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**Datasheet for the decision
of 18 January 2008**

Case Number: T 1458/05 - 3.5.04

Application Number: 02751455.3

Publication Number: 1415480

IPC: H04N 9/31

Language of the proceedings: EN

Title of invention:

An image projecting device and method

Applicant:

Explay Ltd.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Amendments - added subject-matter (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1458/05 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 18 January 2008

Appellant:

Explay Ltd.
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Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 22 June 2005
refusing European application No. 02751455.3
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: F. Edlinger
Members: M. Paci
C. Vallet

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division to refuse European patent application No. 02 751 455.3 (published as international patent application WO 03/005733 A1).
- II. The decision under appeal was based on the ground that the application had been amended in such a way that it contained subject-matter extending beyond the content of the application as filed (Article 123(2) EPC). The following document was cited as prior art in the decision under appeal:
- D1: EP 0 425 266 A2.
- III. With the statement of grounds of appeal the appellant submitted an auxiliary request including an amended claim 1 and filed the following documents (numbered E1 to E4 by the board in the present decision) as evidence in support of his arguments:
- E1: R. Macdonald, "Liquid Crystal Displays", Optical Institute of the Technical University of Berlin, undated.
- E2: M. Zavracky et al., "Microdisplays for the Camcorder Viewfinder Market", Kopin Corporation, undated.
- E3: S. Utsunomiya et al., "36.2: Low Temperature Poly-Si TFTs on Plastic Substrate Using Surface Free Technology by Laser Ablation/Annealing (SUFTLATM)", SID 00 DIGEST, ISSN0000-0966X/00/3101-0916, ©2000.

E4: T.-J. King, "Poly-Si TFT Technologies for Future Flat-Panel Displays", ISSN1083-1312/00/2001-0406, ©2000 SID.

IV. Independent claim 1 according to the main and auxiliary requests reads as follows:

Main request

"An image projecting device (1) comprising a spatial light modulating (SLM) unit (12) having an SLM pixel arrangement (5) defining an active surface; first and second lens' arrays (10,14) at opposite sides of said SLM pixel arrangement (5), such that each lens in the first array and a respective opposite lens in the second array are associated with a corresponding one of the pixels; a light source system (LSS) operable to produce an incident light beam of a predetermined cross section corresponding to the size of said active surface; and a magnification optics (22) accommodated at the output side of the SLM pixel arrangement; the device being characterized in that:

said first and second lens' arrays are integral with said SLM pixel arrangement being located at opposite sides of the active surface of the SLM pixel arrangement, and forming together with the SLM pixel arrangement a combined arrangement inside the SLM unit (12), each of said first and second lens' arrays being spaced from the active surface of the pixel arrangement a predetermined small distance up to a physical contact;

said SLM unit includes polymer spacers (P1, P2), located at opposite sides of said SLM pixel arrangement; and

said first and second lens' arrays interface with said polymer spacers (P1, P2), respectively, inside the SLM unit at opposite sides of said SLM pixel arrangement wherein said polymer spacers engage said active surface of said pixel arrangement."

Auxiliary request

"An image projecting device (1) comprising a spatial light modulating (SLM) unit (12) having an SLM pixel arrangement (5) formed by an array of active cells (42) presenting an array of pixels, respectively, and defining together an active surface of the SLM unit; first and second lens' arrays (10,14) at opposite sides of said SLM pixel arrangement (5), such that each lens in the first array and a respective opposite lens in the second array are associated with a corresponding one of the pixels; a light source system (LSS) operable to produce an incident light beam of a predetermined cross section corresponding to the size of said active surface; and magnification optics (22) accommodated at the output side of the SLM pixel arrangement; the device being characterized in that:

the SLM unit comprises a combined arrangement formed by said active cells and said first and second lens' arrays, which are integral with said active cells via polymer spacers (P1, P2), the first and second lens' arrays interfacing said polymer spacers (P1, P2) located at opposite sides of the active cells, such that each of said first and second lens' arrays is spaced from the respective side of the active surface a predetermined small distance up to a physical contact."

