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Datasheet for the decision of 5 July 2022

Case Number: T 2216/18 - 3.4.03

Application Number: 05803643.5

Publication Number: 1949411

IPC: H01J49/04, H01J49/40

Language of the proceedings: EN

Title of invention:
MASS SPECTROMETER

Applicant:
Shimadzu Corporation

Headword:

Relevant legal provisions:
EPC Art. 123(2)
RPBA 2020 Art. 13(1), 13(2), 15(1)

Keyword:
Amendments (main request and auxiliary requests 1 to 3) - added subject-matter (yes)
Late-filed requests (auxiliary requests 4 and 5) - admitted (no)

Decisions cited:
T 1707/17

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 2216/18 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 5 July 2022

Appellant: (Applicant)	Shimadzu Corporation 1, Nishinokyo-Kuwabaracho, Nakagyo-ku Kyoto-shi, Kyoto 604-8511 (JP)
Representative:	Vleck, Jan Montagu Reddie & Grose LLP The White Chapel Building 10 Whitechapel High Street London E1 8QS (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 26 March 2018 refusing European patent application No. 05803643.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	T. Häusser
Members:	S. Ward
	E. Mille

Summary of Facts and Submissions

I. The appeal is against the decision of the Examining Division to refuse European patent application No. 05 803 643 on the grounds that the claimed subject-matter was not new within the meaning of Article 54 EPC 1973 (former main request and first auxiliary request) and did not meet the requirements of Article 123(2) EPC (former second and third auxiliary requests).

II. At the end of the oral proceedings held before the Board the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request, or alternatively any of auxiliary requests 1 to 3, all filed with the statement setting out the grounds of appeal, or auxiliary request 4 filed with the appellant's letter dated 22 June 2022, or auxiliary request 5 submitted during the oral proceedings before the board.

III. (i) Claim 1 of the main request reads as follows:

"A mass spectrometer, comprising:
an ion source (1) for generating ions;
a mass analyzer (11,12) for selecting a target ion by separating the ions with respect to their mass to charge ratios; and
an ion optic (5) for focusing and introducing the ions into the mass analyzer (11,12), the ion optic being located on an ion path between the ion source (1) and the mass analyzer (11, 12);
the mass spectrometer being ***characterized by*** *further comprising:*

a voltage generator (24) for applying radio frequency voltages to the mass analyzer (11, 12) and the ion optic (5); and
a controller (21) configured to change a frequency of the radio frequency voltage applied to the ion optic (5) by the voltage generator (24) such that the radio frequency voltage is set to a lower frequency when ions having a larger mass-to-charge ratio are transported by the ion optic (5) and the radio frequency voltage is set to a higher frequency when ions having a smaller mass-to-charge ratio are transported by the ion optic (5), thereby improving the transmission efficiency of the ion optic."

(ii) Claim 1 of the first auxiliary request reads as follows:

"A mass spectrometer, comprising:
an ion source (1) for generating ions;
a mass analyzer (11,12) for selecting a target ion by separating the ions with respect to their mass to charge ratios; and
an ion optic (5) for focusing and introducing the ions into the mass analyzer (11,12), the ion optic being located on an ion path between the ion source (1) and the mass analyzer (11, 12);
the mass spectrometer being ***characterized by*** *further comprising:*
a voltage generator (24) for applying a voltage composed of a radio frequency voltage superimposed on a direct current voltage to the mass analyzer (11,12) and for applying a voltage including a radio frequency voltage to the ion optic (5);
a first controller (20) configured to control the voltage applied to the mass analyzer in order to scan the mass-to-charge ratio of the target ion; and

a second controller (21) configured to change a frequency of the radio frequency voltage applied to the ion optic (5) by the voltage generator (24) such that the radio frequency voltage is set to a lower frequency when ions having a larger mass-to-charge ratio are transported by the ion optic (5) and the radio frequency voltage is set to a higher frequency when ions having a smaller mass-to-charge ratio are transported by the ion optic (5), thereby improving the transmission efficiency of the ion optic."

(iii) Claim 1 of the second auxiliary request comprises all features of claim 1 of the first auxiliary request, together with the following final feature:

"and wherein the radio frequency voltage applied to the ion optic (5) is a rectangular wave generated by switching".

(iv) Claim 1 of the third auxiliary request comprises all features of claim 1 of the second auxiliary request, together with the following final feature:

"and wherein the second controller (21) changes the frequency of the radio frequency voltage applied to the ion optic (5) according to a pre-determined relationship between the mass-to-charge ratio of the target ion and the frequency of the radio frequency voltage applied to the ion optic (5)".

