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**Datasheet for the decision  
of 30 July 2008**

**Case Number:** T 0348/06 - 3.4.02

**Application Number:** 93924954.6

**Publication Number:** 0742915

**IPC:** G02F 1/137

**Language of the proceedings:** EN

**Title of invention:**

Multistable chiral nematic displays

**Patentee:**

KENT STATE UNIVERSITY

**Opponent:**

Systems Quasi-Recursive Ltd  
ASAHI GLASS COMPANY, LTD.

**Headword:**

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**Relevant legal provisions:**

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**Keyword:**

"Sufficiency (yes)"

"Remittal for other issues - yes, the board however regrets the delay in resolving the case and remarks that it would not be unhelpful if the opposition division were able to expedite its examination, dealing with all the issues still up for decision"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0348/06 - 3.4.02

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.02  
of 30 July 2008

**Appellant:**  
(Patent Proprietor)

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**Decision under appeal:**

Decision of the Opposition Division of the  
European Patent Office posted 15 December 2005  
revoking European patent No. 0742915 pursuant  
to Article 102(1) EPC 1973.

**Composition of the Board:**

**Chairman:** A. Klein  
**Members:** M. Rayner  
B. Müller

## Summary of Facts and Submissions

I. The patent proprietor appealed against the decision of the opposition division revoking European patent No. 742915 (application number 93 924 954.6, International Publication No. WO 94/10260). The patent concerns multistable chiral nematic displays. In the present decision, the board will refer to documents R8 and R30, to which reference was made in the decision under appeal, the documents being as follows:

- R8 D.K. Yang et al., Invited Address.  
"Cholesteric Liquid-Crystal/Polymer-Gel  
Dispersions: Reflective Display  
Applications"; SID 92 Digest of technical  
papers, pages 759-761, May 1992
- R30 WO-A-92019695

A number of grounds for opposition were raised during the opposition proceedings, of which only sufficiency was dealt with in the decision under appeal. In this decision, the opposition division reached the view that the European patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The objection arose because the patent is based on the concept that stability of the different textures of the liquid crystal material is achieved in the absence of a stabilizing polymer component, but does not provide any clear indication of how this stability is achieved. The patent does not place any restriction on the particular structure of the cell and/or the treatment of the cell walls. More particularly, the patent contains a number of examples of the claimed invention (i.e. with stable

textures), which in terms of their structural features are very similar to examples of the prior art (documents R8 and R30) in which at least one texture is not stable, the substrates of the devices carrying a rubbed (or "buffed") polyimide layer. The patent does not state that a homogeneous alignment is of any significance to the stability of the focal conic texture and such treatment is not excluded by paragraph 17. Table II lists two examples with rubbed polyimide, which accordingly must be assumed to result in homogenous alignment but which are said to be stable. The minor differences between these examples of the claimed invention and the prior art are such that the stability of the examples of the patent cannot be attributed to them. It therefore has to be concluded that the stability is due to a further structural difference which is not disclosed in the opposed patent. Since the skilled person would not be able to deduce from common general knowledge what the difference might be, the opposed patent does not disclose the claimed invention in a manner sufficiently clear and complete for it to be carried out.

- II. In its appeal, the appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, in the alternative, on the basis of one of six auxiliary requests. The appellant further requested that the case be remitted to the opposition division for further consideration of novelty and/or inventive step. Oral proceedings were requested on an auxiliary basis.

According to the appellant, the patent in suit is the first to describe a cholesteric liquid crystal cell in

which liquid crystal material having a pitch length which reflects light in the visible spectrum will exhibit stable twisted planar and focal conic textures in the absence of an applied electric field without the need to include a stabilising polymer in the cell. Prior attempts used cell walls or substrates having surface treatments which promoted homogeneous alignment and which were desirable for earlier technologies, but which destroyed the stability of the focal conic textures. Neither the opponents nor the opposition division attempted to produce, yet alone succeeded in producing verifiable facts supporting the notion that thirty seven of the thirty nine examples in the patent do not show multistability. The opposition division alleges the remaining two examples are substantially identical to the prior art devices. However, in contrast to these examples, the devices of documents R8 and R30 are described as being polyimide coated and buffed for homogeneous alignment of the liquid crystal, whereas the patent simply talks of rubbing. This significant difference destroys the assumption of the opposition division upon which it based its decision. The claims as granted as well as those of the auxiliary requests fulfil the requirements of Articles 83 and 100(b) EPC 1973.

III. Opponent 01 (Systems Quasi Recursive) has not taken any position on the appeal. Opponent 02 (Asahi Glass) has requested that the appeal be dismissed and on an auxiliary basis oral proceedings.