- V. Claims 2 to 36 of the main and auxiliary requests have no bearing on the present decision.
- VI. In an official communication accompanying the summons to oral proceedings the board informed the appellant of its preliminary non-binding opinion that claim 1 according to both requests contained subject-matter extending beyond the content of the application as filed (Article 123(2) EPC).
- VII. In a reply to the official communication the appellant withdrew his request for oral proceedings and requested that the procedure continue in writing. A decision in due course was also requested.
- VIII. The oral proceedings were cancelled.
- IX. The appellant's final requests are:
(a) that *"the decision of the Division in relation to Article 123(2) be overturned, and that that Board agrees with the applicant in relation to Article 56"*,
(b) *"consideration of Auxiliary Request I"* by the board, and
(c) that the board issues *"a decision in due course"*.
- X. The examining division's reasoning regarding claim 1 of the main request can be summarised as follows.

The phrase in claim 1 *"wherein said polymer spacers engage said active surface of said pixel arrangement"* was added during the oral proceedings held before the examining division in an attempt to distinguish the claimed subject-matter from the device disclosed in D1.

As a basis for the amendments to claim 1 the applicant cited the following passages of the description in which the added feature was allegedly mentioned: page 9, line 23; page 10, line 15; and page 11, lines 11-13; as well as figures 1 and 4. However the meaning of the expression "active surface" is not fully clear and no basis can be found in those passages, or elsewhere in the application as filed, for the feature that the active surface of the pixel arrangement was actually engaging the polymer spacers. Thus the above feature constitutes subject-matter extending beyond the content of the application as filed and therefore contravenes the requirements of Article 123(2) EPC.

XI. The appellant argued essentially as follows:

Regarding the main request

A typical SLM unit (or LCD panel) comprises a pixel arrangement enclosed between two glass plates and/or polarizers as disclosed for example in D1 and in E1.

As a basis for claim 1 of the main request, page 9 of the application as filed refers in particular to an SLM module from Kopin (SLM Module RS170) as an example of a pixel arrangement for use in the present invention. The Kopin displays are referred to in E2 as "active matrix LCDs" i.e. LCDs in which the pixel arrangement is formed to have two external active surfaces (a TFT matrix layer on one side and a transparent conducting surface return electrode in the form of an indium tin oxide (ITO) layer on the opposite side). The fabrication of the Kopin LCD differs from the conventional approach to manufacturing LCD panels, such

as employed in the SLM of D1, in that manufacture of the Kopin LCD starts from a TFT layer, not from a glass layer. The TFT layer is then removed from the silicon wafer and placed on a glass substrate. A similar process is Epson's SUFTLA process, disclosed in E3 and E4, which show that the TFT layer is independent of the glass plate. In conventional applications for the Kopin LCD the TFT surface of the pixel arrangement is attached to a glass plate before removing the silicon substrate on which the TFT layer is formed. The indium tin oxide (ITO) can be coated on any surface, i.e. glass, polymer, etc.

By contrast, the present invention provides a novel SLM unit comprising a combined arrangement formed by the pixel arrangement (e.g. that of Kopin) and a microlens assembly (see page 13 of the present application). So, rather than fixing the TFT to glass to form a conventional SLM unit of Kopin, this layer engages a polymer spacer (P1) which in turn interfaces the respective lens array (46 in figure 4C), and then is attached to the glass substrate. On the ITO side, the ITO is coated on polymer spacer P2 which in turn interfaces the lens array 46' and which is then attached to the glass substrate. The liquid-crystal is then inserted into the device gap between the TFT/lens and ITO/lens pieces in a manner analogous for example to conventional Kopin applications to form the SLM.

The invention preferably takes advantage of the Kopin pixel arrangement fabrication technology, and forms the first microlens array on the outer surface of the TFT layer and the second microlens array on the outer surface of the ITO layer, each connected to their

respective layer through a polymer spacer P1, P2, as shown in figure 4C. The resulting combined arrangement is then enclosed between the glass plates.

