BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [ ] To Chairmen
(D) [X] No distribution

D E C I S I O N
of 12 June 2002

Case Number: T 0194/98 - 3.4.2

Application Number: 92121611.5

Publication Number: 0548848

IPC: G01D 5/38

Language of the proceedings: EN

Title of invention:
Displacement detecting device

Patentee:
CANON KABUSHIKI KAISHA

Opponent:
DR. JOHANNES HEIDENHAIN GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 84

Keyword:
"Claims amended during oral proceedings - clarity (no)"

Decisions cited:
-

Catchword:
-

Case Number: T 0194/98 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 12 June 2002

Appellant: (Proprietor of the patent)
CANON KABUSHIKI KAISHA
30-2, 3-chome, Shimomaruko
Ohta-ku
Tokyo (JP)

Representative:
Tiedtke, Harro, Dipl.-Ing.
Patentanwaltsbüro
Tiedtke-Bühling-Kinne & Partner
Bavariaring 4
D-80336 München (DE)

Respondent: (Opponent)
DR. JOHANNES HEIDENHAIN GmbH
Postfach 1260
D-83292 Traunreut (DE)

Representative:
-

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 22 December 1997 revoking European patent No. 0 548 848 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: M. A. Rayner
V. Di Cerbo

Summary of Facts and Submissions

I. The appellant (=patent proprietor) has appealed against the decision of the opposition division revoking European patent number 0 548 848 (application number 92 121 611.5). The patent concerns a displacement detecting device.

II. The appeal was based on claims according to a main or subsidiary request filed with the statement setting out the grounds of appeal. The respondent (=opponent) replied to the appeal and the appellant responded thereto. Consequent to subsidiary requests of both parties, oral proceedings were appointed, the communication accompanying the summons assessing the arguments of the parties, declaring the intention of reaching a final decision at the oral proceedings and also touching on substantive issues in relation to the prior art. Following the summons and in advance of the oral proceedings the appellant filed fresh main and subsidiary requests containing amended claims.

III. During the oral proceedings, clarity of claims as amended was addressed. The board drew attention in this respect *inter alia* to a feature involving "two optical mixing elements" in the context of "light beams" mentioned in the independent claims. The appellant explained his view of the functioning of the detecting device to the board and, in the light of this explanation, offered to review the claims. Comments were made by the respondent and interruptions to the oral proceedings were made to afford the appellant opportunities to review claims as amended in order to met the clarity objection. The appellant each time took

the opportunity to effect further amendments, the wording of independent claims 1 and 14 finally arrived at according to the main and the subsidiary requests being as follows:

Main request

"1. A displacement detecting device for detecting information relating a displacement of an object having:
a light source;
a light beam transforming optical element for transforming converge-diverge condition of a light beam from said light source;
an optical splitting element for splitting the light beam transformed by said light beam transforming optical element so that at least two light beams split by said optical splitting element are irradiated onto said object; and
a detection system, including:
two optical mixing elements for mixing and interfering two light beams from among said at least two light beams, which come from said object to produce mixed and interfered light beams;
a light-receiving element for detecting said mixed and interfered light beam, respectively; and
a signal processing circuit for measuring the displacement of said object depending on a detection signal of said light-receiving element,
characterized in that
a transparent member is provided, whereby said light beam transforming optical element is integrally provided on one surface of said transparent member, said light splitting element and said two optical mixing elements are integrally provided on another

surface of said transparent member, said light splitting element and said optical mixing elements are aligned in a predetermined positional relation with each other, and said light beam transforming optical element and said light splitting element are aligned in a predetermined positional relation so that the light beam from said light source passes through said transparent member from said light beam transforming optical element to said optical splitting element. "

The wording of independent claim 14 differs from that of claim 1 as follows:

- "A displacement detecting device for detecting information relating a displacement of an object having" is replaced by "An apparatus for driving an object having",
- "to produce mixed and interfered light beams" is replaced by "to produce a plurality of mixed and interfered light beams", and
- "characterized in that" is replaced by "and the apparatus further comprising: a driving unit for effecting relative drive between said object and said light-receiving element; and a control unit for controlling said driving unit on the basis of a detection signal of said light-receiving element; characterized in that".

