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Aktenzeichen / Case Number / N° du recours : T 568/89 - 3.4.1

Anmeldenummer / Filing No / N° de la demande : 85 303 377.7

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 162 649

Bezeichnung der Erfindung: Mass spectrometer using ion cyclotron resonance
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : H01J 49/38

ENTSCHEIDUNG / DECISION

vom / of / du 10 January 1990

Anmelder / Applicant / Demandeur : Nicolet Instrument Corporation (US)

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Articles 83 and 84 EPC

Schlagwort / Keyword / Mot clé : "Clarity of the claims (Yes); feasibility of the invention (Yes)"

Leitsatz / Headnote / Sommaire

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Case Number : T 568/89

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 10 January 1990

Appellant : Nicolet Instrument Corporation
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Representative : P.A. Smith
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Decision under appeal : **Decision of Examining Division 047 of the European Patent Office dated 13 March 1989 refusing European patent application No. 85 303 377.7 pursuant to Article 97(1) EPC**

Composition of the Board :

Chairman : K. Lederer
Members : E. Turrini
L. Mancini

Summary of Facts and Submissions

I. European patent application No. 85 303 377.7 (publication number 0 162 649) was refused by decision of the Examining Division.

II. The reasons given for the refusal were that the subject-matter of independent Claims 1 and 10 was not clear (Article 84 EPC) and that the whole application did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

III. The Appellant lodged an appeal against the decision.

IV. Current Claim 1 filed on 20 January 1989 and Claim 10 as originally filed, which correspond to the claims on which the decision of the Examining Division is based, read as follows:

Claim 1:

"An ICR spectrometer having a vacuum chamber (26), means (27, 28) for maintaining molecular flow conditions in the vacuum chamber, means (36, 37) for introducing a sample into the vacuum chamber, means (32) for ionizing a sample within the vacuum chamber, means (25) producing a magnetic field (B) through the chamber for inducing ion cyclotron resinance (read "resonance"), trapping plates within the chamber (10, 11), means (12) for applying trapping potential to the trapping plates to restrict movement of ions along the magnetic field, means (16) for exciting the trapped ions, and means (18) for detecting ion excitation

characterized by a conductance limit plate (14) dividing the vacuum chamber (26) into first and second compartments (30, 31), the means for maintaining molecular flow conditions comprising means (27, 28) for separately maintaining such conditions in the two compartments (30, 31), and said conductance limit plate (14) comprising an electrode connected to the means (12) for applying trapping potential and having an orifice (20) positioned and configured to allow ion equilibration between the compartments while maintaining a pressure differential between them."

Claim 10:

"The method of mass spectrometry comprising the steps of:

providing a magnetic field:

introducing a sample into a first high vacuum compartment in which molecular flow conditions are maintained, said first compartment being within said magnetic field;

forming ions of said sample within said magnetic field;

trapping said ions to restrict their movement along said magnetic field while allowing their movement along said magnetic field through an orifice for equilibration with a second high vacuum compartment in which molecular flow conditions are maintained, said orifice being positioned and configured to allow ion passage between said compartments while maintaining a pressure differential between said compartments;

trapping said ions to restrict their movement from said second compartment;

exciting ions trapped within said second compartment; and

detecting ion excitation for sample analysis."

Claims 2 to 9 are dependent on Claim 1.

Claims 11 to 13 are dependent on Claim 10.

V. In the statement of grounds filed in support of the appeal, the Appellant argued in substance that the invention deals with an improvement of a known device generally referred to as ion cyclotron resonance spectrometer. The man skilled in the art would know that in this kind of device the resonance resulting when the frequency of the excitation electric field matches the frequency of the orbitting ions can be detected and consequently, it is possible to analyse a sample in terms of the number of ions having various mass-to-charge ratios. This appears from document US-A-3 937 955 (D1) which is mentioned in the application in suit as state of the art in this particular technical field.