Thus it is clear from the description in the present application that the microlens arrays are an integral part of the pixel arrangement. It should also be clear from figure 4C of the present application that glass plates cannot be considered as part of the depicted combined lens-spacer-LC-spacer-lens arrangement. The arrangement of figure 4C is disclosed as having a thickness of about 50 microns at each side of the LC material (active surface), which in turn has a thickness of up to 10 microns, which would not be possible if the glass plate were considered inside the SLM. Therefore the glass layer can only be external to the lenses and the polymer spacers. Moreover the Kopin SLM Module RS170 features a pixel size of 15 microns and therefore in a method according to D1 a 15 microns lens would not be able to focus the light on the window of the pixel from beyond the 700-micron thickness of the glass due to light diffraction.

Hence there is sufficient basis in the application as filed to support a claim directed towards the polymer spacers engaging respective active surfaces of the pixel arrangement. Moreover, given the disclosure of E2, the meaning of such a claim is clear.

Regarding the auxiliary request

No argument specific to the auxiliary request was presented.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Article 123(2) EPC - Added subject-matter
 - 2.1 In the decision under appeal the examining division held that the introduction into claim 1 of the phrase "*wherein said polymer spacers engage said active surface of said pixel arrangement*" contravened the requirements of Article 123(2) EPC.
 - 2.2 According to established jurisprudence of the boards of appeal, the relevant question to be decided in assessing whether an amendment adds subject-matter extending beyond the content of the application as filed (Article 123(2) EPC) is whether the amended subject-matter is **directly and unambiguously** derivable from the application as filed by a person skilled in the art using common general knowledge (see Case Law of the Boards of Appeal of the EPO, 5th edition 2006, III.A.2).
 - 2.3 According to the application as filed, the Spatial Light Modulator (SLM) unit comprises a pixel arrangement (5 in figure 1; 40 in figure 3A) having a so-called windowed structure (see page 9, lines 17 to 26). The pixel arrangement (windowed structure) is a two-dimensional array of spaced-apart "*active cells*" (see 42 in figure 3A; page 10, lines 24 to 29, and page 13, lines 1 to 10). A first lenslet array (10 in

figure 1; 46 in figures 3B, 4B and 4C) is formed of lenslets 48 which cluster the incident light beam into a plurality of beamlets (64) each focused by a respective lenslet 48 onto a respective active cell (see from page 13, line 18, to page 14, line 5). A second lenslet array 46' substantially identical to the first lenslet array 46 is positioned at the other side of the pixel arrangement, thus causing a reverse optical operation on the beamlets (66) emerging from the active cells 42 to recreate a single light beam (80) (see page 14, lines 5 to 10). The application as filed states in this context on page 14, lines 1 to 5, that: *"The first lenslet array 46 thus clusters the light beam 50 to correspond to the area of the arrangement 40 (active surface of the SLM unit) by splitting the light beam 50 impinging thereon into a plurality of components 64 and focusing each component by the respective lenslet to the respective pixel"*. It is thus reasonably clear from the above sentence that the **"active surface"** of the SLM pixel arrangement (as specified in claim 1) consists of the sum of the areas of the active cells (42 in figure 3A).

- 2.4 The application as filed only discloses **polymer spacers** in figure 4C (illustrating "a specific example of the SLM unit construction"; see page 8, line 27) and in the paragraph on page 15, lines 1 to 4, of the description which reads: *"As exemplified in Fig. 4C, the SLM unit may be of a 100 μ m thickness, wherein the pixel arrangement (e.g., LC unit) has a thickness of 10 μ m and each of the polymer spacings P1 and P2 has a thickness of 45 μ m. The SLM unit may be manufactured using stamping and hot embossing techniques."*

