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D E C I S I O N
of 16 September 1999

Case Number: T 0303/94 - 3.3.1

Application Number: 86115156.1

Publication Number: 0220747

IPC: C09K 19/02

Language of the proceedings: EN

Title of invention:

Ferroelectric smectic C mixture, method for controlling its tilt angle, and light switching element

Patentee:

Chisso Corporation

Opponent:

HI-TEC Elektronik Vertriebs GmbH

Headword:

Ferroelectric mixture/CHISSO

Relevant legal provisions:

EPC Art. 54(3), (4), 114, 123(2)

Keyword:

"Jurisdiction of the Board of Appeal on issues decided by the first instances (yes) - power on the Board to review each separate issue"
"Interpretation of claims using the description in case of doubt (yes)"
"Novelty (no) - anticipation by intermediate document"
"Amendment - not directly and unambiguously derivable from the application as filed"

Decisions cited:

G 0009/91, G 0010/91, G 0003/97, G 0004/97, T 0016/87,
T 0288/92, T 1002/92, T 0039/93, T 0680/93

Catchword:

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Boards of Appeal

Chambres de recours

Case Number: T 0303/94 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 16 September 1999

Appellant: HI-TEC Elektronik Vertriebs GmbH
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Respondent: Chisso Corporation
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 25 March 1994
rejecting the opposition filed against European
patent No. 0 220 747 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: A. J. Nuss
Members: R. Freimuth
A. C. G. Linqvist

Summary of Facts and Submissions

I. The Appellant (Opponent) lodged an appeal on 5 April 1994 against the decision of the Opposition Division posted on 25 March 1994 rejecting the opposition against European patent No. 220 747 which was granted on the basis of seven claims, the claims 2, 4 and 7 reading as follows:

"2. In the preparation of a ferroelectric smectic C mixture having at least two components at least one of which is a liquid crystal compound having ferroelectric smectic C phase and having no smectic A phase or at least two components comprising a liquid crystal compound having smectic C phase and having no smectic A phase and a chiral compound,

a method for controlling the tilt angle of said ferroelectric smectic C mixture, which method comprises having at least one component having no smectic A phase contained in said ferroelectric liquid crystal mixture in excess of the quantity of said components having smectic A phase contained in said at least two components, so that said ferroelectric smectic C mixture exhibits no smectic A phase, to thereby be able to adjust the tilt angle of said ferroelectric smectic C phase to a definite value in the range of 32E to 58E.

4. A method of preparing a ferroelectric smectic C mixture in which at least two components are mixed, at least one of which is a liquid crystal compound having ferroelectric smectic C phase and having no smectic A phase or in which at least two components are mixed comprising a liquid crystal compound having smectic C phase and having no smectic A phase and a chiral

compound, and

the tilt angle of said ferroelectric smectic C mixture is controlled by the method of claim 2 to thereby produce a ferroelectric smectic C mixture having a ferroelectric smectic C phase with a tilt angle in the range of 32E to 58E.

7. A method of manufacturing a light switching element in which ferroelectric liquid crystal smectic C mixture produced according to claim 3 or 4 is incorporated as an active light switching region."

II. The Opposition was based on the grounds of lack of novelty and inventive step. The Opposition Division held that the subject-matter of claims 1 and 2 was novel and involved an inventive step in the light of the documents cited.

III. The **Appellant** submitted on 25 July 1994 with the Statement of Grounds of Appeal the fresh document

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to further support his case.

Having regard to the Patentee's allegations about the Appellant to be a "straw man", these allegations were mere suspicions and were to be regarded as an unsubstantiated objection. They should therefore be rejected.

