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**Datasheet for the decision
of 22 February 2016**

Case Number: T 0068/12 - 3.4.02

Application Number: 01979366.0

Publication Number: 1434975

IPC: G01J3/44, G01J3/42

Language of the proceedings: EN

Title of invention:

APPARATUS AND METHOD FOR REAL-TIME IR SPECTROSCOPY

Applicant:

UNIVERSITY OF DELAWARE

Headword:

Relevant legal provisions:

EPC 1973 Art. 84

Keyword:

Claims - clarity (no)

Decisions cited:

Catchword:



Beschwerdekammern
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Chambres de recours

European Patent
Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89
2399-4465

Case Number: T 0068/12 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 22 February 2016

Appellant: UNIVERSITY OF DELAWARE
(Applicant) 210 Hullihen Hall
Newark, DE 19716-1551 (US)

Representative: Zanolli, Enrico
Zanolli & Giavarini S.p.A.
Via Melchiorre Gioia, 64
20125 Milano (IT)

Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 29 June 2011
refusing European patent application No.
01979366.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairwoman T. Karamanli
Members: F. Maaswinkel
A. Hornung

Summary of Facts and Submissions

- I. European patent application No. 01979366.0 relating to real-time infrared spectroscopy imaging was refused in a decision, posted on 29 June 2011, of the examining division in which reference was made to a prior communication of 30 March 2011. In this communication the examining division had objected that the subject-matter of claim 1 of the request then on file did not meet the requirement of inventive step (Article 56 EPC) in view of the obviousness of its subject-matter over the disclosure of document D6 (US4975581) and the further documents cited in the supplementary European search report. In a reply to that communication the applicant had requested a decision according to the state of the file.
- II. Against this decision the applicant (appellant) lodged an appeal which was received on 25 August 2011. The fee for the appeal was paid on the same day. In the letter of 27 October 2011 setting out the grounds of appeal the appellant requested that a patent be granted on the basis of a new set of claims 1 to 69 filed with the grounds of appeal. Alternatively, oral proceedings were requested.
- III. Claim 1 reads as follows:
- "1. A non-interferometric apparatus (300; 400) for determining IR spectral information of at least one sample in at least one sample volume, the apparatus comprising
- a broadband IR light source (310);
- an optically dispersive element (350) in the optical path,; and

an IR detector (370) comprising a plurality of detection elements arranged in a plurality of rows, the IR detector (370) configured to receive a dispersed light beam and provide an output which determines the IR spectral information of the at least one sample;

characterized in that:

the apparatus uses no moving parts during operation;

the apparatus comprises a plurality of sampling accessories (330), each positioning at least one different sample volume in an optical path;

the apparatus comprises an adjustable aperture (320) in the optical path between the broadband IR light source (310) and the plurality of sampling accessories (330);

said optically dispersive element is a diffraction grating or a prism;

said IR detector (370) is a focal plane array having a capability of; i) receiving the dispersed light beam such that a row direction along the IR detector is essentially aligned with a dispersion direction of the dispersed light beam, and each column of the IR detector corresponds to an associated wavelength of light in the dispersed light beam and ii) detecting at least wavelengths within a mid-IR range at a sensitivity comprising a noise equivalent temperature difference (NEAT) of less than or equal to 100 mK for the dispersed light beam resulting from passing of at least a portion of an emission from the broadband IR light source (310) through the at least one sample and interaction with the optically dispersive element (350);

the apparatus simultaneously determines IR spectral information of each of the at least one different sample volumes."

The wording of the remaining claims is not relevant for the present decision.

IV. In support of its request the appellant in its grounds of appeal indicated the basis for the amendments made in the new claims and offered arguments in support of the patentability of the claims having regard to document D6 and the further documents cited by the examining division.

V. In a communication pursuant to Article 15(1) RPBA (Rules of Procedure of the Boards of Appeal, OJ EPO 2007, 536), accompanying the summons to oral proceedings scheduled for 22 February 2016, the board gave a preliminary assessment of the appellant's case on appeal and raised objections against claim 1 *inter alia* under Article 84 EPC 1973. The relevant passages read as follows:

" [...]

1. According to Article 84 EPC 1973 the claims shall be supported by the description. For the following reasons this requirement appears to be in doubt with respect to claim 1:

1.1 Claim 1 defines that the apparatus comprises a broadband IR light source. Furthermore the apparatus comprises a plurality of sampling accessories, each positioning at least one different sample volume in an optical path; and an adjustable aperture in the optical path between the light source and the sampling accessories. Hence the claim defines the following optical sequence of apparatus features:

- (a) a broadband IR light source;
- (b) an adjustable aperture; and
- (c) a plurality of sampling accessories.

