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Datasheet for the decision of 16 November 2017

Case Number: T 1740/15 - 3.4.02

Application Number: 05733798.2

Publication Number: 1756636

IPC: G02B26/08

Language of the proceedings: EN

Title of invention:
SYSTEM AND METHOD FOR CANCELING DISTURBANCE IN MEMS DEVICES

Applicant:
Capella Photonics, Inc.

Headword:

Relevant legal provisions:
EPC 1973 Art. 84

Keyword:
Claims - clarity (no) - claim must be clear in itself

Decisions cited:

Catchword:

Europäisches Patentamt
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Case Number: T 1740/15 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 16 November 2017

Appellant: (Applicant)	Capella Photonics, Inc. 19 Great Oaks Boulevard, Suite 20 San Jose, CA 95119 (US)
Representative:	Gillard, Matthew Paul Withers & Rogers LLP 4 More London Riverside London SE1 2AU (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 2 March 2015 refusing European patent application No. 05733798.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Bekkering
Members:	A. Hornung
	B. Müller

Summary of Facts and Submissions

I. The applicant appealed against the decision of the examining division refusing European patent application No. 05733798.2 on the basis of Article 56 EPC.

II. With the statement setting out the grounds of appeal, the applicant filed sets of claims according to a main request and to an auxiliary request, both being identical, respectively, to the sets of claims according to the main request and the second auxiliary request underlying the appealed decision. The applicant requested that the decision of the examining division be set aside and a patent be granted on the basis of one of these two sets of claims.

III. On 26 April 2017, the board summoned the applicant to attend oral proceedings. In a communication annexed to the summons the board provided its provisional opinion on the merits of the appeal.

IV. In response to the summons to oral proceedings, the applicant filed, with a letter of 13 October 2017, amended sets of claims according to a new main request and a new auxiliary request.

The applicant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 13 of the main request or claims 1 to 11 of the auxiliary request, both requests filed with the letter dated 13 October 2017.

V. Subsequently, the applicant's representative informed the board with a letter dated 3 November 2017, that he would not attend the oral proceedings.

VI. Oral proceedings were held on 16 November 2017 in the absence of the applicant.

VII. Independent claim 1 according to the main request reads as follows:

"An optical apparatus comprising:
a MEMS device (203), including a plurality of elements (203-1 to 203-N), which are individually movable; and

a control assembly (207) that is communicatively coupled to the MEMS device (203) and that provides control signals (U_1 -U_N) to the plurality of elements (203-1 to 203-N) for moving the elements, characterised in that the control signals include feed-forward control signals (U_j) to certain non-moving elements (203-1 to 203-N) that substantially cancel disturbance caused by moving elements."

Independent claim 1 according to the auxiliary request differs from claim 1 of the main request only in that it comprises the following additional feature at the end of the claim:

"... according to the following equation:

$u_j = \sum_{all\ k} -a_{jk} \cdot \Delta u_k \cdot g(\cdot)$,

where element k is a moving element, u_j is a feed-forward control signal to a non-moving element j, a_{jk} is a coupling coefficient from element k to element j, Δu_k is the difference between end and start values, and $g(\cdot)$ is a normalized function characterizing disturbance in non-moving elements, wherein the summation is over all k, and wherein $a_{kk} = 0$."

Reasons for the Decision

1. Main request

The subject-matter of claim 1 lacks clarity within the meaning of Article 84 EPC 1973.

1.1 It is unclear in claim 1 what the exact nature of the "feed-forward control signal" is.

Claim 1 lacks a clear technical definition of the actual signal applied to certain non-moving elements (e.g. a clear mathematical expression of the actual control signal) or at least a clear definition of the process for generating the signal (e.g. exercising the device during a preliminary learning process; see page 7, lines 24 to 28 of the application as filed). Merely referring to a general "feed-forward control signal" is not sufficient to ensure the effective cancellation of disturbances over the whole scope of claim 1, which encompasses any nature and type of movement of the elements and any origin and type of disturbances. Claim 1 attempts to define the "feed-forward control signal" in terms of the result that it is supposed to deliver, i.e. "substantially cancel disturbance caused by moving elements", instead of defining it in terms of technical features responsible for achieving the claimed result (Article 84 EPC 1973).

1.2 In its letter of reply dated 13 October 2017, the applicant presented arguments referring to disturbances on non-moving mirrors in an array due to the motion of nearby moving mirrors.