Subsidiary request

The wording of independent claim 1 differs from that of claim 1 of the main request as follows:

"a detection system, including:
two optical mixing elements for mixing and interfering

two light beams from among said at least two light beams, which come from said object to produce mixed and interfered light beams;
a light-receiving element for detecting said mixed and interfered light beam, respectively;"
is replaced by
"a detection system, including:
two optical mixing elements for mixing and interfering two light beams from among said at least two light beams, which come from said object to produce a mixed and interfered light beam, respectively;
a light-receiving element for detecting said mixed and interfered light beam;"

The word "integrally" is deleted in the characterising part of the claim and the penultimate feature of the claim beginning "said light splitting element and said optical mixing elements..." is amended to read as follows:

"said light splitting element and said optical mixing elements are integrally formed to be aligned in a predetermined positional relation with each other on said transparent member,"

The wording of independent claim 14 differs from that of claim 1 as follows:

- "A displacement detecting device for detecting information relating to a displacement of an object having" is replaced by "An apparatus for driving an object having",
- "characterized in that" is replaced by "and the apparatus further comprising: a driving unit for effecting relative drive between said object and said

light-receiving element; and a control unit for controlling said driving unit on the basis of a detection signal of said light-receiving element; characterized in that",

- "said two mixing elements are provided on another surface" is replaced by "said optical mixing elements are provided on another surface".

IV. The cases of the parties as advanced during the oral proceedings can be summarised as follows:-

IV.i **Requests**

Appellant

Setting aside of the decision under appeal and maintenance of the patent on the basis of the main or the subsidiary request as filed during the oral proceedings.

Respondent

Dismissal of the appeal.

IV.ii **Submissions**

Appellant

The amended features of claims 1 and 14 of both the main and the subsidiary requests pertaining to the two optical mixing elements are based on the arrangement disclosed in the patent specification with reference to Figure 1C, and in particular on the paragraphs at lines 39 onward of page 3 of the patent specification. From among the at least two light beams diffractively

split by the optical splitting element, irradiated onto the object and diffractively radiated back by the object, two are then diffractively mixed and interfered by the two optical mixing elements 32B and 32C. The two light beams to be mixed are therefore different from the two light beams split by the optical splitting element. The correspondence between the split light beams and the light beams for mixing is made clear in the amended claim by virtue of both the term "from among" and the comma in the amended feature "[...] mixing and interfering two light beams from among said at least two light beams, which come from said object". Amended claims 1 and 14 give a teaching sufficiently clear to be understood by the person skilled in the art, for whom no other interpretation can be given to the light beam splitting and mixing arrangement defined in the amended claim.

Respondent

The amended features of claims 1 and 14 of both the main and the subsidiary requests pertaining to the two optical mixing elements are not clear in the sense of Article 84 EPC. In particular, it is not clear in the amended claim which two light beams from the object are referred to, and whether or not the two light beams to be mixed correspond with two of the light beams split by the optical splitting element. Therefore, it is not clear how the light from the light source is actually brought into interference at the optical mixing elements.

V. At the end of the oral proceedings, the board gave its decision.

Reasons for the Decision

1. The appeal complies with the provisions mentioned in Rule 65(1) EPC and is therefore admissible.

2. *Main request - Article 84 EPC*

2.1 In comparison with claim 1 as granted, claim 1 of the main request has been amended, *inter alia*, to specify that the detection system includes "two optical mixing elements for mixing and interfering two light beams from among said at least two light beams, which come from said object to produce mixed and interfered light beams". The "said at least two light beams" refer to the "at least two light beams" split by the optical splitting element and irradiated onto the object as previously defined in the claim.