IV. According to the respondent (=opponent 02), the claims of the patent in dispute do not place any restriction on the structure of the cell walls or the choice of

chiral nematic liquid material and thus encompass any type of cell-type "polymer-free" chiral nematic liquid crystal devices, wherein the chiral nematic material has positive dielectric anisotropy and reflects in the visible region. The only feature which allegedly distinguishes the liquid crystal device of the patent from the prior art is the fact that the focal conic texture is stable in the absence of applied field, whereas in the prior art such texture is allegedly metastable. This amounts to no more than a long-standing result to be achieved. In addition, the definitions of stable and metastable are ambiguous. The key issue is thus, whether the information in the opposed patent puts the skilled person in a position to realise a device exhibiting the required stability without undue burden - this information is completely missing. The alleged decisive difference between the types of rubbing used in the examples of the patent and the prior art are not deducible from the patent itself without relying on ex post facto information. An expert opinion is offered as evidence of this. There is no indication that the rubbing is such as not to achieve homogeneous alignment, in fact the patent is silent, which is simply not a clear and unambiguous disclosure. Moreover, the surface treatment is said to be merely optional so that it being a key to stability contradicts the patent. Giving a small number of isolated examples allegedly exhibiting the desired stability fails to disclose the subject matter of claim 1 sufficiently clearly and sufficiently for it to be carried out over the whole claimed range. Thus the patent teaching is insufficient.

V. Consequent to the auxiliary requests of the parties, oral proceedings were appointed by the board. In a communication attached to the summons, the board indicated that it looked as though the board was procedurally in a situation where it was likely to focus on the question of sufficiency during the oral proceedings. In other words, it seemed likely that either the appeal would be dismissed or the case remitted. The oral proceedings would offer an opportunity to discuss whether the skilled person really would have understood the teaching in the patent to mean that examples in the patent have structural features very similar to the prior art, for example in relation to surface treatments promoting homogeneous alignment.

VI. During the oral proceedings, the appellant argued as follows.

#### Sufficiency

Sufficiency is met by teaching of at least one way of carrying out the invention, which invention is reproducible without undue burden. In the patent in dispute, sections 10 to 28 are a general disclosure and examples 1 to 39 concrete examples, all of which were produced and stable. The patent in dispute has been licensed to other parties, none of whom has had any difficulty in understanding the patent. The respondent argues there must be a specific feature to which stability can be pinned, yet the reality is that there is no specific feature beyond that which is disclosed. The respondent clearly also understood that many materials can be used in reaching the solution taught.

Both of documents R8 and R30 teach that polyimide is rubbed for homogeneous alignment. On the other hand, the patent in dispute specifies in section 17 "without delicate treatment", in other words not cost intensive rubbing with expensive machines. Rubbing can still be done as mentioned in section 24. This can be for variations in switching contrast. It is also pointed out that ITO rubbing does not lead to homogeneous alignment. The burden of proof lies with the respondent and should be based on verifiable facts, but the respondent failed to provide any experimental evidence.

In fact the discussion of "stability" is about clarity rather than sufficiency and so is not relevant. Nevertheless, it can be observed that stability relates to a time span useful in the life of the display, so the term indefinitely relates to the lifetime of the display and not that of the universe. The term stability has been used since the 1960's and in 1993 was understood in the context of storage devices without electrical power, devices put up for display or where the display is refreshed several times per minute. Therefore stability can mean for minutes, hours, months or years, what is understood is a useful time. In practice, a sample is made up and checked with time. A very well known way is to look at the liquid crystal sample through a microscope. Macroscopic change is defined by microscopic changes, so that if nothing is happening in the latter, then the summation, i.e. the macroscopic crystal is not changed.



## Remittal

Remittal to the first instance should take place. Length of the procedure should not be the defining consideration, but the possibility of having a fair chance before two instances. Should novelty and inventive step, substantive grounds very different to sufficiency dealt with by the first instance, lead to revocation before the second instance, this would amount to a draconian measure in the present case.

- VII. During the oral proceedings, the respondent argued as follows.

## Sufficiency

Stability in the absence of an applied field is not defined nor is it explained how it is achieved. What exactly is stability, is it indefinitely stable as in section 12 of the patent and confirmed in section 14, line 35 and sections 16, 45 and 46? Does stability mean alternatively for one hour or just over a sufficient time span? Does it apply to all types of display, i.e. those that stay on or only to active displays?

According to section 24, stability may be adjusted or altered. Section 2.2.1 of decision T 0252/02 indicates it should be possible to reliably prepare the product, but in the present case, the skilled person does not know whether the product has been obtained or not. The patent teaches use of any cell with an additive and according to section 24, surface treatment may be used, as by rubbing in section 43. The patent in dispute is however silent about any decisive factor necessary for stability. The situation amounts to one involving many

small screws, any of which can be adjusted to achieve a desired result. Section 17 recites that delicate treatment is not required, but what does this mean, as nothing is stated? The terminology "not required" does not exclude rubbing, which is involved in ten examples out of thirty nine. Moreover, thirty nine examples does not amount to a plethora of examples because only three different liquid crystals are used with two chiral agents.