(v) Claim 1 of the fourth auxiliary request comprises all features of claim 1 of the second auxiliary request, together with the feature that the mass spectrometer further comprises:

"a means for holding information about the relationship between the mass to charge ratio of the ion and the frequency of the RF voltage".

(vi) Claim 1 of the fifth auxiliary request comprises all features of claim 1 of the second auxiliary request, together with the feature added to claim 1 of the fourth auxiliary request (see above, point III(v)) and the feature added to claim 1 of the third auxiliary request (see above, point III(iv)), in which the expression "according to a pre-determined relationship" has been amended to "according to the pre-determined relationship".

IV. Following the summons to oral proceedings, the Board sent the appellant a communication under Article 15(1) RPBA setting out its provisional view that it was doubtful that any of the requests then on file (the main request and the first to third auxiliary requests) met the requirements of Article 123(2) EPC or involved an inventive step in the sense of Article 56 EPC 1973. The appellant's attention was also drawn to the requirements of Article 13(2) RPBA.

V. The appellant's arguments, insofar as they are relevant to the present decision, may be summarised as follows:

A controller "configured" to change a frequency of the radio frequency voltage applied to the ion optic by the voltage generator had a basis in the description, for example, on page 5, lines 14 to 17, from page 5, line 25 to page 6, line 8 and on page 16, lines 17 to 21. This also applied to the same feature in claim 1 of the auxiliary requests. Moreover, the Article 123(2) EPC objection set out in the Board's communication under

Article 15(1) RPBA was not applicable to the third auxiliary request.

The fourth auxiliary request was filed as a response to specific objections under Article 123(2) EPC raised for the first time in the Board's communication. This request could not, therefore, have been filed earlier and should be admitted into the proceedings.

The fifth auxiliary request was filed at oral proceedings before the Board in response to the objection, which was first raised during the oral proceedings, that both a means for holding information about the relationship between the m/z ratio of the ion and the frequency of the RF voltage, and controlling the frequency of the RF voltage according to this relationship, were considered essential features of the claimed invention. Hence this request could not have been filed at an earlier opportunity.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request: Article 123(2) EPC*

2.1 Claim 1 as originally filed includes the feature:

"a controller for changing a frequency of the radio frequency voltage applied to the ion optic from the voltage generator, according to the mass to charge ratio range of the ion transported by the ion optic".

As pointed out in the contested decision (page 7, first paragraph), such a formulation is interpreted as a controller *suitable* for changing the said frequency. For example, it could include a means for changing the frequency manually by an operative (e.g. a knob or slider) according to the mass to charge ratio range.

2.2 In claim 1 of the present main request the corresponding feature is as follows:

"a controller (21) configured to change a frequency of the radio frequency voltage applied to the ion optic (5) by the voltage generator (24) such that the radio frequency voltage is set to a lower frequency when ions having a larger mass-to-charge ratio are transported by the ion optic (5) and the radio frequency voltage is set to a higher frequency when ions having a smaller mass-to-charge ratio are transported by the ion optic (5), thereby improving the transmission efficiency of the ion optic".

2.3 There is no literal basis for the word "configured" in the application as originally filed. In claim language, a controller being "configured" to perform an operation generally implies (or at the very least includes the possibility) that the controller is capable of ensuring that the operation is carried out automatically, without manual intervention.

2.4 In its communication (point 3.7), the Board accepted that on page 5, lines 3 to 17 of the description there was a disclosure of a controller automatically changing the frequency of the RF voltage as follows:

"In the mass spectrometer according to the present invention, the controller includes a means for holding

information about the relationship between the mass to charge ratio of the ion and the frequency of the RF voltage that yields a preferable (or if possible, optimal) transmission efficiency. The relationship of the RF amplitude to mass to charge ratio should be determined before the analysis is carried out. When an analysis is carried out, the controller refers to the relationship information and controls the voltage generator to change the frequency of the RF voltage according to the mass to charge ratio of the ion that is to be transmitted through the ion optic".

2.5 This passage contains at least the following features which have not been imported into claim 1 of the main request:

(a) means for holding information about the relationship between the mass to charge ratio of the ion and the frequency of the RF voltage;

(b) the information held yields a preferable (or if possible, optimal) transmission efficiency;

(c) when an analysis is carried out, the controller refers to the relationship information in controlling the frequency of the RF voltage according to the mass to charge ratio of the ion.

2.6 As a result of omitting these features, claim 1 of the main request is defined at a broader level of generality than that disclosed on page 5, lines 3 to 17, as mentioned under point 3.8 of the Board's communication.

2.7 As an alternative basis the appellant cited the passage from page 5, line 25 to page 6, line 8. The Board does not find it necessary to quote this passage at length, as it is sufficient to note that the first three words are: "As described above ...". Hence, contrary to the

argument of the appellant, this passage merely adds further details and benefits of the mass spectrometer already described in the passage cited above under point 2.4, and does not constitute a new and more general disclosure of a mass spectrometer according to the invention.