IV. At the oral proceedings before the Board, held on 16 September 1999, the **Respondent** (Proprietor of the Patent) defended the maintenance of the patent in the

form as granted as the main request and on the basis of two auxiliary requests. The first auxiliary request comprised a set of seven claims submitted during oral proceedings before the Board which differed from those according to the main request exclusively in amendments to claims 1 and 2, claim 2 of the first auxiliary request reading as follows:

"2. In the preparation of a ferroelectric smectic C mixture having at least two components at least one of which is a liquid crystal compound having ferroelectric smectic C phase and having no smectic A phase **and at least one of which is a compound having smectic A phase** or at least two components comprising a liquid crystal compound having smectic C phase and having no smectic A phase and a chiral compound **and a compound having smectic A phase,**

a method for controlling the tilt angle of said ferroelectric smectic C mixture, which method comprises having at least one component having no smectic A phase contained in said ferroelectric liquid crystal mixture in excess of the quantity of said components having smectic A phase contained in said at least two components, so that said ferroelectric smectic C mixture exhibits no smectic A phase, to thereby be able to adjust the tilt angle of said ferroelectric smectic C phase to a definite value in the range of 32E to 58E." (emphasis added)

The second auxiliary request comprised a set of four claims submitted during oral proceedings before the Opposition Division which consisted of renumbered claims 2, 4, 6 and 7 as granted, the numerical references to previous claims comprised therein being

adapted accordingly.

- V. The Respondent submitted that the Appellant as well as the Board had no power to challenge the novelty of the patent in suit since this ground for opposition, though formally raised in the letter of opposition, was not properly supported by facts, evidence and arguments in that letter. Furthermore the Opposition Division decided that issue in favour of the Respondent-Patentee thereby preventing the Board from deciding otherwise.

The subject-matter as defined in the claims required the presence of two different types of components in the ferroelectric liquid crystal mixtures, i.e. a component having smectic A phase and a component not having such a phase. The latter component was to be used in excess over the former one according to claim 2. Those parts of the specification of the patent in suit, which referred to liquid crystal mixtures comprising only the type of components not having smectic A phase, were neither covered by the claims nor illustrating the present invention.

Document (8) in general did not address the control of the tilt angle of a ferroelectric liquid crystal mixture by selecting the components contained therein according to the types of phases shown by those components and by varying their relative amounts in the mixture. With respect to example 6 in particular, that document disclosed a ferroelectric liquid crystal mixture comprising exclusively components not having smectic A phase whereas the claimed invention required the additional presence of a component having smectic A phase.

The Respondent submitted furthermore that the Appellant was acting as a "straw man" and requested the Representative of the Appellant to provide a declaration that he was truly acting on behalf of the Appellant and that he received his instructions from the Appellant. Nevertheless, at the oral proceedings before the Board the Respondent no longer objected to the admissibility of the Appellant's appeal.

- VI. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained unamended (main request) or that the patent be maintained on the basis of claims 1 to 7 submitted during oral proceedings before the Board (first auxiliary request) or on the basis of claims 1 to 4 submitted during oral proceedings before the Opposition Division on 11 March 1994 (second auxiliary request).

- VII. Oral proceedings were held in the absence of the Appellant who, after having been duly summoned, informed the Board that he would not attend. At the end of the oral proceedings the decision of the Board was given orally.

Reasons for the Decision

1. *Admissibility*

- 1.1 The Respondent argued that the Appellant would act as a "straw man" on behalf of an unknown third party with

the consequence that the opposition filed by the Appellant-Opponent was inadmissible. However, while maintaining his objection to the Appellant acting as a "straw man", he withdrew at the oral proceedings before the Board his request to declare the Appellant's opposition inadmissible.

The Board notes that an opposition is not inadmissible purely because the person named as opponent according to Rule 55(a) is acting on behalf of a third party (decisions G 3/97 and G 4/97, OJ 1999, 245 and 270, point 3(a) of the orders). Therefore the Board is satisfied that the opposition filed by the Appellant-Opponent is admissible. This being no longer in dispute between the parties to appeal proceedings, it is not necessary to give detailed reasons for this finding.