Said known general features need not, therefore, be explicitly mentioned in the application, e.g. the reference in Claim 1 to "means for exciting ions" and "means for detecting ion excitation" is sufficient for the skilled person to realise said means, without the need for any further constructional detail.

The claims are, therefore, sufficiently clear and the skilled man starting from the disclosure of the application in suit does not need any further information to carry out the invention.

Reasons for the Decision

1. The appeal is admissible.

2. Clarity of the claims.

Claim 1 refers to an ion cyclotron resonance spectrometer which is known in the art as a mass spectrometer in which the induced ion cyclotron resonance is utilised to analyse the sample under examination in terms of the number of ions having various mass-to-charge ratios. Claim 1 refers, inter alia, to means for inducing ion cyclotron resonance, means for exciting the ions and means for detecting ion excitation. The claim contains, therefore, a clear indication concerning means utilised for distinguishing ions having different mass-to-charge ratios.

Indeed, those skilled in the art know that for every excitation frequency only the ions whose resonant frequency matches said excitation frequency are detected, due to the fact that they absorb energy from the exciting electric field and are thus accelerated to larger orbital radii and measurable higher kinetic energy levels. Also the disclosure of document D1, mentioned in the application in suit as state of the art, defines the ion cyclotron resonance mass spectrometers as those spectrometers according to which the numbers of ions having a particular resonant frequency is measured by exciting them with an oscillating electric field acting as exciting means.

In the Board's view it is therefore not necessary that the claim explicitly mentions "means distinguishing ions according to their mass-to-charge ratios".

The same reasoning can be applied, mutatis mutandis, to method Claim 10. It is true in said claim that there is no explicit reference to ion cyclotron resonance spectrometry. However, the whole wording of the claim and in particular expressions like "providing a magnetic field ...", "exciting ions" ..." and "detecting ion excitation ..." clearly indicate that the subject-matter relates to ion cyclotron resonance spectrometry.

Thus, the Board is satisfied that Claims 1 and 10 do not offend Article 84 EPC.

3. Feasibility of the invention.

The whole application refers to a mass spectrometer and to a corresponding method of mass spectrometry which are based on the ion cyclotron resonance phenomena. In particular, description and drawings disclose a magnet to induce a magnetic field, ion excitation control means and excitation detection means for spectral evaluation.

The skilled man expert in this field would therefore understand the function of the claimed device and method and would be able to carry out the invention without the need of subsidiary information going over the general knowledge of the average technician (see also the decision T 32/84, OJ 1/1986, page 9).

The Board is therefore of the opinion that Article 83 EPC is not infringed.

4. The Examining Division in its decision has not considered the allowability of the claims under Article 52(1) EPC.

This is the reason why the Board has decided not to examine

further the application, in order to give the Appellant the opportunity to take advantage of the two instances, as far as the conformity of the application in suit to the requirements of Article 52(1) EPC is concerned and to remit the case for further prosecution to the Examining Division in accordance with Article 111 EPC.

5. Refund of the Appeal Fee.

The Board cannot find any substantial procedural violation as is a prerequisit for reimbursement of appeal fees according to Rule 67 EPC.

Before rejecting the application, the Examining Division issued a communication according to Art. 96(2) and Rule 51(2) EPC containing a reasoned statement (e.g. page 1, lines 2 to 6 of the communication) according to Rule 51(3). Whether the given reason was correct or not is a matter of judgment and not of procedure.

The request for reimbursement of the appeal fee must therefore be rejected.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division for further prosecution on the basis of the following documents:

- Description: pages 1 to 3 filed on 20 January 1989;
  pages 4 to 11 as originally filed.

- Claims: 1 to 3 filed on 20 January 1989;
  4 to 13 as originally filed.

- Drawings: Figures 1 to 4 as originally filed.

3. The appeal fee shall not be refunded.

The Registrar: The Chairman:

S.Fabiani K. Lederer