Internal distribution code:

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

Datasheet for the decision of 29 June 2015

Case Number: T 0788/11 - 3.4.02

Application Number: 04721921.7

Publication Number: 1613935

IPC: G01J3/42, G01N21/35, G01N21/49

Language of the proceedings: EN

Title of invention:
SPECTROSCOPY APPARATUS AND ASSOCIATED TECHNIQUE

Applicant:
Teraview Limited

Relevant legal provisions:
EPC 1973 Art. 56, 84
EPC Art. 123(2)

Keyword:
Clarity (yes - amended claims)
Added subject-matter (no - amended claims)
Novelty and inventive step (yes - amended claims)

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
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 0788/11 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 29 June 2015

Appellant: (Applicant)	Teraview Limited Platinum Building St. John's Innovation Park Cambridge, Cambridgeshire CB4 0WS (GB)
Representative:	Granleese, Rhian Jane Marks & Clerk LLP 90 Long Acre London WC2E 9RA (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 9 November 2010 refusing European patent application No. 04721921.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	B. Müller
Members:	F. J. Narganes-Quijano
	H. von Gronau

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 04721921.7 (based on international application No. PCT/GB2004/001194 published under the International publication No. WO2004/083796).

II. In its decision the examining division held that the set of amended claims then on file contravened the requirements of Article 123(2) EPC, the requirements of conciseness of Article 84 EPC in combination with Rule 43(2) EPC, and the requirements of clarity of Article 84 EPC, and that the claimed invention was not novel and/or did not involve an inventive step (Article 52(1) EPC).

During the examination procedure the examining division referred to the following documents:

D1: WO-A-0050859
D2: US2001/0033636
D3: WO-A-02057750
D4: "T-ray imaging", D. M. Mittleman; IEEE Journal of Selected Topics in Quantum Electronics, Vol. 2 (1996), pages 679 to 692
D5: WO-A-0217231.

III. With the statement setting out the grounds of appeal the appellant requested that the decision under appeal be set aside and a patent be granted. Oral proceedings were requested on an auxiliary basis.

IV. In reply to a communication annexed to a summons to oral proceedings the appellant, with the letter dated

29 May 2015, submitted an amended second auxiliary request consisting of an amended set of claims 1 to 21, amended pages 3 to 7 of the description, and pages 1, 2 and 9 to 25 of the description and drawing sheets 1/14 to 14/14 of the application as published, page 8 of the description being cancelled. Subsequently, with the letter dated 11 June 2015, the appellant withdrew a request for oral proceedings and the main and first auxiliary requests, so that the request labelled "new second auxiliary request" became its sole request.

In view of the requests of the appellant, the oral proceedings were cancelled.

V. Independent claims 1 and 19 amended according to the present request of the appellant read as follows:

" 1. A method of detecting an explosive material or composition, comprising:

irradiating an object (20) with an optically-generated pulse of electromagnetic radiation, said pulse having a plurality of frequencies in the range from 100 GHz to 100 THz or an optically-generated beam of substantially continuous electromagnetic radiation having a frequency in the range 100 GHz to 100 THz;

detecting radiation transmitted and/or reflected from the object (20);

determining a frequency spectrum from the detected radiation;

calculating a first derivative of the frequency spectrum; and

identifying one or more features of the first derivative of the frequency spectrum of the detected radiation which are indicative of a known explosive material or composition."

" 19. An explosive detection apparatus, comprising:
an optically-driven emitter (17) for irradiating an object (20) with a beam of substantially continuous electromagnetic radiation having a frequency in the range 100 GHz to 100 THz or a pulse of electromagnetic radiation, said pulse having a plurality of frequencies in the range from 100 GHz to 100 THz;
means (24) for detecting radiation transmitted and/or reflected from the object; and
an analyser for analysing the detected radiation to determine if one or more predetermined features of an explosive material exists, the analyser being arranged to calculate a frequency spectrum from the detected radiation, calculate a first derivative of the frequency spectrum and identify one or more features of the first derivative of the frequency spectrum of the detected radiation which are indicative of a known explosive material or composition."