It further argued that "it is not necessary to specify the nature of the disturbance as long as the cause is known" and that "it is not necessary to specify the mathematical expression of the actual control signal so long as it is known".

Finally, the applicant explained how "the first three paragraphs on page 7 of the specification clearly teach the general feed-forward strategy that is implemented by control assembly 207".

1.3 These arguments are not convincing. First of all, the applicant refers to features, such as "mirrors", "in an array", disturbances "due to the motion" and "nearby" mirrors, which are not present in claim 1.

Furthermore, contrary to the applicant's contention, the exact cause of the disturbance is left open in claim 1. Indeed, the wording of claim 1 encompasses not only aerodynamic coupling as mentioned in the description, page 2, lines 11 to 13, but also other causes of disturbance such as causes of disturbance of a mechanical, electrical, optical or thermodynamical nature.

The explanations about the "general feed-forward strategy" provided by the applicant in its letter of reply and based on information taken from the description of the application are also not found convincing, because claims must in principle be clear in themselves when read by the person skilled in the art. Claim 1 does not define any technical features of the feed-forward control signal which are necessary to achieve the claimed result and a person skilled in the art, using normal skills, will not clearly understand from the wording of claim 1 alone how to achieve the result defined in the claim. Therefore, claim 1 in itself is unclear. This clarity deficiency in the claim wording cannot

be rectified by the fact that the description could possibly help the reader to understand the technical subject-matter which the claim was intended to define.

1.4 It follows from the above that claim 1 lacks clarity, contrary to Article 84 EPC 1973.

2. Auxiliary request

The subject-matter of claim 1 lacks clarity within the meaning of Article 84 EPC 1973.

2.1 Despite the provision in claim 1 of the mathematical relation defining the feed-forward control signal u_j, it is still unclear in claim 1 what the exact nature of the "feed-forward control signal" is (see also point 1.1 above). Indeed, claim 1 does neither define the exact meaning of the parameters a_{jk}, Δu_k and $g(\cdot)$ used in the mathematical relation nor how these parameters are determined. In particular, claim 1 defines the parameter Δu_k as being "the difference between end and start values" without, however, defining the kind of end and start values. The parameters a_{jk} and $g(\cdot)$ are merely designated by the general expressions "coupling coefficient" and "normalized function characterizing disturbance", respectively, without, however, defining the concrete technical meaning of these terms. Therefore, the mathematical relationship is not suitable to clarify the nature of the "feed-forward control signal".

2.2 The applicant, in its letter of reply, explained that "with respect to the "start and end values", one skilled in the art will readily appreciate that these refer to the start and end values of control signal values u_k corresponding to the start and end angles θ_k for the moving mirror k". The start and end values "can readily be determined, as may be seen from figure 4 and corresponding discussion on page 8 at

lines 5-19". Therefore, "Δu_k is basically the amplitude of the signal that causes the motion of element k that causes the disturbance in neighboring mirror j".

Concerning the parameters a_{jk} and $g(\cdot)$, the applicant explained that "from these paragraphs on page 7 [i.e. the first three paragraphs on page 7], one skilled in the art would readily be able to devise" an experimental process for measuring and determining a_{jk} and $g(\cdot)$ via an iterative procedure.

2.3 These arguments are not considered to be persuasive. For explaining the meaning of the parameters a_{jk}, Δu_k and $g(\cdot)$ and the manner of obtaining them, the applicant refers to the abilities of the skilled person to understand the information provided in the description of the patent application. However, the board is not convinced that the skilled person would necessarily interpret the claim wording as suggested by the applicant in its letter of reply. For instance, the coupling between elements of the MEMS device depends on many aspects, such as the distance between the elements, the mechanical structure of the elements or the signal amplitude and duration applied to the elements. Claim 1 leaves open which kind of coupling is to be considered and how the coupling coefficients a_{jk} are effectively computed or measured. A similar lack of information exists concerning the disturbance function $g(\cdot)$. For instance, it is unclear in claim 1 whether parameter $g(\cdot)$ is an angle, a power level or a voltage and how it is computed or measured. Concerning "the end and start values", even if the skilled person would assume that values of control signals are referred to, it remains unclear from the wording of the claim how and at what point in time the end and start values of the control signals are to be computed or measured.

As already mentioned in point 1.3 above, the board is of the

opinion that claims must in principle be clear in themselves when read by the person skilled in the art. This is not the case for present claim 1 since the applicant, in its attempt to clarify the wording of claim 1, had to constantly refer to various passages of the description.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl R. Bekkering

Decision electronically authenticated