1.2 The appeal is also admissible.

2. *Jurisdiction of the Board of Appeal*

Having regard to the issue of novelty, the Respondent disputed the power of the Board to review and to decide on that matter since this ground for opposition, though formally raised in the statement of opposition, was not properly supported by facts, evidence and arguments in that statement, and since it was decided by the first instance in the Respondent's favour.

An opposition division has the power to challenge the patent in suit on any ground for opposition, in application of Article 114(1) EPC, of its own motion even if that ground for opposition was not covered by the statement of opposition pursuant to Rule 55(c) EPC

(decision G 9/91, OJ 1993, 408, point 16 of the reasons; opinion G 10/91, OJ 1993, 420, point 2 of the opinion). In the present case, the issue of novelty was decided by the Opposition Division in the decision under appeal, as conceded by the Respondent. Regardless of whether or not the ground for opposition of lack of novelty was properly supported in the Appellant-Opponent's statement of opposition, the Opposition Division had the power to consider the issue of novelty and to decide on it, which the Opposition Division did in the decision under appeal. Therefore, once an appeal is lodged by the Appellant-Opponent against that decision, the decision under appeal as a whole is subject to review by the Board of Appeal and is within its jurisdiction. It is the Board's power and duty pursuant to Article 111(1) and 102 EPC to decide for itself upon each matter and each issue addressed and decided in the decision under appeal and the Board is not bound by any finding of that decision. Thus, the Board is empowered to review and to decide upon all matters considered and decided upon by the Opposition Division, i.e. in the present case the matter of novelty pursuant to Article 54 EPC of the claims of the patent in suit.

For these reasons, in the Board's judgement, the Appellant's objections to the jurisdiction of the Board have no legal basis and are to be rejected.

3. *Late-filed evidence (Article 114 EPC)*

Document (8) is new evidence submitted for the first time with Appellant's Statement of grounds of Appeal on 25 July 1994 and has so far not been relied upon. The

Appellant did not object to its introduction into the appeal proceedings.

New evidence should only very exceptionally be admitted into the proceedings before the Boards of Appeal, namely if it is *prima facie* highly relevant in the sense that it is highly likely to prejudice the maintenance of the European patent in suit (see decisions T 1002/92, OJ EPO 1995, 605, point 3.4 of the reasons; T 39/93, OJ EPO 1997, 134, point 3.1.2 of the reasons). Since document (8) discloses the preparation of a light switching element of the guest-host type comprising a ferroelectric liquid crystal smectic C mixture having a tilt angle of 42°, as does the claimed invention, that document is *prima facie* highly relevant with regard to novelty.

Consequently, the Board decides to admit document (8) into the appeal proceedings pursuant to Article 114(1) EPC.

Main request

4. *Interpretation of claim 7*

4.1 In the present case the correct interpretation of the claims was under dispute in appeal proceedings. It is therefore of crucial importance for the decision to be taken by the Board to determine the subject-matter of the claims and to identify the technical features defined therein, prior to any assessment of novelty.

4.2 Turning to claim 7, it is an independent claim directed to a method of manufacturing a light switching element

wherein a ferroelectric liquid crystal smectic C mixture is incorporated as an active light switching region. That mixture is defined in claim 7 further by the process for its preparation, i.e. it is produced *inter alia* according to the process of claim 4.

Claim 4 is directed to a method of preparing that ferroelectric smectic C mixture by mixing at least two components. That claim in its first part defines the components to be mandatorily comprised in that mixture. Thus, claim 4 requires the presence either of a liquid crystal compound having ferroelectric smectic C phase and having no smectic A phase or of a liquid crystal compound having smectic C phase and having no smectic A phase and a chiral compound in that mixture. Claim 4 in its second part specifies the ferroelectric smectic C mixture to have a tilt angle in the range of 32° to 58°. This tilt angle of said mixture is controlled by the method of claim 2.

Claim 2 is directed to a method for controlling the tilt angle of the ferroelectric smectic C mixture to a value in the said range. That method comprises having at least one component having no smectic A phase "in excess of the quantity of said components having smectic A phase contained in said at least two components".