Claims 2 to 18 and claims 20 and 21 are all dependent claims referring back to independent claims 1 and 19, respectively.

Reasons for the Decision

1. The appeal is admissible.

2. *Article 123(2) EPC*

In its decision the examining division held that a feature present in the set of claims amended according to the request then on file did not satisfy the requirements of Article 123(2) EPC. The mentioned feature has been omitted in the set of claims of the

present request and, accordingly, the amended set of claims overcomes the objection raised by the examining division in this respect.

In addition, the Board is satisfied that the application documents amended according to the present request of the appellant complies with the requirements of Article 123(2) EPC. In particular, independent claim 1 is based on claims 1, 2, 4 and 12 as originally filed, independent claim 19 is based on claims 23 to 25, 1, 2 and 12 as originally filed, and dependent claims 2 to 18 and dependent claims 20 and 21 are based on the following parts of the application as originally filed, respectively: claim 3 and page 8, fourth paragraph of the description, claims 5 to 11, 13 to 16, 18 to 22 and 26, and page 8, fourth paragraph of the description.

The amendments to the description concern its adaptation to the claimed invention (Article 84 and Rule 27(1) (c) EPC 1973) and the acknowledgement of the prior art (Rule 27(1) (b) EPC 1973).

3. *Article 84 EPC 1973*

3.1 In its decision the examining division held with regard to the set of claims then on file that the presence of two independent claims within each category contravened the requirements of conciseness of Article 84 in combination with Rule 43(2) EPC. Each of the pair of independent claims within each category related to two different aspects of the invention, namely to the irradiation of an object with either a pulse of electromagnetic radiation or a beam of substantially continuous electromagnetic radiation. The Board considers that, in view of the complementary nature of these two technical aspects and the technical effect

that they achieve (see point 4.2 below, second paragraph), these two aspects constitute two alternative solutions to a common technical problem. Consequently, the two aspects constitute "alternative solutions to a particular problem" within the meaning of paragraph (c) of Rule 29(2) EPC 1973, and it was legitimate for the appellant to formulate these two aspects in separate, independent claims without contravening the requirements of conciseness of Article 84 EPC 1973. In any case, the mentioned aspects have now been defined as two alternatives within each of the independent claims in each category (method claim 1 and apparatus claim 19), and the present set of claims satisfies the requirements of Rule 29(2) EPC 1973 relating to the number of independent claims within each category.

3.2 In its decision the examining division held that the feature defined in the independent claims then on file relating to the identification of "one or more features of the detected radiation which are indicative of a known explosive material or composition" merely constituted the definition of a result to be achieved and that for this reason the claims were not clear (Article 84 EPC 1973). Present independent claims 1 and 19 have been amended to specify the technical features required for achieving the mentioned identification, and consequently the objection of lack of clarity raised by the examining division no longer applies to the present claims; thus, independent claims 1 and 19 now require that the identification is carried out, among other features, on the basis of the first derivative of the frequency spectrum of the radiation transmitted and/or reflected by the object.

4. *Novelty and inventive step*

4.1 In its decision the examining division held that the claims of the request then on file did not define new subject-matter with regard to document D1 or document D5.

4.1.1 Document D1, with reference to Figure 17, discloses the irradiation of an object with pulsed electromagnetic radiation having frequencies in the range from 50 GHz to 84 THz, and the identification of specific features of the object on the basis of the frequency spectrum of the radiation transmitted or reflected by the object (cf. abstract, together with the description of Fig. 17, and page 3, third paragraph).

However, while claim 1 is directed to a method of detecting an explosive material or composition present in an object, document D1 pertains to the detection of cancer tumours and the like (see abstract). Already for this reason, the method defined in claim 1 is novel over the disclosure of document D1. In addition, while in document D1 the identification of the specific features of the object is carried out on the basis of the frequency spectrum of the radiation transmitted or reflected by the object, claim 1 has been amended so as to require that the identification of the material is carried out on the basis of the first derivative of the frequency spectrum of the detected radiation.