In the patent in dispute, the surface treatment is rubbing so there is no difference from document R8, where metastability occurs according to a scientific publication of the inventor, which there is no reason to doubt, rendering additional experimental evidence unnecessary. What can be more convincing than relying on evidence provided from the opposite side? Any differences are minor, so there should be no difference in stability and, if there is, why is it not pointed out in the patent in dispute? Reference to intuitive understanding of stability is not the same as reliably determining stability in the sense of a yes or no answer. Moreover, how exactly do the micro areas have to change to lack stability, is it 10% or is it more to give a macro-lack of stability?

All these lacks of answer are gaps in the teaching of the patent in dispute, which the skilled person cannot fill with general knowledge, meaning that the patent teaching is not sufficient.

Remittal

The case has been pending for a long time and by the time a final decision is taken, which, in any case, is likely to be before the present board, the expiry date of the patent could easily have been reached. Therefore, the board should decide the entire case without prolonging uncertainty by remittal to the first instance.

VIII. Independent claims 1 and 4 of the patent as granted are worded as follows:

"1. A light modulating reflective device comprising a light modulating cell having a cell wall structure (10,11) with chiral nematic liquid crystal light modulating material (16) disposed therebetween, and means for addressing (13, 17) arranged to provide voltage pulses to the cell, the device characterized in that

said chiral nematic liquid crystal light modulating material (16) is polymerfree and has a positive dielectric anisotropy and a pitch length effective to reflect light in the visible spectrum, said material forming light scattering focal conic and light reflecting twisted planar textures between the cell wall structure;

said means for addressing (13, 17) is adapted to selectively establish a first voltage pulse of sufficient duration and amplitude effective to transform at least a portion of said material (16) from a light scattering focal conic texture (30) to a light reflecting twisted planar texture (40), and a second voltage pulse of a sufficient duration and amplitude

effective to transform at least a portion of said material (16) from a light reflecting twisted planar texture (40) to a light scattering focal conic texture (30); and

wherein said light reflecting twisted planar texture and said light scattering focal conic texture are stable in the absence of an applied field.

4. A method of addressing a light modulating device comprising a light modulating cell which comprises a cell wall structure (10,11) with a chiral nematic liquid crystal light modulating material (16) disposed therein, the device also including means for addressing (13, 17) arranged to selectively provide voltage pulses to the light modulating cell, the method further characterized in the steps of providing said material without polymer and a positive dielectric anisotropy and a pitch length effective to reflect light in the visible spectrum, said material between the cell wall structure forming light scattering focal conic and light reflecting twisted planar textures; selectively establishing, with said addressing means, a first voltage pulse of a sufficient duration and amplitude effective to transform at least a portion of said material from a light scattering focal conic texture (30) to a light reflecting twisted planar texture (40), and effective to transform at least a portion of said material from a light scattering focal conic texture (30) to a light reflecting twisted planar texture (40), and a second voltage pulse of a sufficient duration and amplitude effective to transform at least a portion of said material from a light reflecting twisted planar texture (40) to a light

scattering focal conic texture (30); and wherein said light reflecting twisted planar texture and said light scattering focal conic texture are stable in the absence of an applied field."

The wording of the auxiliary requests is not given for the reason set out in the last section of the reasons below.

- IX. The board gave its decision at the end of the oral proceedings.

### **Reasons for the Decision**

1. The appeal is admissible.
2. Sufficiency
  - 2.1 It is established case law that the burden of proof in relation to lack of sufficiency lies with the party making that allegation, in the present case, the respondent (see for instance Section II A.7 of the "Case Law of the Boards of Appeal of the European Patent Office", 5th edition, 2006). The alleged insufficiency is that no clear indication is given how stability of different textures of liquid crystal material is achieved in the absence of a stabilizing polymer component.
  - 2.2 The opposition division was convinced by the respondent that the burden of proof was discharged by virtue of disclosure of reflective devices in documents R8 and R30 with a contra indication that texture is metastable,

which devices it considered very similar to examples disclosed in the patent, any differences being such that stability cannot be attributed to them.