2.2 The provision of two optical mixing elements according to the amended feature is described in the patent specification with reference to Figures 1 to 10 as comprising two optical mixing elements 32B and 32C, the elements being optionally segmented $32B_1$-$32B_2$ and $32C_1$-$32C_2$ as shown in Figures 3 and 7. Unlike the Doppler displacement sensors subsequently described with reference to Figures 12 and 13 and devoid of optical mixing means, the displacement detecting devices, which involve "optical mixing elements", require three light beams (R_0, R_{-1} and R_{+1}) split by the optical splitting element and giving rise by diffraction to two pairs of light beams (R_{+1}^{-1} and R_0^{+1}, and R_{-1}^{+1} and R_0^{-1}) each being mixed and interfered by a respective one of the two optical mixing elements 32B and 32C (see in particular Figure 1C and page 3, line 45 to page 4, line 17 of the patent specification). The mixing operation by two

mixing optical elements, according to the patent specification, therefore requires *four* light beams for mixing originating from *three* different light beams split by the optical splitting means. The relation between the at least *two* light beams irradiated onto the object and the "*two* light beams from among said at least *two* light beams, which come from said object" is thus in the context of the amended claim not clear. Neither is it clear in the formulation of the amended feature in what way just two light beams can be mixed and brought into interference by means of *two different* optical mixing elements so as to produce mixed and interfered light beam*s*. The claim is therefore not clear.

2.3 The explanation given by the appellant concerning the functioning of the described embodiments involving "optical mixing elements" was not in disagreement with the analysis given in point 2.2 above. However, the board is not persuaded by the approach of the appellant that a person skilled in the field of optical splitting and mixing techniques would consider the claimed wording clear because of the description. In the board's view, the skilled person understands, as a matter of language, from the wording "said at least two light beams", that the beams referred to are those antecedent in the claim. The skilled person then has a starting point in the number specified in the claim, i.e. two, and thus knows that two light beams coming from the object derive from among said two split light beams, i.e. just two of two to be mixed and interfered by the two mixing elements. As can be seen from the explanation given in point 2.2 above, producing mixed and interfered light beams from a two to two configuration does not make technical sense as a three

to two pairs configuration is required. If the claim is understood as that the two beams to be mixed derive from more than two split beams (i.e. any number of beams to just two, still not to two pairs), then the split beams concerned are indefinite, so that a further lack of clarity is created as it is unclear what beams are selected such that an interference at the mixing elements is achieved. While it is true that embodiments described in the detailed description are technically sound, the amendment to the claim does not derive from these embodiments, but is intrinsically incorrect. Thus the approach of the appellant would have the board accepting that claims do not have to contain correct or even any essential technical features of the invention as the skilled person merely has to correct or fill in what is meant from the description. Such an approach is far removed from interpreting correct and present features of the claim in the light of the description and cannot convince the board of clarity of the claim.

2.4 Therefore, the board had to conclude that claim 1 as amended in accordance with the main request is not clear as required by Article 84 EPC.

2.5 Independent claim 14 includes the amended features corresponding to those analysed above in relation to claim 1, differing only in that the expression "to produce mixed and interfered light beams" is replaced by "to produce a plurality of mixed and interfered light beams". This difference does not bear on the issues discussed in points 2.1 to 2.3 above, and therefore the conclusion reached in point 2.4 with regard to claim 1 also applies to claim 14 of the main request.

3. *Subsidiary request - Article 84 EPC*

In comparison with claim 1 as granted, claim 1 of the subsidiary request has been amended, *inter alia*, to incorporate the same amendments discussed in point 2 above with regard to claim 1 of the main request, except for the replacement of the expression "to produce mixed and interfered light beams" by the expression "to produce a mixed and interfered light beam respectively". Since this difference does not affect the common features of the main and subsidiary request which are not clear, the conclusion reached in point 2.4 with regard to claim 1 also applies to claim 1 of the subsidiary request. A corresponding conclusion applies furthermore to independent claim 14 which is subject to the same unclear amendment.

4. *Patentability*

Since claims presented by the appellant during oral proceedings before the board lacked clarity, there was no room for pursuing substantive aspects of the case touched upon in the communication accompanying the summons to oral proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

P. Martorana E. Turrini