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D E C I S I O N
of 8 November 1995

Case Number: T 0721/94 - 3.4.2
Application Number: 85108162.0
Publication Number: 0167143
IPC: G02F 1/01, G02F 1/133, B41J 2/435,
G09G 3/36

Language of the proceedings: EN

Title of invention:
Method of driving optical switch element

Patentee:
HITACHI, LTD.

Opponent:
CANON, INC.

Headword:
-

Relevant legal provisions:
EPC Art. 54(1), 123(2)(3)

Keyword:
"Novelty - no (main and first auxiliary requests)"
"Original disclosure - no (second auxiliary request)"

Decisions cited:
-

Catchword:
-



Case Number: T 0721/94 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 8 November 1995

Appellant:
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 4 July 1994
concerning maintenance of European patent
No. 0 167 143 in amended form.

Composition of the Board:

Chairman: E. Turrini
Members: C. Black
M. Lewenton

Summary of Facts and Submissions

- I. European patent No. 0 167 143 (application No. 85 108 162.0) was maintained in amended form by decision of the Opposition Division. The Opposition Division found that the subject-matter of claim 1 of the granted patent did not involve an inventive step, but that claim 1 according to the patent proprietor's auxiliary request satisfied the requirements of the EPC.
- II. The present appeal by the patent proprietor lies against this decision.
- III. Oral proceedings were appointed at the end of which the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following:
 1. Claim 1 of the patent as granted (main request)
 2. Claim 1 as presented in the oral proceedings with appropriate amendment of the description and figures (first auxiliary request)
 3. Claim 1 submitted with the grounds of the appeal dated 8 November 1994 (second auxiliary request).

The respondent requested that the appeal be dismissed as inadmissible (main request) or that the appeal be dismissed (auxiliary request).

IV. Claim 1 according to the main request reads as follows:

"A method of driving a plurality of optical switch elements in a liquid crystal device, each of said optical switch elements including a transparent ferroelectric liquid crystal material (4) which is interposed between opposed electrodes (6a, 6b), said method comprising the step of

- selectively applying a positive or a negative voltage between said opposed electrodes of each of said plurality of optical switch elements during a first period of time so as to control the quantity of light transmission between said opposed electrodes, characterised by the additional step of

- effecting a short circuit state by electrically connecting said opposed electrodes (6a, 6b) of all of said plurality of optical switch elements with each other during at least one second period of time before and after said first period of time so as to reduce the non-uniform existence of ions in said ferroelectric liquid crystal material between said opposed electrodes."

Claim 1 according to the first auxiliary request differs from the above in that on the sixth line (of the claim as typed in this decision), the word "step" is replaced by "alternating steps", the wording "characterised by the additional steps of" is replaced by "and" and on the second last line the word "the" is replaced by "a". Moreover on the seventh last line the reference under brackets is cancelled

Claim 1 according to the second auxiliary request differs from that according to the main request is that after the word "time" on the fifth last line there is inserted "of several seconds or more" and again the word "the" is replaced by "a".

V. The following documents have been referred to in the appeal proceedings:

D1: EP-A-092 181

D2: Phys. Rev. A, Vol. 21, No. 1, January 1980
pages 144 to 147.

D3: JP 59/36227 and English translation thereof.

VI. The appellant's argumentation may be summarised as follows:

D1 is concerned with avoiding deterioration of the liquid crystal and obtaining rapidly a desired light-transmitting state. It is silent concerning the non-uniform existence of ions and therefore gives no guidance to the skilled person faced with this problem. Moreover D1 disclose what is essentially a three-step process, illustrated for example in Figure 9, wherein line E indicates the steps of applying a negative voltage $-V_p$, then a positive voltage V_p , then like voltages to opposite electrodes, which is not to be equated with short-circuiting the electrodes. The process according to the patent in suit is rather a two-step process as is apparent from the wording of claim 1. But even if D1 could be interpreted as disclosing effecting the short-circuit state required by the patent in suit, the time period of 1 to 30 ms would be much too short to achieve the object of the present invention.

The gist of the respondent's argumentation is as follows:

The appeal should be rejected as inadmissible because the arguments contained in the grounds for the appeal serve only to defend claim 1 as acknowledged to be patentable by the Opposition Division but not claim 1 according to the appellant's main request.

However, for the case that the appeal should be considered admissible, the subject-matter of claim 1 (main request) is not novel over the disclosure in D1. The preamble of claim 1 is known from D1 and from Figures 7a, 7b and 8 and the corresponding description can be derived the disclosure of the additional step which is the characterising feature of claim 1.

Even if the subject-matter could be considered to be novel, it would not involve an inventive step having regard to a combination of the teaching of D1 with that of either D2 or D3. These documents disclose the non-uniform existence of ions and provide an indication of how these can be reduced.

Claim 1 according to the first auxiliary request is not allowable under Article 123(2) and (3) EPC because of the introduction of the feature "comprising the alternating steps".

Claim 1 according to the second auxiliary request is also not allowable under Article 123(2) and (3) EPC because of the introduction of the words "or more" after "several seconds".