Independent claim 19 is directed to an explosive detection apparatus, and even assuming that the apparatus disclosed in document D1 would - as assumed by the examining division - be suitable for detecting an explosive material present in an object, the apparatus defined in this amended claim is novel over the apparatus disclosed in document D1 at least in that the claim requires the identification of the material on the

basis of the first derivative of the frequency spectrum of the detected radiation.

4.1.2 Document D5 discloses the detection of different substances present in an object, and in particular of explosive materials (page 1, lines 19 to 33, page 17, lines 2 to 17, and page 18, lines 3 to 14), by analysing the frequency spectrum of radiation reflected by the object (abstract, Fig. 2 and the paragraph bridging pages 9 and 10). The document discloses different techniques for analysing the frequency spectrum of the detected radiation, but the document is silent as to the computation or the processing of the first derivative of the frequency spectrum. Present independent claims 1 and 19, however, require the detection of explosive materials or compositions on the basis of the first derivative of the frequency spectrum of the detected radiation, and the claimed subject-matter is therefore novel over the disclosure of document D5.

4.1.3 The remaining documents on file are less pertinent. In particular, documents D2 (abstract), D3 (abstract) and D4 (abstract) considered by the examining division during the examination procedure relate to different spectral and/or imaging techniques for identifying features in objects on the basis of radiation diffracted and/or transmitted and/or reflected by the objects, and none of these techniques involve the first derivative of the frequency spectrum of the detected radiation.

4.1.4 It follows from the above considerations that independent claims 1 and 19 and the corresponding dependent claims 2 to 18 and dependent claims 20 and 21 define novel subject-matter over the available prior art.

4.2 The closest state of the art can be considered to be represented by document D5 or, alternatively, by document D1. As already concluded in point 4.1 above, the method of detecting an explosive material or composition in an object defined in claim 1 and the explosive detection apparatus defined in independent claim 19 differ from the disclosure of any of documents D1 and D5 at least in that the detection of the explosive material or composition is carried out on the basis of the identification of features indicative of known explosive materials or compositions in the first derivative of the frequency spectrum of the detected radiation.

As disclosed in the description of the application, the spectra of clothing material and the like have a substantially linear frequency spectrum (Fig. 6 and 9 and the corresponding description on pages 20 and 21 of the application), so that its first derivative is substantially a constant (Fig. 7 and page 20, third to fifth paragraphs). Thus, the first derivative of the frequency spectrum of the detected radiation essentially eliminates the contribution to the spectrum of surrounding materials, such as clothing and the like (page 21, third paragraph). The claimed invention therefore simplifies and improves the identification of features indicative of known explosive materials or compositions in the spectrum by highlighting the materials of interest over other materials (clothing, etc.) surrounding the article (page 3, first paragraph, and page 20, second paragraph).

None of documents D1 to D5 and of the remaining documents on file disclose or suggest calculating the first derivative of the frequency spectrum of the detected radiation from the article being examined, nor

the technical advantages achieved therewith and mentioned above.

Therefore, the subject-matter of independent claims 1 and 19 and of dependent claims 2 to 18 and claims 20 and 21 involves an inventive step with regard to the available prior art (Article 56 EPC 1973).

5. The Board is also satisfied that the application documents as presently amended and the invention to which they relate meet the remaining requirements of the EPC within the meaning of Article 97(1) EPC. The Board concludes that the decision under appeal is to be set aside and a patent to be granted on the basis of the application documents amended according to the present 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 grant a patent in the following version:

- claims 1 to 21 submitted with the letter dated 29 May 2015,
- description pages 1, 2 and 9 to 25 of the application as published, and pages 3 to 7 submitted with the letter dated 29 May 2015, page 8 being cancelled, and

- drawing sheets 1/14 to 14/14 of the application as published.

The Registrar: The Chairman:

M. Kiehl B. Müller

Decision electronically authenticated