- 2.3 Taking a look at what the patent in dispute discloses, one can refer to section 17 in the description of the patent in dispute to see that no delicate surface conditions are required (section 17). The description of the patent in dispute also recites that the cell walls can be treated (section 24) and such additional treatments alter the characteristics of the cell response. Additional treatments mentioned in this context are treatments by detergents, chemicals or rubbing. This is thus what the skilled person is taught.
- 2.4 Buffing polyimide coating for homogenous alignment of the liquid crystal is said to take place according to the teaching of document R8 (see the penultimate sentence of the right column of the first complete paragraph on page 759) and R30 (see lines 19-20 on page 27). In view of the disclosure of the patent mentioned in the previous paragraph, the board is thus not convinced, that the devices disclosed in documents R8 and R30 are "very similar" to the examples disclosed in the patent, nor is the board persuaded by the submission of the respondent that involvement of the appellant in documents R8 and R30 renders additional experimental evidence that this is so unnecessary. Moreover, the board has not been given any reason to doubt that any other example taught in the patent meets the claims nor has any evidence been presented in relation to any other examples or materials.

2.5 The opposition division introduced a dubious link in its chain of reasoning using a vague reference to "rubbed (or "buffed")". This reference implies that the opposition division considered an additional treatment by rubbing in the patent in dispute to amount to buffering polyimide coating for homogenous alignment. The division also observed that buffing polyimide coating for homogenous alignment of the liquid crystal was not excluded. A remark later in the decision went even further by referring to two examples with rubbed polyimide listed in table II of the patent, which, according to the opposition division, must be assumed to result in homogenous alignment. However, neither how the implication nor how the basis of the "must" is justified, is explained by the division. Accordingly, the chain of reasoning of the opposition division did not convince the board. Therefore, the board does not agree with the opposition division that the burden of proof has been discharged.

2.6 The respondent agreed with the position of the opposition division in presenting an argument that only ex post facto information excludes "buffing polyimide coating for homogenous alignment" from the patent in dispute, but the board considers it rather more the case that this argument is simply trying to graft a teaching into the patent. Many features are not excluded by any patent description, but for the purpose of assessing sufficiency, it is, with or without expert evidence, what is included in that description which is important. Thus, against this approach can be weighed the position of the appellant directed directly to the teaching of the patent and underlining that all the examples in the patent in dispute, including those

involving rubbed polyimide, do indeed provide stability of different textures of liquid crystal material. The board thus finds the position of the appellant more persuasive as it sees no convincing reason not to follow the teaching present in the patent in assessing sufficiency.

2.7 The respondent also referred to section 2.2.1 of the reasons for decision T 0252/02 in support of its position, which can be cited as follows, "In order to carry out the invention, the skilled person must be in a position to establish whether a product falls within the area covered by the claim and to reliably prepare the claimed product. ... In the present case the nonwoven fabric laminate must have... This presupposes that the skilled person utilises a method... which is either the same or one which gives essentially the same results as the method which has been used as a basis for arriving at... the patent in suit." In the board's view, section 2.2.1 of decision T 0252/02 is not therefore in disagreement with the conclusion reached in the preceding paragraph.

2.8 The respondent also posed a number of questions to emphasise more a lack of disclosure that stability is achieved. These concerns do not amount to discharging the burden of proof because they give the board no reason to doubt that the teaching of the patent can be carried out. After all, an important point is that when considering the stability, the skilled person has already realised the examples according to the teaching in the patent in dispute. The respondent referred to concerns about the type of display, the nature of delicate treatment, (decisive) factors for stability,



duration of stability, the number of micro areas which need to change, yet provided no experimental evidence to show that the realised examples, whether they are large or small in number, or other devices meeting the claims are not stable, whatever the respondent understood that to mean. This line of reasoning did not therefore convince the board as to insufficiency.

2.9 Accordingly, the board reached the view that the teaching of the patent is sufficient so that the requirement of Article 100(b) (Article 83) EPC 1973 is satisfied.

### 3. Remittal

3.1 Generally speaking the board considers that cases should be resolved as soon as possible. In the present case, the board is thus sympathetic to the position of the respondent that the long lifetime of the proceedings is a reason for not remitting the case to the opposition division. On the other hand, the board cannot ignore the fact that the opposition division did not offer enough information in its decision for the board to be to be sure of its position on substantive patentability. If the board were to take a first decision on substantive patentability, it would thus deprive the appellant of an instance. In the absence of a more pressing reason, such as, for example, pending infringement proceedings, the board therefore saw the balance between the parties to be best served, in the present case, by remittal. Nevertheless, from the viewpoints of procedural efficiency and service to the parties, the board regrets the delay in resolving the case and remarks that it would not be unhelpful if the

opposition division were able to expedite its examination of the remitted case, dealing with all the issues still up for decision.

- 3.2 As the case is being remitted, it is not necessary to consider the auxiliary requests of the appellant in the present decision.

## **Order**

### **For these reasons it is decided that:**

The decision under appeal is set aside.

The case is remitted to the first instance for further prosecution.

The Registrar

The Chairman

M. Kiehl

A. G. Klein