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D E C I S I O N
of 27 March 2001

Case Number: T 0987/97 - 3.5.2

Application Number: 89312827.2

Publication Number: 0373835

IPC: H01J 49/42

Language of the proceedings: EN

Title of invention:
Mass spectrometer and method with improved ion transmission

Applicant:
MDS Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)

Keyword:
"Added subject-matter - no (after amendment)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0987/97 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 27 March 2001

Appellant: MDS Inc.
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Representative: Gura, Henry Alan
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 29 April 1997 refusing European patent application No. 89 312 827.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: R. G. O'Connell
B. J. Schachenmann

Summary of Facts and Submissions

I. This is an appeal from the refusal by the examining division of European patent application No. 89 312 827.2. The reason given for the refusal was that the independent claims then on file, which omitted certain features which were in the originally filed independent claims, represented an impermissible amendment of the application resulting in the amended application containing subject-matter which extended beyond the content of the application as filed (Article 123(2) EPC).

II. In a reasoned communication accompanying a summons to oral proceedings the board expressed the provisional view that there was no disclosure in the originally filed application which would support the deletion of the contentious features.

III. Oral proceedings took place before the board on 27 March 2001 at the end of which the appellant withdrew all previous requests and filed a single request whose independent claims read as follows:

"1. A mass spectrometer system comprising:

(a) first and second vacuum chambers (30,38) separated by a wall, said first vacuum chamber having an inlet orifice (26) in an inlet wall (28);

(b) means (18) for generating ions of a trace substance to be analysed and for directing said ions through said inlet orifice into said first vacuum chamber;

(c) a first rod set (32) in said first vacuum chamber extending along at least a substantial portion of the length of said first vacuum chamber, and a second rod set (40) in said second vacuum chamber, each rod set comprising a plurality of elongated parallel rod means spaced laterally apart a short distance from each other to define an elongated space therebetween extending longitudinally through such rod set for ions to pass therethrough, said elongated spaces of said first and second rod sets being first and second spaces respectively, said first rod set being located end to end with said second rod set so that said first and second spaces are aligned;

(d) an interchamber orifice located in said wall (36) and aligned with said first and second spaces so that ions may travel through said inlet orifice (26), through said first space, through said interchamber orifice, and into said second space;

(e) means for applying essentially an AC-only voltage between the rod means of said first rod set so that said first rod set may guide ions from said inlet orifice through said first space and through the orifice between the chambers;

(f) means for applying both AC and DC voltages between the rod means of said second rod set so that said second rod set may act as a mass filter for said ions;

(g) means (42) for flowing gas through said inlet orifice into said first space;

(h) means (31, 39) for pumping said gas from each of said chambers;

(i) the pressure in said second chamber being sufficiently low for operation of said second rod set as a mass filter;

characterised in that

(j) means are provided to maintain the product of the pressure in said first chamber (30) times the length of the rod means of said first rod set (32) equal to or greater than 2.25×10^{-2} torr cm (3.0 Pa cm) and to maintain the pressure in said first chamber below that pressure at which an electrical breakdown will occur between the rod means of said first set; and that

(k) means are provided for applying a DC difference voltage in the range of 1 to 30 volts between said first rod set (32) and said inlet orifice (26) for controlling the kinetic energies of ions moving from said inlet orifice to said first rod set;

whereby to improve the transmission of ions guided through said first rod set and through the orifice (34) between the chambers."

"8. A method of mass analysis utilizing a first rod set (32) and a second rod set (40) located in first and

second vacuum chambers (30, 38) respectively, said first and second rod sets each comprising a plurality of rod means defining between them longitudinally extending first and second spaces respectively located end-to-end with each other and communicating through an orifice (34) between the chambers so that an ion may travel through said first space, through said orifice and into said second space, said method comprising:

(a) producing, outside said first chamber, ions of a trace substance to be analysed;

(b) directing said ions through an inlet orifice (26) in an inlet wall (28) into said first space and through said first space and said orifice between the chambers into said second space, and detecting the ions which have passed into said second space to analyse said substance;

(c) placing an essentially AC-only RF voltage between the rod means of said first rod set (32) so that said first rod set acts to guide ions from the inlet orifice through said first space and through the orifice between the chambers;

(d) placing AC and DC voltages between the rod means of said second rod set (40) so that said second rod set acts as a mass filter;

(e) admitting a gas into said first chamber (30) with said ions;

(f) pumping gas from said second chamber (38) to maintain the pressure in said second chamber at a pressure for effective mass filter operation of

said second rod set;

characterised in that

(g) said gas is pumped from said first chamber (30) to maintain the product of the pressure in said first chamber times the length of said first rod set (32) at or greater than 2.25 X 10^{-2} torr cm (3.0 Pa cm) but the pressure in said first chamber is maintained below that pressure at which an electrical breakdown would occur between the rods of said first rod set; and

(h) a DC difference voltage between 1 and 30 volts is applied between said first rod set (32) and said inlet orifice (26) in order to control the kinetic energy of ions entering said first rod set;

whereby to improve the transmission of ions guided through said first rod set and through said orifice between the chambers."

IV. The appellant's arguments can be summarised as follows:

In view of the fact that the appellant had not persuaded the board in the course of the oral proceedings that the person skilled in the art would conclude that the contentious features were not presented as essential in the application documents as originally filed, these features were now restored in the independent claims of the single request. The claims now filed differed from those proposed for grant by the examining division in the Rule 51(4) communication dated 30 June 1994 only in respect of minor clarifying amendments so that the application

should now be in order for grant.

V. The appellant requested that the decision under appeal be set aside and that a patent be granted in the following version:

Claims: 1 to 13 filed in the oral proceedings,

Description: pages 1, 2 and 5 to 34 filed in the oral proceedings (note: pages 3 and 4 have been cancelled),

Drawings: Figures 2 to 19 as originally filed; Figure 1 as in the Rule 51(4) communication dated 30 June 1994.

Reasons for the Decision

1. The appeal is admissible.

2. Since the appellant has reverted to a set of claims which differ only in respect of permissible clarifying amendments from those which the examining division was prepared to grant and since the board judges that the application meets the requirements of the EPC the application can proceed to grant.

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 13 filed in the oral proceedings,

Description: pages 1, 2 and 5 to 34 filed in the oral proceedings (note: pages 3 and 4 have been cancelled),

Drawings: Figures 2 to 19 as originally filed; Figure 1 as in the Rule 51(4) communication dated 30 June 1994.

The Registrar: The Chairman:

M. Kiehl W. J .L. Wheeler