Reasons for the Decision

1. *Admissibility*

The respondent (opponent) has requested that the appeal be dismissed as inadmissible. What the respondent is in effect arguing is that the statement of grounds of appeal does not give the reasons why the appellant considers the decision rejecting the main request to be incorrect, because the said reasons do not seek to defend claim 1 according to said main request to the extent that the claim requires "a second period of time...so as to reduce...etc.," but rather a claim corresponding more closely to the claim found allowable by the Opposition Division. This line of argumentation is based on the statement in the sentence bridging pages 2 and 3 of the grounds of appeal, that the time period disclosed in D1 would be much too short to eliminate the non-uniform existence of ions. In the Board's opinion the grounds as a whole can be read as containing argumentation relating to the present main request and the above-cited passage is seen rather as a flaw in the said argumentation. The appeal is therefore admissible.

2. *Main request - novelty*

D1 is undisputedly the closest prior art in that it discloses the features of the preamble of claim 1. More particularly it discloses a method of driving (page 1, lines 2 to 4) a plurality of optical switch elements in a liquid crystal device (page 4, lines 2 to 4), each of said optical switch elements including a transparent ferroelectric liquid crystal material (Table 1 exemplifies the same materials as in the patent in suit) which is interposed between opposed electrodes

(Figure 2), said method comprising applying a positive or a negative voltage between said opposed electrodes of each of said plurality of optical switch elements during a first period of time (Figure 7a, time period to t_2) so as to control the quantity of light transmission between said opposed electrodes.

In respect of the wording "a positive or a negative voltage" in claim 1, it is noted that D1 discloses applying a positive then a negative voltage, or vice versa, between the opposed electrodes (Figures 7 and 9). However the wording of claim 1 of the patent in suit is clearly intended to embrace such a voltage reversal (see for example Figure 7c and the corresponding description) so that no difference is to be seen here.

D1 also discloses the step of effecting a short circuit state by electrically connecting said opposed electrodes with each other during at least one second period of time before and after said first period of time. In this respect the Board agrees with the argumentation of the Opposition Division and the respondent that the step described with reference to Figure 8 of D1 consists in short-circuiting the electrodes when transistors Q_3 and Q_4 are open so that the electrodes are connected to each other via resistor R_3 , and that this step corresponds to the one illustrated in Figure 8 of the opposed patent wherein the opposed electrodes are both connected to earth through a resistor.

Further, again in agreement with the Opposition Division and the respondent, the Board's opinion is that it is usual to address matrix-type arrangements in LC displays a line at a time. Since during operation of such a display, a line will necessarily include a plurality of pixels in the same state (transparent or opaque) then all of the switch elements of a line will have this

opposed electrodes submitted to be said short-circuiting step. It will be recalled that D1, page 4, lines 2 to 5, refers to the application of the driving method to a display having a plurality of pixels.

Accordingly the only difference between the subject-matter of claim 1 and the disclosure in D1 is the purpose of the short-circuiting step, that is, to reduce the non-uniform existence of ions in the ferroelectric liquid crystal material between said opposed electrodes, since D1 does not mention this non-uniform existence of ions. It should be emphasised that claim 1 only requires a reduction in the said non-uniform existence of ions, and does not specify any minimum extent of said reduction, let alone the elimination with which the patent is mainly concerned. Therefore since short-circuiting brings about said reduction, even a very short time period as is disclosed in D1 will effect some reduction.

Accordingly anyone repeating the teaching of D1 will inevitably be carrying out the driving method which is the subject-matter of claim 1, which therefore is not novel.

3. *First auxiliary request*

The significant difference between claim 1 according to this request and that according to the main request is that on line 6 the word "step" is replaced by "alternating steps". The respondent is of the opinion that this amendment contravenes Article 123 EPC. In the Board's opinion, of the figures indicating the sequence of steps, only Figure 2b can be said to illustrate the required alternation. There is however some doubt as to the role of this figure, because on page 5, lines 38, 39 it is stated that Figure 2 shows the light transmission

characteristics in a method of preventing (i.e. not of reducing or eliminating) the non-uniform existence of ions, although it is true that page 6, lines 10, 11 does refer to elimination and in respect of Figure 2b this is confirmed in lines 26, 27. But Figure 2b has to be further interpreted by having recourse to Figure 16 (see page 6, lines 31 to 33) from which it is apparent that more than just a simple alternation of steps is intended, so that the respondent's objection is justified. Alternatively one can interpret the word "step" as including one or more sub-steps, so that for example Figures 7a to 7e, 9, 16 and 17 would then be consistent with the wording of the claim. This interpretation however would be equally valued for the voltage reversal steps disclosed in D1, Figure 9. Therefore if the question of conformity with Article 123 could be resolved in favour of the appellant, then the amendment introduces no further distinction over D1 and the subject-matter of claim 1 according to this request is also not novel.

4. *Second auxiliary request*

The Board agrees with the respondent that there is no basis in the documents as originally filed for the wording "several seconds or more" and the appellant was unable to indicate such a basis. Claim 1 according to this request is not allowable since it contravenes Article 123(2) and (3) EPC.

5. In view of the foregoing, it is not necessary to consider documents D2 and D3.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

P. Martorana

E. Turrini

