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**Datasheet for the decision
of 1 April 2014**

Case Number: T 1206/10 - 3.4.02

Application Number: 99660194.4

Publication Number: 1016817

IPC: F21V8/00

Language of the proceedings: EN

Title of invention:

A backlighting light pipe for illuminating a flat-panel display

Patent Proprietor:

Nokia Corporation

Relevant legal provisions:

EPC Art. 54(3)

Keyword:

Novelty (main and first auxiliary request: no; second auxiliary request: yes)



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Chambres de recours**

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Case Number: T 1206/10 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 1 April 2014

Appellant:
(Patent Proprietor)

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Decision under appeal:

**Interlocutory decision of the Opposition
Division of the European Patent Office posted on
14 January 2010 concerning maintenance of the
European Patent No. 1016817 in amended form.**

Composition of the Board:

Chairman: A. G. Klein
Members: F. J. Narganes-Quijano
B. Müller
A. Hornung
D. Rogers

Summary of Facts and Submissions

- I. The appellant (patent proprietor) lodged an appeal against the interlocutory decision of the opposition division finding European patent No. 1016817 (based on European patent application No. 99660194.4 filed on 28 December 1999 and claiming a priority date of 30 December 1998), as amended according to the fourth auxiliary request then on file, to meet the requirements of the EPC.

The opposition filed by the opponent against the patent as a whole was based on the grounds for opposition of lack of novelty and lack of inventive step (Article 100 (a) EPC 1973). The boxes for the grounds for opposition under Article 100 (b) and (c) EPC 1973 were also crossed in the notice of opposition; these grounds for opposition, however, were neither substantiated by the opponent nor addressed by the opposition division during the first-instance proceedings.

The opponent withdrew its opposition during the first-instance proceedings and the opposition division decided to continue the opposition proceedings of its own motion.

- II. In its decision the opposition division referred to document

D4: WO-A-0074026 (published on 7 December 2000 and claiming a priority date of 28 May 1999)

and, among other findings, held that

a) the claimed invention was not entitled to the claimed priority date of 30 December 1998 (section A of the reasons for the decision) and the disclosure of

document D4 pertinent to the present case was entitled to the priority date of 28 May 1999, so that the mentioned disclosure of document D4 constituted prior art within the meaning of Article 54(3) EPC (section B of the reasons);

b) the relevant facts of the public prior use alleged by the opponent could not be sufficiently proven on the basis of the available evidence and the hearing of the witnesses (section F, point 3 of the reasons);

c) neither the subject-matter of claim 1 of the patent as granted and relating to the main request nor the subject-matter of claim 1 amended according to the first auxiliary request then on file were new over the disclosure of document D4 (sections C and D of the reasons);

d) the subject-matter of claim 1 amended according to the second auxiliary request then on file contravened the requirements of Article 123(2) EPC (section E of the reasons);

e) the subject-matter of claim 1 amended according to the third auxiliary request then on file was new over the disclosure of document D4 (section F, point 2 of the reasons) and involved an inventive step over the available prior art (section F, point 4), but the claim was not clear within the meaning of Article 84 EPC 1973 (section F, point 5 of the reasons); and

f) the patent as amended according to the fourth auxiliary request complied with the requirements of the EPC (section G of the reasons).

III. With the statement setting out the grounds of appeal the appellant submitted sets of claims amended according to a first, a second and a third auxiliary request and requested that the decision under appeal be set aside and the patent be maintained as granted, as a

main request, or maintained as amended according to one of the first to third auxiliary requests, or maintained as amended according to the fourth auxiliary request underlying the decision under appeal. Oral proceedings were also requested on an auxiliary basis.

Claim 1 of the patent as granted reads as follows:

"A light pipe (313, 900) for providing backlighting (312) of a flat-panel display (311) by means of at least one light source (L3, 901), which light pipe (313, 900) has a certain first surface (313C) with a surface profile, which comprises patterns that have diffractive properties, which surface profile is manufactured directly on said surface, characterized in that

- the patterns comprise uniform, mutually different pixel-like areas (903, 904) with a certain distribution on the first surface (313C),
- some (904) of said areas (903, 904) have an orientation (904) of a diffractive surface formation, in order to distribute light coming from the light source (L3, 901) to form macroscopically uniform lighting and
- some (903) others of said areas (903, 904) have a diffractive surface formation in order to couple light out from the light pipe (313, 900) in order to produce lighting (312)."

The wording of claim 1 of the first auxiliary request differs from that of claim 1 as granted in that the expression "by means of at least one light source (L3, 901)" in the first paragraph of the claim reads "by means of at least one light source (L3, 901) at a source end of the light pipe" and in that the claim further reads:

"wherein the distribution of the patterns depends on distance from the source end of the light pipe."

