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Anmeldenummer / Filing No / N° de la demande : 80 302 534.5

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Bezeichnung der Erfindung: Liquid crystal display device

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement : G02F 1/133; G09F 9/35

ENTSCHEIDUNG / DECISION

vom / of / du 28 April 1988

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Stanley Electric Co., Ltd.

Einsprechender / Opponent / Opposant :

OI VDO Adolf Schindling AG
OII Dipl.Ing. Georg Feicht

Stichwort / Headword / Référence :

EPO / EPC / CBE

Articles 123(3) and 56 EPC

Kennwort / Keyword / Mot clé :

"Extended protection (no); Inventive step
(no)"

Leitsatz / Headnote / Sommaire



Case Number : T 225/85

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 28 April 1988

Appellant : Stanley Electric Co., Ltd.
(Proprietor of the patent) 2-9-13 Nakameguro
JP-Meguro-ku Tokyo

Representative : Mr D.C. Harrison
c/o Mewburn Ellis & Co.
2/3 Cursitor Street
GB-London EC4A 1BQ

Respondent : VDO Adolf Schindling AG
(Opponent OI) Gräfstrasse 103
D-6000 Frankfurt/Main

Representative : Dipl.-Ing. Thomas Klein
Sodenerstr. 9
D-6231 Schwalbach a.Ts.

Respondent : Dipl. Ing. Georg Feicht
(Opponent OII) Kolomanstr. 16A
D-8261 Reischach

Representative : Dipl.-Ing. R. Roth
c/o Patentsanwaltsbüro Tiedtke-Bühling-
Kinne-Grupe-Pellmann-Grams-Struif-Winter-
Roth
Bavariaring 4
D-8000 München 2

Decision under appeal : Decision of the Opposition Division of the European
Patent Office dated 29 April 1986 revoking
European patent No. 0 023 421 pursuant to
Article 102(1) EPC.

Composition of the Board :

Chairman : E. Turrini
Members : J.A. Van Voorthuizen
O.P. Bossung

Summary of Facts and Submissions

- I. European patent No. 0 023 421 was granted in response to European patent application No. 80 302 534.5.
- II. Two oppositions were filed against the European patent by VDO Adolf Schindling AG (Opponent OI), hereinafter referred to as Respondent OI and by Dipl. Ing. Georg Feicht (Opponent OII), hereinafter referred to as Respondent OII and revocation of the patent requested.

GB-A-1 490 110 was cited by Respondent OI and JP-A-59 957/1979 together with DE-A-2 422 784 and DE-A-2 837 431, the latter already considered in the examination procedure were cited by Respondent OII to support the objection of lack of inventive step. Later in the opposition procedure, Respondent OII cited DE-A-2 263 850 and US-A-3 961 843.
- III. The Opposition Division revoked the patent. The decision was based on the new set of claims filed by the Appellant (Patentee) on 1 July 1985.
- IV. The reason for the revocation was that in view of the prior art documents GB-A-1 490 110 or JP-A-59 957/79 in conjunction with DE-A-2 422 784 and DE-A-2 263 850 or in conjunction with US-A-3 961 843 the subject-matter of Claim 1 did not involve an inventive step within the meaning of Article 56 EPC and the claim was thus not allowable under Article 52(1) EPC.
- V. An Appeal was lodged against this decision. In the Grounds of Appeal the Appellant requested the maintenance of the patent in an amended form, based on the set of claims filed on 1 July 1985, as main request. He also made a first and a

second auxiliary request based on two further sets of claims.

VI. Following a communication from the Board with summons to oral proceedings, said communication raising objections concerning Article 123(2) EPC, the Appellant filed on 15 March 1988 three sets of claims as a main request, first auxiliary request and second auxiliary request respectively and the Respondents OI and OII presented two new prior art documents, DE-A-2 431 482 and US-A-4 006 968 respectively.

VII. At the oral proceedings the Appellant requested

- (a) that the decision under appeal be set aside and the patent be maintained on the basis of the main set of claims or the first auxiliary set of claims or the second auxiliary set of claims filed on 15 March 1988;
- (b) that, if the appeal will be allowed, the appeal fee be reimbursed.

The Respondents OI and OII requested that the appeal be dismissed.

VIII. Current Claim 1 of the main request reads as follows:

"A twisted nematic or guest-host liquid crystal coloured display device having transparent image electrodes formed directly on a substrate and a coloured light-transmitting film on the same substrate, the coloured light-transmitting film (5, 5a, 5b, 5', 5'a) being formed directly over and covering at least one of said electrodes (4, 4a, 4b) formed on said substrate, characterised in that the coloured light-transmitting film comprises a dye in a cellulosic

binding agent or in polyvinyl alcohol and was printed onto the at least one electrode."