These are the facts and to this extent there is no dispute in appeal proceedings.

- 4.3 The Respondent submitted that the excess of a component having no smectic A phase over the quantity of a component having smectic A phase "contained in said at

least two components" as defined in Claim 2 required both components to be mandatorily present in the mixture prepared according to the process of Claim 4 and used in the process for manufacturing a light switching element of claim 7.

This notwithstanding, it appears that Respondent's view conflicts with some other facts since it is claim 4 which defines exhaustively those components mandatorily present in the mixture incorporated in the light switching element manufactured in the process of claim 7 and that claim 4 does not stipulate the presence of a component having smectic A phase. In claim 4, the reference to "the method of claim 2" is rather directed to the definition of the **ratio** of components in that mixture without addressing whether their presence is mandatory or not.

The Board therefore concludes that the subject-matter as defined in claim 7 is at least ambiguous to the extent that the wording of the claims does not set out without any doubt whether or not a component having smectic A phase is mandatorily present in the ferroelectric liquid crystal smectic C mixture incorporated in the light switching element manufactured in the process of claim 7.

- 4.4 However, it is the established jurisprudence of the Boards of Appeal that when doubts exist about the exact scope of a claim of a granted patent, the description shall be used to interpret the claims when an objective assessment of the content of a claim has to be made, in order to judge whether its subject-matter is novel and not obvious (see Case Law of the Boards of Appeal of

the European Patent Office, 3rd edition, 1999, Chapter II, B 4; in particular decision T 16/87, OJ 1992, 212, point 6 of the reasons).

Therefore, in the present case, the matter of whether or not the claims should be construed such that the presence of a component having smectic A phase is mandatory in the ferroelectric smectic C mixture comprised in the light switching element manufactured in the process of Claim 7, must be interpreted in the light of the description of the patent in suit.

4.4.1 Page 14, lines 44 to 48, of the description of the patent in suit is directed to the preparation of a ferroelectric smectic C liquid crystal mixture suitable to guest-host display mode, which has a tilt angle of 32° to 58° (page 3, lines 1 to 6), as does claim 4. In particular, line 46 of that page 14 of the description states explicitly to use a compound exhibiting the phase series (i) and (ii), i.e. a compound having smectic A phase (page 6, lines 51 and 52), in a small quantity in that mixture only **"if necessary"**. Hence, that part of the description of the patent in suit teaches that a compound having smectic A phase is not a mandatory component in the ferroelectric smectic C mixture prepared according to the process of claim 4, but merely an optional one.

4.4.2 The description of the patent in suit also describes on page 16, lines 1 to 16, by way of example, a binary ferroelectric smectic C mixture having a tilt angle of 40°, i.e. a mixture prepared according to the process of claim 4. That mixture consists of two different liquid crystal compounds, both exhibiting no smectic A

phase (lines 10 and 11). Thus, any component having smectic A phase is absent in that mixture, thereby demonstrating that the presence of that type of component is not mandatory in the ferroelectric smectic C mixture prepared according to the process of claim 4.

4.4.3 Further, example 6 on page 25 of the specification of the patent in suit describes the preparation of a ferroelectric smectic C mixture having a tilt angle of 38°, as does claim 4. That mixture consists of four components each component having no smectic A phase (lines 4 and 12). Thus, none of those components has smectic A phase, which again demonstrates that a component having smectic A phase need not to be mandatorily present in the mixture prepared according to the process of claim 4.

4.4.4 The Respondent argued at the oral proceedings before the Board that those parts and that example of the patent in suit referred to in point 4.4.1 to 4.4.3 above were not within the invention as defined in claim 4. Therefore they could not be used to interpret the scope of that claim.