The wording of claim 1 of the second auxiliary request differs from that of claim 1 as granted in that the expression "by means of at least one light source (L3, 901)" in the first paragraph of the claim reads "by means of at least one light source (L3, 901) at a source end of the light pipe" and in that the claim further reads:

"wherein the relative portion of said first surface covered by light distributing areas (902, 904) decreases as a function of increasing distance from the source end of the light pipe".

The set of claims of the second auxiliary request also includes independent claim 15 directed to a light pipe arrangement including, among other devices, a light pipe as defined in claim 1, and dependent claims 2 to 14 and 16 all referring back to independent claims 1 and 15, respectively.

The wording of the claims of the remaining auxiliary requests is not relevant to the present decision.

- IV. Oral proceedings were appointed as requested by the appellant. In a communication annexed to the summons to attend oral proceedings the Board - in an enlarged composition pursuant to Article 21(4)(b) EPC - gave a preliminary assessment of the appellant's case on appeal. In particular, as regards the main request, the Board commented as follows:

"The opposition division held in its decision that the disclosure of document D4 - with the possible exception of the passages on page 1, lines 12 to 26, page 3, lines 13 to 20, page 5, lines 8 to 13 and 18 to 22, and page 11, lines 14 to 16 - constituted prior art within the meaning of Article 54(3) EPC (paragraph [II-a]) above) and that the subject-matter of claim 1 as granted was anticipated by this disclosure (paragraph [II-b]) above). The appellant has not disputed the first of these findings, but has contested the opposition division's finding of lack of novelty. In particular, the appellant has disputed that the light pipe disclosed in document D4 comprises areas satisfying the claimed conditions relating to the distribution and the coupling-out of light. After consideration of the submissions of the appellant in the grounds of appeal, the Board notes the following:

i) The structure and the orientation with respect to the incident light of the diffractive areas on the surface of the plates disclosed in both the patent in suit and in document D4 are such that light propagating within the plate and incident on the diffractive areas is partly extracted from the plate and partly redirected within the plate, see Figures 1D, 3D and 5B of the patent specification and Figures 1c and 2a of document D4 together with the corresponding disclosure; see also the opposition division's arguments on page 6 of the decision, two last paragraphs. Consequently, the light incident on the claimed light distributing areas and on the claimed light out-coupling areas is also partially coupled out and distributed by the areas, respectively, and the light incident on the grating structures disclosed in document D4 is partly coupled out of, but - contrary to the appellant's submissions - also partly distributed within the plate, see in this respect page 8, lines 3 to 11 and Figure 1c.

ii) Document D4 discloses that the diffraction efficiency of the grating structure of the plate is "a function of place" (page 5, lines 5 to 7 and 14 to 16). In addition, Figure 1b, although schematic, clearly teaches that the grating structure is composed of a pattern of two different types of diffractive areas ("type A" and "type B" in the figure). It follows that - irrespective of whether or not the patterns of lines represented in Figure 1b of document D4 constitute a clear and unambiguous disclosure of the orientation of grating grooves as assumed by the opposition division and disputed by the appellant - the grating structure of document D4 determines two different types of diffractive areas on the surface of the plate having different diffraction efficiency. Accordingly, a first one of the type of areas would have a greater light extracting capability than the second type of areas, and the latter a greater light distributing capability than the former. Furthermore, the diffractive areas of the plate of document D4 intrinsically have an orientation (see for instance elements 2u in Figures 1a and 1c) which influences the distribution of light incident therein, and consequently the second type of areas with a greater light distributing capability intrinsically have "an orientation of a diffractive surface formation in order to distribute light" incident thereon as required by the claimed subject-matter. In addition, according to document D4 the technical function of the diffractive structure - including in particular the light distribution function inherent to the second type of areas - improves the uniformity of the lighting emerging from the plate (paragraph bridging pages 2 and 3, and page 10, lines 27 to 34). Therefore, the appellant's submissions that document D4 "only discloses diffractive areas whose sole purpose and function is to outcouple light from

the light pipe" does not appear persuasive. In addition, none of the claimed features appears to impose limitations to the orientation of the diffractive areas, or to the degree of light distribution capability of the light distributing areas, or to the degree of light outcoupling capability of the light outcoupling areas, or to the degree of uniformity of the light illumination that would distinguish the claimed light pipe from the light pipe disclosed in document D4.

iii) As submitted by the appellant, the plate disclosed in document D4 operates by total reflection of light propagating within the plate (page 5, lines 2 to 5, page 7, lines 22 to 35, and page 9, lines 4 to 7). This, however, also appears to be the case with the plate of the claimed invention, see Figures 5A and 5B together with the corresponding disclosure, and in particular column 5, lines 48 to 50.