Claims 2 to 4 are dependent on Claim 1.

IX. Current Claim 1 of the first auxiliary request reads as follows:

"A twisted nematic or guest-host liquid crystal coloured display device having transparent image electrodes formed directly on a substrate and a coloured light-transmitting film on the same substrate, the coloured light-transmitting film (5, 5a, 5b, 5', 5'a) being formed directly over and covering at least one of said electrodes (4, 4a, 4b) formed on said substrate, characterised in that the electrodes form respectively images and are separated from each other on the substrate and in that the coloured light-transmitting film comprises a dye in a cellulosic binding agent or in polyvinyl alcohol and is printed onto the said at least one electrode."

Claims 2 to 4 are dependent on Claim 1.

X. Current Claim 1 of the second auxiliary request reads as follows:

"A twisted nematic or guest-host liquid crystal coloured display device having transparent image electrodes formed directly on a substrate and a coloured light-transmitting film on the same substrate, the coloured light-transmitting film (5, 5a, 5b, 5', 5'a) being formed directly over and covering at least one of said electrodes (4, 4a, 4b) formed on said substrate, characterised in that the coloured light-transmitting film comprises a dye in a cellulosic binding agent or in polyvinyl alcohol and was printed onto the at least one electrode, the film after application

having been treated by rubbing to align the liquid crystal material which it contacts."

Claims 2 to 4 are dependent on Claim 1.

XI. As far as the position of the Appellant with respect to the late presented prior art documents, in particular DE-A-2 431 482, was concerned, although he questioned its admissibility, he was prepared to discuss it. The main arguments presented by the Appellant were essentially as follows:

Claim 1 of the main and auxiliary requests did not infringe Article 123(3) EPC, because said claim was changed by adding, and not removing, features, so that there is no extension of the conferred protection.

The subject-matter of Claim 1 of the main request involved an inventive step. (The non-obviousness of the main claims of the two auxiliary requests follows directly). Alone the fact that a great number of prior art documents were needed to arrive at the invention by putting together in a mosaic fashion single elements, was a clear indicium of the presence of an inventive step. The Opposition Division and Respondent's arguments were therefore based on hindsight.

More particularly, document GB-A-1 490 110, which was the closest prior art, while substantially disclosing the features of the preamble of Claim 1 and the feature that the coloured light-transmitting film comprises a dye, did not mention that the dye was in a cellulosic binding agent or polyvinyl alcohol and that the film was printed onto the electrode. Indeed, document GB-A-1 490 110 merely emphasised that the film was connected with a plate-like substrate to form a screen and said screen could be made by

printing, i.e. the printing of the film on the electrode was not considered.

Document US-A-3 961 843 described the coating of the electrode by means of a cellulose resin. However, the printing method was merely referred to as being used in the prior art without giving any example of such use.

It was admitted that DE-A-2 431 482 described a cellulosic binding agent printed onto the electrode. However, this was merely presented as a possibility among many others, without any indication pointing unambiguously at the invention.

Document DE-B-2 422 784 referred to the utilisation of polyvinyl alcohol as polariser covering an electrode by stretching, thus giving no hint at the printing method.

Document DE-A-2 263 850, while containing a reference to a dye in polyvinyl alcohol, related to a filter material for copiers and was therefore irrelevant.

Finally, document JP-A-599 57/79 clearly taught away from the use of films made of organic materials.

The technique of printing directly on to the electrodes chosen in the present invention had the advantage of realising fine controlled shapes. The use of cellulosic binding agent or polyvinyl alcohol had the advantage of providing effective protection, no reaction with the liquid crystal material, readiness for printing onto the electrodes.

XII. The Respondent OI on the other hand admitted that document DE-A-2 431 482 was sent late, emphasizing, however, that

the relevant pages of the document had been forwarded to the Appellant in due time by telefax.

He also raised the objection that the independent claims of the main and auxiliary requests infringed Article 123(3) EPC.

As far as the inventive step of Claim 1 of the main request was concerned, he held the view that all the features of the claim were known from document GB-A-1 490 110 apart from that concerning the cellulosic binding agent or in alternative the polyvinyl alcohol.

The utilisation of a cellulose resin covering the electrodes was known from document US-A-3 961 843 and it was obvious to apply this teaching to the display device according to document GB-A-1 490 110, because the latter needed a binding agent for the dye, thus obtaining the subject-matter of Claim 1.