1.1.1 According to paragraph [0053] of the published patent application, this source may be "any common IR light

- source" and, in some applications "IR radiation of the sun may be used".
- 1.1.2 Furthermore, see paragraph [0056], in a more elaborate sampling accessory having a set of mirrors or other suitable arrangement the system may be used "to monitor smokestack emissions, or to monitor hazardous chemical fumes or vapors in laboratory, military, or industrial environments". See also paragraph [0042] disclosing remote sensing of "smokestacks".
- 1.1.3 Paragraph [0039] discloses a second embodiment to be used "in remote sensing applications". It is also stated in respect of this embodiment: "In an environmental application, which monitors smokestack emissions, for example, the sample volume to be analyzed may be hundreds of meters in the air".
- 1.1.4 Paragraph [0101] refers to an "environmental application of IR spectroscopy in an aqueous environment, for example on a lake, river, or on the ocean...".
- 1.1.5 Finally, paragraph [0111] discloses: "A method to measure and detect the thickness, either in transmission or reflection, the chemical structure and orientation of oil on water including but not limited to environmental oil spills, polluted lakes, streams, rivers, etc".
- 1.1.6 However, it is not apparent how the optical path of the apparatus defined in claim 1 would include the above features (a), (b) and (c) in these embodiments. Firstly, the sun cannot be defined as a technical feature of an apparatus claim. Moreover it is not understandable how, even if assuming the sun as a light source, in the case of remote sensing an adjustable aperture can be positioned between the light source (sun) and the

plurality of sampling accessories (e.g. smokestacks, chemical emissions, hundreds of meters in the air, lakes, rivers, ocean).

1.2 Furthermore in claim 1, the concept of an "adjustable aperture" appears equivocal:

1.2.1 Referring to Figure 3 and paragraph [0054] the adjustable aperture 320 is used "at least in part, to establish the resolution of the apparatus". Also "a smaller-sized opening provides higher resolution". As examples of such an aperture a circular iris or an adjustable rectangular slit are disclosed.

1.2.2 From the above wording it is not clear whether the higher resolution refers to spatial or spectral resolution and whether the adjustable aperture should act as a pupil stop or as a field aperture. Should a higher spectral resolution be aimed at it is observed that the embodiment shown in Figure 3 does not disclose any imaging components (apart from the schematic "focusing optics" 360, for which, however, in the embodiment of Figure 3 no details are disclosed). Therefore, given the fact that the "sampling accessory" is arranged between the adjustable aperture 320 and the optically dispersive element 350, it is not understandable how this aperture (iris, slit) could properly define the spectral resolution, a fortiori since neither this figure nor the description in paragraphs [0053] to [0060] discloses any imaging optical elements.

1.2.3 It is added that the concepts of "adjustable aperture" arranged in the optical path between the light source and the "plurality of sampling accessories" would appear to be irreconcilable for the case of an iris aperture

(since this would select only one circular sample) and, in case of a slit, would correspond to a plurality of sampling accessories which must be aligned along the slit.

1.2.4 In the embodiment of Figure 4, addressed in paragraphs [0061], [0065] and [0076] the features "broadband IR light source" and "adjustable aperture in the optical path between the broadband IR light source and the plurality of sampling accessories" appear to be missing. It is added that the "adjustable aperture 320" [*sic*] in Figure 4 and referred to as adjustable aperture 420 in paragraph [0076] is not a field aperture but rather a pupil stop. Therefore the support of claim 1 by the embodiment in Figure 4 is in doubt (Article 84 EPC 1973)."

VI. In a letter of 22 December 2015 the appellant's representative announced that the appellant would not be attending the oral proceedings. No further submissions were filed.

VII. On 22 February 2016 the board held oral proceedings in the absence of the appellant, in accordance with Rule 71(2) EPC 1973 and Article 15(3) RPBA. At the end of the oral proceedings the chairwoman announced the board's decision.

Reasons for the Decision

1. The appeal is admissible.

2. With the statement of grounds of appeal the appellant submitted arguments in support of its view that, despite the finding of the examining division in its decision, claim 1 of the new request involved an inventive step over the disclosure of document D6 and the further documents cited by the examining division.

In the communication annexed to the summons to oral proceedings, however, the board gave *inter alia* detailed reasons in support of its preliminary view that, contrary to Article 84 EPC 1973, claim 1 was not clear or supported by the description (see point V above, sub-points 1.1. to 1.2.4).

The arguments of the appellant in the statement of grounds of appeal in support of novelty and inventive step do not alter the board's preliminary view relating to lack of clarity, and, in its letter of reply dated 22 December 2015, the appellant declined to submit any counter-arguments in reply to the reasons given by the board in support of that view (cf. points V and VII above).

After consideration of its preliminary assessment of the applicant's request, and in the absence of any attempt by the appellant to refute or overcome the objections raised by the board to that request, the board sees no reason to depart from the preliminary opinion expressed in its communication, which therefore becomes final.

3. In the absence of an allowable request, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairwoman:



M. Kiehl

T. Karamanli

Decision electronically authenticated