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**D E C I S I O N**  
**of 28 October 2005**

**Case Number:** T 1211/03 - 3.2.02

**Application Number:** 97917747.4

**Publication Number:** 948284

**IPC:** A61B 5/00

**Language of the proceedings:** EN

**Title of invention:**

Monitoring of tissue analytes by infrared radiation

**Applicant:**

Buchert, Janusz M.

**Opponent:**

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**Headword:**

-

**Relevant legal provisions:**

EPC Art. 52(1), 54, 56

**Keyword:**

"Novelty (yes), Inventive step (yes)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 1211/03 - 3.2.02

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.02  
of 28 October 2005

**Appellant:**

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New York  
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**Representative:**

Hengelhaupt, Jürgen  
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**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 5 May 2003  
refusing European application No. 97917747.4  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** T. Kriner  
**Members:** S. Chowdhury  
U. Tronser

## Summary of Facts and Submissions

I. This appeal is against the decision of the examining division dated 5 May 2003 to refuse European patent application No. 97 917 747.4.

The application was refused on the grounds that claim 1 did not meet the novelty requirement of Article 52(1) EPC.

The following document cited during the examination procedure is the only one of interest in the appeal procedure:

D1: WO-A-95/31930.

All other cited documents are less relevant.

II. On 7 July 2003 the appellant (applicant) lodged an appeal against the decision and paid the prescribed fee on the same day. On 4 September 2003 a statement of grounds of appeal was filed.

III. Oral proceedings were held on 28 October 2005.

The appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of the following documents:

Claims 1 to 10 and description pages 1 to 18 as submitted at the oral proceedings,

Figures 1 to 6b as published.

IV. Independent claim 1 reads as follows:

"Instrument for determining a human body tissue analyte concentration by non-invasive measurements, comprising  
a. a means for detecting emission spectral lines characteristic to the body tissue analyte, in an infrared spectral region naturally emitted as heat thermal emission, and for measuring the spectral intensity of the emission spectral lines at a predetermined infrared wavelength, wherein the detecting means comprise an analyzing means for selecting significant wavelengths of the tissue analyte comprising

- an optical filter set (6) for filtering the emission spectral lines, with a first filter blocking the emission spectral wavelengths characteristic to the body tissue analyte and a second neutral density filter, and

- means for subtracting the intensities of the radiation passed through the first and the second filter, and

b. a means for correlating the difference between the intensities of the radiation passed through the first and the second filter of emission spectral lines with the tissue analyte concentration."

V. The appellant argued as follows:

The application was based on the principle of detecting emission spectral lines whereas the prior art was based on the principle of detecting absorption spectral lines. Although both principles use human body heat emission, they possess fundamental differences which lead to corresponding but different spectra. The claimed device

comprised a negative correlation filter which enabled the emission spectrum to be examined. Since neither the detection of emission spectral lines nor the use of such a filter was suggested by the state of the art the claimed subject-matter was new and involved an inventive step.

## **Reasons for the Decision**

1. The appeal is admissible.
2. *The application*
  - 2.1 The application relates to a spectroscopic instrument for measuring the concentration changes of analytes (e.g. glucose) in human body tissues (e.g. blood) and operating in the infra-red spectral region. It includes an instrument for detecting the infrared radiation naturally emitted by the human body through the use of an infrared detector with a combination of filters.
  - 2.2 A heated body of matter emits radiation in a spectrum approximating to a black body radiation spectrum as shown in Figure 1 of the application. The body radiates by being excited by the heat energy, from the ground state into one of many higher energy levels or states and then decaying back to the ground state. This spectrum is an emission spectrum.
  - 2.3 A given body also has a characteristic absorption spectrum which arises when a broadband radiation source irradiates the body. The absorption spectrum and

emission spectrum are generally correlated but dissimilar.

- 2.4 The application describes the use of a negative correlation filter in order to study the emissive intensity of a spectral band of an analyte in the body.

3. *Novelty*

Document D1 describes the measurement of blood constituents, e.g. glucose, using infra-red absorption. The infra-red source is located externally of the body in one embodiment, and is the body itself in another embodiment. In each case two narrow band pass bands filters are placed at the detector, the pass bands being located respectively at a wavelength which is sensitive to the concentration of analyte and a wavelength insensitive to the concentration of analyte.

By contrast, the filter system defined in claim 1 of the application comprises a first filter for blocking the emission spectral wavelengths characteristic to the body tissue analyte and a second neutral density filter, and means for subtracting the intensities of the radiation passed through the first and the second filter. These latter filters are not disclosed in D1, so that the instrument of claim 1 is novel.

4. *Inventive step*

The principle of measuring the analyte concentration in D1 and in the other prior art reviewed in the application is the use of two narrow band pass band filters in order to examine the absorption spectrum of

the radiation emitted from the body. The outputs of the two filters are compared in order to derive a signal indicative of the analyte concentration.

The present application, on the other hand, employs a quite different principle of measurement in that the emission spectrum is examined instead of the absorption spectrum. In order to exploit this different principle the present detection apparatus has a different filter set to that used in the prior art, namely a first filter for blocking the emission spectral wavelengths characteristic to the body tissue analyte and a second neutral density filter.

The description explains how the difference signal from respective detectors behind the two filters is proportional to the analyte concentration.

The prior art neither suggests the use of this different principle in order to evaluate an analyte spectrum, nor does it disclose the use of the present filter set in order to do so. Therefore, the claimed instrument also involves an inventive step.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside
2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:
  - Claims 1 to 10 and
  - Description pages 1 to 18 as submitted at the oral proceedings
  - Figures 1 to 6b as published.

The Registrar:

The Chairman:

V. Commare

T. Kriner