The same could be said for document DE-A-2 431 482 which related to a cellulosic binding agent printed on to the electrodes.

The alternative use of polyvinyl alcohol was also known e.g. from DE-A-2 263 850, which referred to the general technical field of colour-films.

Claim 1 of the first auxiliary request was also obvious, because the features that "the electrodes form respectively images and were separated from each other on the substrate" were also known from document GB-A-1 490 110.

The feature of Claim 1 of the second auxiliary request concerning the rubbing was well known in the art, e.g. from

document US-A-3 961 843 or DE-A-2 431 482, so that also this claim was obvious.

XIII. The Respondent OII agreed with and emphasised the arguments put forward by the Respondent OI, as far as the lack of inventive step was concerned. Furthermore, he stressed that the independent claims of the main and auxiliary requests infringe Article 123(3) EPC, because the protection field of the invention is shifted due to the change in the object of the invention.

Reasons for the Decision

1. The appeal is admissible.
2. The present version of the claims, main and auxiliary requests, is not objectable under Article 123(2) or (3) since the claims are supported at least implicitly by the original application (the feature that the dye in polyvinyl alcohol is printed onto the electrodes is supported by the original description on page 6, last paragraph, in conjunction with page 4, lines 1 to 5 and the feature that the electrodes form respectively images and are separated from each other on the substrate is supported by the original description on page 6, second paragraph and the drawings). Furthermore the present claims differ from the granted claims only in being further restricted by adding features, without exchanging any feature, so that they still remain within the scope of the granted claims.
3. Novelty

Following a comprehensive study of the prior art documents to which reference has been made during the appeal and/or

the preceding procedures, the Board of Appeal is satisfied that the display devices claimed in the independent Claim 1 of the main and auxiliary requests are novel within the meaning of Article 54 EPC. As the Respondents have never alleged lack of novelty, the Board of Appeal deems it unnecessary to deal with this in greater detail.

4. Citations produced after expiry of the opposition period.

DE-A-2 431 482, cannot be considered a late-filed document, because it was submitted shortly after the date of filing of a newly presented Claim 1 of the second auxiliary request, which contained a new feature taken from the description and concerned that new feature.

Among the late-filed documents, the Board considered US-A-3 961 843 as being relevant for the assessment of the inventive step of the claimed subject-matter and introduced it in the procedure (cf. T 156/84, OJ 1988, 187).

5. Inventive step - Main request.

5.1 Document GB-A-1 490 110 (figures 5 and 7) is in the Board's opinion the nearest prior art. Said document describes a twisted nematic (page 2, line 87) liquid crystal coloured display device (page 1, lines 14 to 26) having transparent image electrodes (page 2, lines 45 to 47 references 22 and 24) formed directly on a substrate (20; 23) and a coloured light-transmitting film (included in the screen 21; page 2, lines 16 to 21) being formed directly over and covering at least one of said electrodes formed on said substrate (figure 5), the coloured light-transmitting film comprising a dye (page 2, line 19).

Contrary to the subject-matter of Claim 1, GB-A-1 490 110 does not mention a dye in a cellulosic binding agent or in

polyvinyl alcohol and does not mention that the film is printed onto the electrodes either. It is true that "printing" is mentioned on page 2, line 18. However, there is no hint that the film is printed onto the electrodes. The document merely states that the screen, including the film and a plate-like substrate, can be made by printing and not that the screen is printed onto the electrodes (page 2, lines 18 to 21). Contrary to the objections of the Respondents, the Board shares the view of the Appellant that figure 5 can not support the feature that the screen is printed onto the electrodes, due to the fact that the schematic drawing merely indicates that the screen is formed directly over the electrodes.

The display of this document solves the main problem of avoiding parallax errors.

- 5.2 Starting from the disclosure of said document, the general objective problem to be solved is to improve the device performance so as to allow discrimination between fine portions of a pattern and the utilisation of multi-coloured pattern.
- 5.3 The identification of the problem does not contribute to the inventive step, since the skilled man would as a matter of course try to achieve better performance of the known device in this respect.
- 5.4 As far as the solution of this problem is concerned, the skilled man would, in order to achieve his aim, look at prior art liquid crystal display devices and he would indeed be expected to consider document US-A-3 961 843, which refers to a display device whose light-transmitting film, similarly to the device of document GB-A-1 490 110, is positioned directly over the electrode (column 2,

lines 49 to 51). Said film comprises a cellulose resin (column 2 line 50). Document US-A-3 961 843 also hints at the possibility of printing a film onto the electrode (column 3, lines 4 to 13). The skilled man knows that the cellulose resin is a reliable binding agent and he is also aware that the printing technique allows the realisation of fine and multi-coloured patterns. He would therefore try to improve the device performances by applying the features of the cellulosic binding agent and of the printing to the device of document GB-A-1 490 110, thus obtaining a device according to Claim 1.