iv) Document D4 discloses the provision of a diffuser for widening and equalizing the angular distribution of diffracted radiation and re-directing light beams (page 7, lines 5 to 11, and page 8, line 3 to page 9, line 2). The provision of this diffuser, however, complements, but - contrary to the appellant's submissions - does not exclude the light distributing function of the diffractive structure. In addition, the patent specification also mentions a Lambertian white reflector having a technical function similar to the diffuser of document D4, see sentence bridging columns 4 and 5 of the patent specification.

v) The submissions of the appellant that document D4 refers to "places with no outcoupling grating" (page 9, lines 14 to 19) and that light is still outcoupled in these places but without any diffraction appear to be at variance with the requirement of document D4 that the light outcoupling diffractive structure "is

arranged on the entire panel element all over its light surface" (page 5, lines 5 to 8). The "places with no outcoupling grating" mentioned in the second paragraph of page 9 would rather appear to correspond to the end walls previously mentioned in the same paragraph (page 9, lines 7 to 14) and at which light is reflected by total reflection (see Figure 2b), while light would only emerge from the plate through the "desired illuminated areas" (page 9, lines 16 to 19) corresponding to the diffractive areas.

In view of the above considerations, the Board is of the preliminary opinion that the claimed features considered by the appellant as distinguishing the claimed subject-matter from the disclosure of document D4 only amount to the description of features that appear to be intrinsically present in the light pipe disclosed in document D4 and, consequently, the Board does not see at the present time any reason for departing from the opposition division's finding of lack of novelty of claim 1 as granted."

As regards the first auxiliary request, the Board commented as follows:

"The Board notes on a preliminary basis that the amendments to the first auxiliary request do not appear to overcome the opposition division's finding of lack of novelty. Indeed, claim 1 amended according to the first auxiliary request differs from claim 1 as granted in that the claimed subject-matter further requires that the light source is disposed at a source end of the light pipe and the distribution of patterns depends on distance from the source end of the light pipe. The light pipe disclosed in document D4, however, also appears to satisfy these two requirements. In particular, in document D4 the light pipe is positioned

with respect to the corresponding light source(s) as shown in Figures 1a, 1b and 4 to 6, thus determining a "source end" of the light pipe, and in the pattern of areas of types A and B represented in Figure 1b the type of area in the pattern varies with the position and can therefore be said to depend on the distance from the source end of the light pipe, it being noted that claim 1 does not impose any restriction to the dependency of the pattern distribution on the distance."

As regards the second auxiliary request, the Board noted that the set of claims would appear to overcome the objections raised by the opposition division under Article 123(2) EPC and would also appear to define patentable subject-matter, but that the description of the patent specification did not appear to be in accordance with the invention as claimed (Article 84 EPC 1973, second sentence).

- V. In reply to the summons to oral proceedings, the appellant, with a letter dated 26 February 2014, filed amended pages 3 to 6 of the description of the patent replacing the corresponding documents of the second auxiliary request. In the same letter the appellant conditionally withdrew the request for oral proceedings provided that the second auxiliary request was found allowable.
- VI. Subsequently, the oral proceedings were cancelled.
- VII. No substantiated counter-argumentation was submitted by the appellant in response to the preliminary opinion of the Board given in the aforementioned communication in respect of the main and the first auxiliary requests. The arguments in the statement of grounds of appeal in

support of these two requests predate, and have no bearing on the issues subsequently raised by the Board in the aforementioned communication.

Reasons for the Decision

1. The appeal is admissible.
2. *Main and first auxiliary requests*

In the communication annexed to the summons to oral proceedings the Board *inter alia* explained in detail (see point IV above) why in its preliminary opinion claim 1 as granted to which the main request was directed and claim 1 amended according to the first auxiliary request did not define novel subject-matter with regard to the pertinent disclosure of document D4 constituting prior art within the meaning of Article 54(3) EPC (see paragraph II-a) above together with the second paragraph of point IV above).

In addition, the appellant made no substantive submissions in reply to the detailed objections raised by the Board in the aforementioned communication. In particular, as far as the main and the first auxiliary requests are concerned, the appellant effectively withdrew, by virtue of the conditional request mentioned in point V above, the request for oral proceedings and, in addition, chose not to take a written position on the substantive matters raised by the Board (point VII above).

In these circumstances, the Board sees no reason to depart from its preliminary opinion expressed in the communication. The Board therefore concludes that the subject-matter of claim 1 of the main and the first auxiliary requests is not novel (Article 52(1) EPC together with Article 54(1) EPC 1973 and Article 54(3) EPC) and that, consequently, these two requests are not allowable.