However, the description of the patent in suit is divided in different sections and the section starting on page 6, line 46 is headed "DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS". Those parts and that example addressed in points 4.4.1 to 4.4.2 above are within that section of the specification of the patent in suit with the consequence of inevitably representing "preferred embodiments" of the invention. The example 6 addressed in point 4.4.3 above is within that section of the description identified on page 19, line 50 as

describing in more detail the present invention by way of examples. Thus, the present invention, in particular claim 4, compulsorily encompasses that example. The Respondent's argument not being supported by the facts, it cannot convince the Board.

4.4.5 To summarize, the description makes plain that a component having smectic A phase is not a mandatory component of the ferroelectric smectic C mixture prepared according to the process of claim 4.

4.5 The Board concludes therefore that the process for manufacturing a light switching element of claim 7, to the extent that it incorporates a mixture produced according to claim 4, is to be construed such that it does not require the mandatory presence in that mixture of a component having smectic A phase.

5. *Novelty*

After having determined the subject-matter of claim 7 and the technical features defined therein, the state of the art needs to be considered, in particular document (8).

5.1 Document (8) discloses in Example 6 (Use example 3) on page 29, lines 4 to 15 a process for manufacturing a light switching element in which the liquid crystal mixture prepared in that example on page 27, penultimate line to page 29, line 3 is incorporated as an active light switching region.

That liquid crystal mixture has a tilt angle of 42° (page 28, penultimate line) and exhibits a

ferroelectric smectic C phase and no smectic A phase (page 28, penultimate paragraph). The mixture consists of four components as defined on page 28:

- (a) 20% of compound No. 9 of Table 2 on page 9 which exhibits ferroelectric smectic C, but no smectic A phase according to that table,
- (b) 20% of compound No. 23 of Table 2 on page 10 which exhibits ferroelectric smectic C, but no smectic A phase according to that table,
- (c) 30% of a ferroelectric compound having a large tilt angle of 45°and
- (d) 30% of another ferroelectric compound having a large tilt angle of 45°.

Although document (8) is silent about whether or not the components (c) and (d) exhibit smectic A phase, these two components meet the criterion for not exhibiting smectic A phase, as defined in the patent in suit, in that they have a large tilt angle of 45°. Indeed, as set out in the patent in suit on page 14, line 56, "when no S_A phase is exhibited, the tilt angle is large (è \$ 30°)", the acronym "S_A" denoting the smectic A phase. Hence, the components (c) and (d) in having a large tilt angle of \$ 30° are components having no smectic A phase in the sense of the patent in suit. This is in line with the more specific information provided for component (d), which is identical to compound (B12) of the patent in suit (page 25, last formula) exhibiting explicitly **no** smectic A phase according to page 25, lines 48 and 49.

Thus, none of the four components (a) to (d) of the ferroelectric smectic C mixture exhibit smectic A phase. That finding has not been contested by the Respondent.

Therefore, example 6 of document (8) discloses all the technical features of Claim 7, to the extent that it refers to Claim 4. The Respondent's counterargument that the mixture disclosed in example 6 is distinguished from the subject-matter claimed due to the absence of a compound having smectic A phase, is not pertinent since this technical feature is not mandatory according to the correct interpretation of claim 7 as set out in detail in point 4 above.

For those reasons, in the Board's judgement, document (8) discloses subject-matter which is within the scope of claim 7 of the patent in suit.

5.2 Document (8) has a priority date earlier than the priority date of the patent in suit, and the Respondent has not contested that the former is entitled to that earlier priority date. Since that document is a European patent application, its content is therefore to be considered as comprised in the state of the art pursuant to Article 53(3) EPC, subject to the requirements of Article 54(4) EPC.

5.3 Pursuant to Article 54(4) EPC, Article 54(3) EPC applies only in so far as the Contracting States designated in document (8) were also designated in the patent in suit. Document (8) designates the Contracting States CH, DE, FR, GB and LI, as does the patent in suit. Thus, document (8) is comprised in the state of

the art under Article 54(3) EPC for the patent in suit with respect to all the Contracting States designated in the latter.