The Appellant argued that the printing method was merely referred to in document US-A-3 961 843 without giving any example of such use. While this is generally accepted, the Board's opinion is that the hint at the printing feature present in document US-A-3 961 843 is sufficient to lead the skilled man to do so, due to the fact that, as outlined above, the advantage of easily obtainable fine patterns by the printing technique is known in the art.

Additionally, it should be noted that the alternative feature of Claim 1 i.e. the utilisation of polyvinyl alcohol instead of a cellulosic binding agent, is also known, e.g. from document DE-B-2 422 784 (page 4, first paragraph). The application of such a feature together with the printing feature discussed above is considered a working option.

The lack of inventive step of Claim 1 could also be proved by the combination of the teachings of document GB-A-1 490 110 with document DE-A-2 431 482. In this respect, the skilled man starting from GB-A-1 490 110 and wishing to solve the above mentioned problem, would of course consider document DE-A-2 431 482. Indeed, the latter document refers to a nematic liquid crystal with the

electrode surface being directly connected with the light-transmitting film which comprises a cellulosic binding agent, said film being printed onto the electrode surface (pages 6 and 7), whereby high performances are obtained (page 6, second paragraph). Thus the skilled man would apply the features of document DE-A-2 431 482 to the device of document GB-A-1 490 110, thereby obtaining a device according to Claim 1.

The Appellant's opinion that the printing feature was merely presented in document DE-A-2 431 482 as an alternative among many others and that consequently the choice of the printing alternative implied inventive ingenuity, can not be followed by the Board. Indeed the Board is of the opinion that the printing feature (page 7, last paragraph: "Walzenüberziehen") is clearly indicated in the document as well known and normally used in practice (page 7, last paragraph: "nach einer üblichen Überzugsmethode, beispielsweise durch ... Walzenüberziehen ...") and that consequently there would be no reason why the skilled man should not try this possibility.

The Appellant alleged furthermore that the teaching of JP-A-599 57/79 leads away from the invention. Generally, however, an unreasoned mere statement in a single prior art document although it may appear to lead away from the invention cannot invalidate an objective reasoning based on the further available prior art documents leading to the conclusion that the proposed solution to the stated problem must be regarded as obvious.

- 5.5 Thus, the subject-matter of Claim 1 is not considered to involve an inventive step within the meaning of Article 56 EPC and the grounds for opposition mentioned in Article 100(a) EPC prejudice therefore the maintenance of Claim 1.

5.6 Claims 2 to 4 are dependent on Claim 1 and for this reason are also not acceptable.

6. Inventive step - First auxiliary request.

6.1 The subject-matter of Claim 1 of the first auxiliary request differs from the subject-matter of Claim 1 of the main request in that it includes the features that "the electrodes form respectively images and are separated from each other on the substrate". These features however are known from document GB-A-1 490 110 (page 2, line 126 to page 3, line 8; figures 1 to 3), which is the starting document in the problem-solution approach.

Thus, the subject-matter of Claim 1 of the first auxiliary request is not considered to involve an inventive step within the meaning of Article 56 EPC and the grounds for opposition mentioned in Article 100(a) EPC prejudice therefore the maintenance of Claim 1.

6.2 Claims 2 to 4 are dependent on Claim 1 and for this reason are not acceptable.

7. Inventive step - Second auxiliary request.

7.1 The subject-matter of Claim 1 of the second auxiliary request differs from the subject-matter of Claim 1 of the main request in that it includes the features that the film after application has been "treated by rubbing to align the liquid crystal material which it contacts". These features correspond however, to conventional treatments in the art (e.g. document US-A-3 961 843, column 2, lines 9 to 13). A combination of said features with the subject-matter of Claim 1 of the main request is considered routine for the skilled man.

Thus, the subject-matter of Claim 1 of the second auxiliary request is not considered to involve an inventive step within the meaning of Article 56 EPC and the ground of opposition mentioned in Article 100(a) EPC prejudice therefore the maintenance of Claim 1.

7.2 Claims 2 to 4 are dependent on Claim 1 and for this reason are not acceptable.

8. The Appellant's request of reimbursement of the appeal fee needs not to be discussed, this request being valid only under the condition that the appeal will be allowed (present decision, section VII, (b)).

Order

For these reasons, it is decided that:

The appeal is dismissed

The Registrar

The Chairman

F.Klein

E.Turrini