colour mask only, which causes the output panel to appear uniformly dark to an observer when the multicolour liquid crystal display device is in its off-state.

Document D6, which is the sole prior art document relied upon in this respect by the appellant in the appeal procedure, does not explicitly address the technical problem of causing the output panel of multicolour liquid crystal display devices - in the sense of the present patent, i.e. devices which exhibit adjacent display areas of different colours as defined by a colour mask - to appear uniformly dark in the off-state.

Neither does document D6 even appear to be specifically dedicated to such multicolour liquid crystal display devices. As a matter of fact, the improvements proposed in this document like the limitation of the spectrum of the light source, the addition of dichroic dyes to the liquid crystal material or the use of colour filter foils to achieve a constant colour impression apply equally to liquid crystal devices for the display of characters or symbols in a single colour; see in this respect the first sentence on the fourth page which refers to the spectral transmission of "a cell for the display of red signs".

The sentence at the end of the fourth page of document D6 as referred to by the appellant is the sole passage in the document to relate to colour filters. The various colour filter foils referred to there, are said to aim at achieving an acceptable constancy of the colour impression in the reflective and in the transmissive operation of the cell. In the absence from the document of any suggestion that the cell referred to is of the multicolour type, the skilled person in the Board's judgement would most logically interpret the above explanation of the technical function of the filter foils in the sense that the filter foils should be so designed and located at "different locations in the illumination system" - e.g. behind and in front of the cell - that the brightness of the characters

displayed in the on-state is substantially the same independently of the operating mode - i.e. independently of which of the two light sources referred to in the preceding paragraph of the document is activated.

This interpretation does not imply the provision of coloured patches and of a grey surround in a single colour mask, nor their mutual luminance-balancing, as was suggested by the appellant.

For these reasons the Board is not convinced that the specific structure of the colour mask with the luminance-balanced colour patches and grey surround area as set out in claim 1 can without hindsight be considered to be suggested in an obvious way by the scant reference made in document D6 to various colour filter foils.

The appellant in his argumentation established a distinction between scientific papers like document D6 and usual prior art documents such as patent publications, implying in particular that the skilled person reading a theoretical paper would be more inclined to envisage applying its general teaching to specific situations he might be aware of, than when reading the detailed description of specific embodiments as disclosed usually in a patent document. In the Board's view, however, it is the actual content of any document which matters, not the type of publication to which it belongs. In the present case, the fact that document D6 is a scientific paper cannot make up for its missing of any hint either at the technical problem solved by the invention or at the claimed solution.

The other citations no longer relied upon by the appellant in the appeal procedure do not come closer to the claimed subject-matter.

- 3.4 For these reasons the subject-matter of independent claim 1 is considered to involve an inventive step in the sense of Article 56 EPC.

So does the subject-matter of independent claims 8 and 9 which in substance recite the same limitations.

4. Since, taking into consideration the amendments brought to the patent, the patent and the invention to which it relates meet the requirements of the Convention, maintenance of the patent so amended can be decided under Article 102(3) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in amended form on the basis of the following documents:

Claims: 1 to 9 filed with the letter of
11 November 1997;

Description: page 2 filed with the letter of
11 November 1997;
pages 3 to 4 and 6 to 11 according to the
published patent specification;
page 5 filed at the oral proceedings held
before the Opposition Division on 18
January 1995;
page 5a filed at the oral proceedings
held before the Board of Appeal on
18 November 1997;
Figures 1 to 12 of the published patent
specification.

The Registrar:

The Chairman:

P. Martorana

E. Turrini