- 5.4 The Board concludes from the above, that document (8) destroys the novelty of claim 7 of the patent in suit.
- 5.5 Since a decision can only be taken on a request as a whole, none of the further claims need to be examined. In these circumstances, the Respondent's main request is not allowable for lack of novelty pursuant to Articles 52(1), and 54(3) and (4) EPC and must be rejected.

First auxiliary request

6. *Amendments (Article 123(2) EPC)*

- 6.1 The Respondent has carried out amendments to the claims in the course of appeal proceedings (see point IV above). In case of such amendments, they must be fully examined by the Board as to their compatibility with the requirements of the EPC, in particular with the provisions of Article 123 EPC (see decision G 9/91, *loc cit.*, point 19 of the reasons).
- 6.2 In order to determine whether or not an amendment offends against Article 123(2) EPC it has to be examined whether technical information has been introduced which a skilled person would not have objectively and unambiguously derived from the application as filed (see decisions T 288/92, point 3.1 of the reasons; T 680/93, point 2 of the reasons; neither published in OJ EPO).

6.3 The Respondent has made two amendments to claim 2 as granted. The second amendment consists in specifying a compound having smectic A phase to be mandatorily present in the ferroelectric smectic C mixture. According to claim 2 as amended that compound "**and**" both a liquid crystal compound having smectic C phase and having no smectic A phase as well as a chiral compound are required to be present in that mixture. Thus, claim 2 as amended defines the ferroelectric smectic C mixture to comprise a particular compound, i.e. a compound having smectic A phase, **in addition** to both the latter particular compounds.

6.4 The Respondent alleged that this second amendment to claim 2 as granted has a basis in the section on page 10, lines 9 to 15 of the application as filed which is a literal repetition of a part of claim 2 as filed and as granted. The application as filed discloses in the section referred to by the Respondent the excess of at least one component having no smectic A phase over the quantity of the components having smectic A phase contained in said components. That section of the application as filed, however, is silent about the presence of the particular compound having smectic A phase in the ferroelectric smectic C mixture **in addition** to both the particular liquid crystal compound having smectic C phase and having no smectic A phase and the particular chiral compound, as required in claim 2 as amended. Thus, the direct and unambiguous disclosure of the second amendment of claim 2 is lacking in the section of the application as filed referred to above.

On the invitation of the Board during oral proceedings,

the Respondent submitted that no further section of the application as filed backed up that amendment. The Board, on its own motion, could also not discover any additional information in the application as filed supporting it.

6.5 Therefore, in the Board's judgement, the result of the second amendment to claim 2 as granted is that the skilled man is presented with information which is not directly and unambiguously derivable from the application as filed.

6.6 The Board concludes that claim 2 as amended extends the subject-matter claimed beyond the content of the application as filed, contrary to the requirements of Article 123(2) EPC. In these circumstances, Respondent's first auxiliary request is not allowable and must be rejected as well.

Second auxiliary request

7. The second auxiliary request consists of four claims and is confined to claims 2, 4, 6 and 7 according to the main request, which are renumbered into claims 1, 2, 3 and 4 and wherein the numerical references to previous claims are adapted accordingly. Thus, claim 7 of the main request becomes claim 4 of the second auxiliary request and claim 4 becomes claim 2, respectively. Therefore the subject-matter of renumbered claim 4 according to the second auxiliary request comprising a reference to renumbered claim 2 of that request is identical to the subject-matter of claim 7 according to the main request to the extent that it refers to claim 4 of the latter request.

8. The considerations having regard to novelty given in point 5 with respect to claim 7 according to the main request to the extent that it refers to claim 4 of that request are not affected by the renumbering of that claim 7 into claim 4 according to the second auxiliary request. Therefore, the conclusion drawn in point 5.4 with regard to the main request still applies for the second auxiliary request, i.e. the subject-matter of its claim 4 is not novel.

9. In these circumstances, the Respondent's second auxiliary request is also not allowable for lack of novelty pursuant to Articles 52(1), and 54(3) and (4) EPC.

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:

E. Görgmaier

A. Nuss