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D E C I S I O N
of 9 April 2003

Case Number: T 0644/00 - 3.5.1

Application Number: 92912576.3

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Title of invention:
Viewing device

Patentee:
DURAND LIMITED, et al

Opponent:
VIRTUAL RESEARCH SYSTEMS
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Nakaishi, Yukiaki
Koninklijke Philips Electronics N.V.

Headword:
Viewing device/DURAND

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0644/00 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 9 April 2003

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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 8 May 2000 revoking European patent No. 0 574 551 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: S. V. Steinbrener
Members: R. S. Wibergh
S. C. Perryman

Summary of Facts and Submissions

I. This is an appeal by the proprietors of European patent No. 0 574 551 against the decision of the Opposition Division to revoke the patent.

II. The four respondents had opposed the patent in particular on the ground that the invention was not new or did not involve an inventive step (Article 100(a) EPC) having regard to - among others - the documents

D1: M. A. Teitel, "The Eyephone, a head mounted stereo display", *Stereoscopic Displays and Applications*, John O. Merrit, Scott S. Fischer, Editors, Proc. SPIE 1256 (1990), pp. 168-171

D2: IBM Technical Disclosure Bulletin, Vol. 29, No. 1, June 1986, pp. 276-279

D6: EP-A-0 294 122.

III. The Opposition Division held that the subject-matter of claim 1 in amended form according to a main request and seven auxiliary requests did not involve an inventive step.

IV. In the statement setting out the grounds of appeal the patent proprietors requested that the patent be maintained as amended in accordance with the main request submitted with the statement of grounds, or in accordance with the first auxiliary request or the second auxiliary request before the Opposition Division. There was no request for oral proceedings.

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

"A viewing device comprising a frame or support (10) adapted to be worn on the user's head and supporting, so as to be in front of each of the user's eyes, a respective video display screen (12) which comprises a plurality of individual pixels, driving circuitry driving said display screens, a respective optical system (14), supported by said frame or support, interposed between each eye and the respective screen (12) characterised in that a respective light-diffusing or randomising screen (16) is interposed between each display screen (12) and its respective optical system (14) and said diffusing or randomising screen (16) comprises a sheet of light-transmitting material in or on which is formed an array of closely packed microlenses".

VI. Claim 1 according to the *first auxiliary request* contains the additional feature

"each said light-diffusing or randomising screen interposed between the display screen and the viewer being such as to act as a spatial filter removing the high spatial frequency image detail which is due to the pixelation leaving only the lower spatial frequencies corresponding to actual picture content".

VII. Claim 1 according to the *second auxiliary request* adds to the first auxiliary request the feature

"the diameter of each microlens being between 5 and 1 microns".

VIII. In a communication from the Board three possible arguments against the invention's involving an inventive step were outlined. The first one, based on D1 and D2, corresponded to the reasoning in the decision under appeal.

None of the parties replied to the arguments in the communication.

IX. Respondents 03 and 04 request that the appeal be dismissed and, as an auxiliary measure, that oral proceedings be held.

X. Respondent 01 has withdrawn its opposition. Respondent 02 has made no request at the appeal stage.

Reasons for the Decision

1. *The closest prior art*

D1, which is the closest prior art document, describes a head-mounted display with small LCD monitors consisting of individual colour cells. An optical system magnifies the displayed image before presentation to the viewer. In order to merge the individual coloured cells into continuous tricolour pixels the resolving power of the system must be lowered. This is achieved by a "wavefront randomiser" interposed between the LCD screen and the magnifier optics (page 169, bottom). The wavefront randomiser "can be thought of as a collection of small (ie much less than a cell size), weak, prisms, each of which deflects light through a random angle" (page 170, top).

It is specified that the angle should be small and have a maximum value equal to a cell width for a given distance between the randomiser and the LCD. Under these conditions three coloured cells are merged into a colour pixel.

Besides the wavefront randomiser D1 describes three other ways of merging the light from the cells. One of them involves "scattering diffusers" (page 169). The appellant has explained (statement of grounds, page 3) that these elements scatter light in all directions, but a large portion of light is transmitted straight through. The wavefront randomiser is however preferred in D1.

2. *Novelty*

D1 discloses the preamble of claim 1 according to the main request and also the feature that a randomising screen is interposed between the display screens and the optical system. Claim 1 is thus distinguished from this prior art by the feature that the randomising screen is formed of closely packed *microlenses*. Microlenses are, according to column 3, second and third paragraphs of the patent-in-suit, minute conventional (convex) lenses formed on one or both surfaces of the screen, or graded refractive index lenses formed in the screen material.

Thus the invention is new.

3. *The technical problem*

The technical problem can be seen as finding an alternative implementation of the wavefront randomiser

described in D1, having the same effect of deflecting light through a random angle which is smaller than a given value.

4. *Inventive step*

4.1 D2 describes a "light diffuser" deflecting light at random angles using microlenses (Figure 6). It is explained that "/t/he spectrum of diameters influences the manner in which the light is angularly redistributed" (page 278).

4.2 The appellants, noting that D2 is entitled "Light Diffuser", have argued that the described device is what D1 refers to as a "scattering diffuser", not a "wavefront randomiser". Thus the skilled person, searching for alternatives to the randomiser, would not consider D2. Respondent 04 has disagreed, stating that since according to D2 the angular distribution of the diffused light power can be controlled this document does disclose a wavefront randomiser.

4.3 The Board takes the view that the skilled person would be primarily guided by the functions of the optical elements, not by the expressions used to designate them. In D1 the wavefront randomiser is characterised by the particular requirement that light is deflected through angles which are small but limited. D2 explicitly discloses a "light diffuser" having this property since, by adjusting the microlens diameters, random angles smaller than a given value can be obtained. It cannot be assumed that the skilled person would disregard this "light diffuser" only because it happens to be referred to by a name which is similar to the designation "scattering diffuser" used in D1 for a

different kind of device. The skilled person would therefore assume that the microlenses of D2 would yield an acceptable result.

4.4 It is true that D1 specifically mentions prisms, not lenses. But again, because of the similarities in function between the light diffuser of D2 and the wavefront randomiser in D1 the skilled person would at least have tried this technique. It is moreover noted that microlens arrays in the meaning of the opposed patent have already been used as diffusing surfaces in TV systems (D6, page 4, lines 31, 32). There was thus nothing surprising about their use in the context of D1.

4.5 The appellants have furthermore pointed out that the microlenses in D2 are too big for application to D1. However, the appropriate size of the elements is indicated in D1 ("much less than a cell size"), and this is what the skilled person would use.

4.6 Thus, the invention according claim 1 of the main request does not involve an inventive step (Article 56 EPC).

5. *The appellants' first auxiliary request*

According to the first auxiliary request, each light-diffusing or randomising screen interposed between the display screen and the viewer is such as to act as a spatial filter removing the high spatial frequency image detail which is due to the pixelation, leaving only the lower spatial frequencies corresponding to actual picture content. This feature is known from D1, where it is said at page 170, paragraph 4 that the

image "looks fuzzy because there is no high spatial frequency component to the image".

6. *The appellants' second auxiliary request*

According to the second auxiliary request the diameter of each microlens is between 5 and 1 microns. This interval seems to correspond roughly to the dimensions a skilled person would choose after being taught by D1 that the prisms should be much smaller than the cell size, the cell size being typically 50 microns (as mentioned in the statement of grounds of appeal, point 36).

7. *Conclusion*

It follows that none of the appellants' requests is allowable under Articles 52 and 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl S. Steinbrener