3. *Second auxiliary request*

3.1 *Amendments*

The set of claims of the second auxiliary request differs from the set of claims as granted in that dependent claims 8 and 15 as granted have been omitted and in that claim 1 further specifies that the at least one source is "at a source end of the light pipe" and that "the relative portion of said first surface covered by light distributing areas decreases as a function of increasing distance from the source end of the light pipe". The first of these features is supported by the disclosure of all the embodiments of the invention in the application as originally filed and in which the light from the light source(s) is projected into the light pipe through one of its ends (see in particular the figures and the corresponding description); the second of the features is based on the disclosure of the application as filed according to which the distribution on the surface of the light pipe of the two different types of pixel-like areas defined in the claim "depends on [the] distance" from the light source (dependent claim 7) and is such that "more light distributing pixels [are provided] in the vicinity of the light source than further from it" (column 7, lines 25 to 33) as also shown graphically in the schematic

representation of Figure 9A. The amendments to claim 1 overcome the objections raised under Article 123(2) EPC by the opposition division in its decision with regard to a similar feature defined in claim 1 of the then second auxiliary request (see paragraph II-d) above).

In addition, the features introduced by way of amendment in claim 1, in the Board's view, are clear. In particular, the features of claim 1 relating to the relative position of the light pipe and the light source to be used with the light pipe are now defined with reference to the "source end of the light pipe".

As regards the description, its text has been brought into conformity with the invention as defined in the amended claim 1 (Article 84, second sentence, and Rule 27(1) (c) EPC 1973).

3.2 *Novelty and inventive step*

Claim 1 as amended according to the second auxiliary request requires that the relative portion of the surface of the light pipe covered by light distributing areas decreases as a function of increasing distance from the source end of the light pipe and this feature is not disclosed in the pertinent disclosure of document D4 constituting prior art within the meaning of Article 54(3) EPC and referred to in the first paragraph of point 3 above. In particular, in Figure 1b of document D4 the two types of pixels appear to be distributed uniformly on the light extraction surface of the light pipe, and the fact that according to the document a predetermined degree of lighting uniformity is achieved in the light pipe (page 2, line 8 to page 3, line 8) does not necessarily imply that the

distribution of the two types of pixels satisfy the claimed condition because the disclosed degree of lighting uniformity can also be achieved by other means (see for instance document D4, page 10, line 24 *et seq.*). The light pipe defined in claim 1 of the second auxiliary request is therefore new over the disclosure of document D4 (Article 54(1) EPC 1973 together with Article 54(3) EPC).

As regards the issue of inventive step, the Board notes that claim 1 of the second, the third and the fourth auxiliary requests underlying the decision under appeal constituted different attempts to define essentially the same subject-matter, i.e. a light pipe having one of its surfaces covered by two types of pixel-like areas as claimed, the distribution of the two types of areas varying with the distance from the light source so as to improve the uniformity of the surface lighting capability of the light pipe (patent specification, paragraphs [0010] and [0037] together with Figure 9A and the corresponding description). Apart from the objections under Article 123(2) EPC and Article 84 EPC 1973 raised by the opposition division with regard to claim 1 of the then second and third auxiliary requests (paragraphs II-d) and II-e) above), the opposition division already acknowledged in its decision (see paragraphs II-e) and II-f) above) that the corresponding subject-matter was new and involved an inventive step over the remaining documents available on file and constituting prior art within the meaning of Article 54(2) EPC 1973. After consideration of the disclosure of these documents, the Board has no reason to depart from the opposition division's view in this respect. In addition, as regards the alleged public prior use considered during the first-instance proceedings, the Board does not see any reason to

question the view of the opposition division that the available evidence and the results of the hearing of the witnesses are insufficient to prove the relevant facts of the allegation of public prior use (paragraph II-b) above).

In view of all these considerations, the Board concludes that the light pipe defined in claim 1 of the second auxiliary request is novel and involves an inventive step over the prior art on file (Article 52(1) EPC together with Articles 54(1) and 56 EPC 1973). The same conclusion applies to the light pipe arrangement defined in independent claim 15 and to dependent claims 2 to 14 and 16 by virtue of the reference in all these claims to the light pipe of claim 1.

3.3 The grounds for opposition under Articles 100 (b) and (c) EPC 1973 are not in the appeal proceedings. (These grounds for opposition were formally invoked but not substantiated during the first-instance proceedings and had not formed part of the legal framework of the opposition procedure, cf. point I above, second paragraph).

4. In view of the above considerations, the Board concludes that the patent is to be maintained in amended form on the basis of the present second auxiliary request of the appellant.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent as amended in the following version:
 - claims: claims 1 to 16 of the second auxiliary request, labelled "Auxiliary Request 2", filed with the letter dated 23 April 2010;
 - description: pages 2 and 7 of the patent specification as published and amended pages 3 to 6 filed with the letter dated 26 February 2014; and
 - drawing sheets: pages 12 to 23 of the patent specification as published.

The Registrar:

The Chairman:



S. Sánchez Chiquero

A. G. Klein

Decision electronically authenticated