2.5 The description and claims of the application as filed do not contain any mention of the polymer spacers **engaging** the active surface of the pixel arrangement. In fact, the verb "to engage" or any synonym thereof is not used in this context. In English, the verb "to engage" carries the meaning of "to interlock with" or "to fit in a corresponding part", which can hardly be derived from the two continuous straight lines in a schematic drawing as in figure 4C. Two dashed lines are also drawn in figure 4C inside the pixel arrangement and parallel to the two continuous lines. No explanation is given in the application as filed regarding the meaning of these lines. According to standard conventions for technical drawings the dashed lines might be construed as indicating the presence of two recessed surfaces either inside or behind the pixel arrangement. Even assuming that these dashed lines implied that the surface of the active cells, i.e. the active surface, were recessed from the frame 44 surrounding these active cells - which in the board's view is not implicit because other interpretations for these dashed lines are possible - it would still not be **directly and unambiguously** derivable from the application as filed that the polymer reaches the bottom of these recesses and thus the "active surface", and even less that it engages this surface in the sense of *interlocking with or fitting in a corresponding part*.

2.6 From the above analysis the board concludes that the amendment according to which the "*polymer spacers engage said active surface of said pixel arrangement*" is not directly and unambiguously derivable from the application as filed, and thus does not comply with the requirements of Article 123(2) EPC.

2.7 The appellant's line of argumentation is based on an alleged structure and manufacturing process specific to the SLM Module RS170 from Kopin Corporation. However the application as filed only mentions this module as an example of an SLM unit (see page 9) but does not disclose any information as to its structure or manufacturing process. This information regarding the structure or the manufacturing process of the SLM Module RS170 thus cannot be regarded as directly and unambiguously derivable from the application as filed.

Documents E1 to E4, filed as evidence, are of no help to the appellant's case because they were not referred to in the description and thus cannot form part of the content of the application as filed. Moreover none of them discloses the structure or manufacturing process of SLM Module RS170. E2 bears no date and thus cannot be regarded as available to the public at the effective filing date of the application. Therefore, E1 to E4 cannot provide evidence of relevant common general knowledge at the effective date of the present application as to how a person skilled in the art would have understood the structure of SLM Module RS170 in detail.

Thus the appellant's arguments do not convince the board.

3. For the above reasons the appellant's main request is not allowable.

Auxiliary request

4. Article 123(2) EPC - Added subject-matter
 - 4.1 Claim 1 according to the auxiliary request states that *"each of said first and second lens' arrays is spaced from the respective side of the active surface a predetermined small distance up to a physical contact"*.
 - 4.2 The only reference in the application as filed to a small distance up to a physical contact is the following passage on page 13, lines 18 to 22: *"As illustrated in Fig. 4B, showing the pixel arrangement 40 with the first lenslet array 46 and the second lenslet array 46', the first lenslet array 46 is disposed at the input side of the pixel arrangement 40 very close thereto (up to a physical contact) and the second lenslet array 46' is disposed at the output side of the pixel arrangement 40 also very close thereto, up to a physical contact."*
 - 4.3 Thus, according to the application as filed the small distance (implied by the expression "very close") up to a physical contact is measured between the first (or second) lenslet array and the input (or output) side of the **pixel arrangement**. According to claim 1 of the auxiliary request, however, the small distance up to a physical contact is measured between each of the first and second lens' arrays and the respective side of the **active surface**.

- 4.4 As explained under point 2.5 above, the dashed lines in figure 4C might indicate that the active cells 42 - which together define the "active surface" of the SLM (see lines 1 to 4 of claim 1 of the auxiliary request) - are recessed compared to frame 44 surrounding them, to form a windowed structure (see figure 3A). This could mean that the lenslets come into physical contact with the frame of the windowed structure. However, it is not **directly and unambiguously** derivable from the application as filed that the lens arrays can be in physical contact with a side of the active surface of the active cells, as these might be recessed.
5. For the above reasons the appellant's auxiliary request is also not allowable.
6. Since none of the main and auxiliary requests is allowable the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Sauter

F. Edlinger