2.8 As a further basis the appellant suggested the passage on page 16, lines 17 to 21, which reads as follows:

"... the mass spectrometer in the present embodiment changes both the frequency and the amplitude of the RF voltage to improve the transmission efficiency according to the mass to charge ratio, as opposed to the conventional method that changes only the amplitude of the RF voltage while maintaining the same frequency. This operation can attain a higher transmission efficiency while reducing the increase in the amplitude".

2.9 Again the Board does not accept that this represents a separate disclosure of a mass spectrometer different to that discussed up to that point. The passage immediately after (bridging pages 16 and 17) reads:

"More specifically, in the mass spectrometer in the present embodiment, the voltage controller 21 controls the voltages driving the first ion lens 5 by changing the following parameters according to the mass to charge ratio of the target ion: DC voltages, Vn (n=1, 2, ..., 5); amplitude ν of RF voltage; and frequency ω of RF voltage. This control operation uses the control data stored in the voltage control data storage 22, taking into account the ionization condition or any other analysis condition that influences the optimal

transmission efficiency for a given mass to charge ratio".

It would be clear to the skilled reader that the "voltage control data storage 22" as shown in Fig. 2 corresponds to the "means for holding information" of page 5, line 7 (also referred to as "storage means" on page 6, line 23).

2.10 In short, while the Board accepts that the application as originally filed discloses a controller "configured" to change a frequency of the radio frequency voltage applied to the ion optic, such a controller is only disclosed in combination with the features mentioned above under point 2.5.

2.11 According to established case law it is normally not allowable to base an amended claim on the extraction of isolated features from a set of features originally disclosed only in combination (an "intermediate generalisation"). An intermediate generalisation may be justified only in the absence of any clearly recognisable functional or structural relationship among the features of the combination (see *Case Law of the Boards of Appeal*, 9th Ed., July 2019, II.E.1.9).

2.12 In the present case, the features mentioned above under point 2.5, which are not claimed, represent precisely the means by which the controller is "configured" (i.e. is enabled automatically) to change the frequency of the RF voltage applied to the ion optic to effect the claimed improvement in the transmission efficiency. These non-claimed features therefore have a clearly recognisable functional and structural relationship with the feature that the controller is "configured" to effect the said change in the RF frequency.

2.13 In the light of the above, the Board judges that claim 1 of the main request does not comply with the requirements of Article 123(2) EPC.

3. *First, second and third auxiliary requests: Article 123(2) EPC*

3.1 It was stated in the Board's communication (points 5.2, 6.2, 7.2) that the same objection would appear to apply to the respective versions of claim 1 of the first, second and third auxiliary requests.

Neither claim 1 of the first auxiliary request nor claim 1 of the second auxiliary request comprises any of the features referred to above under points 2.5(a), 2.5(b), and 2.5(c), and hence the objection under Article 123(2) EPC against the main request also applies to the first and second auxiliary requests.

In the letter dated 22 June 2022 the appellant argued that it did "not consider the Article 123(2) EPC objection set out in Sections 3.2 to 3.8 of the preliminary opinion to be applicable to the Third Auxiliary Request" (page 4, second paragraph). The Board does not agree. Claim 1 of the third auxiliary request comprises a final feature approximately corresponding to that stated above under point 2.5(c). However, the features referred to above under points 2.5(a) and 2.5(b) are not included, and hence claim 1 of the third auxiliary request is also considered to represent an unallowable intermediate generalisation.

3.2 At oral proceedings the Chairman reiterated the Board's negative opinion on the first, second and third auxiliary requests in relation to the requirements of

Article 123(2) EPC, and this was not further challenged by the appellant. Consequently the Board sees no reason to change its view on this matter, and judges that the first, second and third auxiliary requests do not comply with the requirements of Article 123(2) EPC.

4. *Fourth auxiliary request: Admission into the proceedings*

4.1 The specific objections under Article 123(2) EPC raised in the Board's communication under Article 15(1) RPBA were not present in the contested decision, and the Board accepts that this may be seen as meeting the requirement for "exceptional circumstances" set out in Article 13(2) RPBA.

4.2 However, in applying Article 13(2) RPBA, the Board may also rely on the criteria set out in Article 13(1) RPBA (see Supplementary publication 2 of the Official Journal EPO 2020, explanatory notes to Article 13(2) RPBA, page 60, fourth paragraph; see also T 2429/17, Reasons for the Decision, point 2.2). According to Article 13(1) RPBA, any amendment to a party's appeal case after it has filed its grounds of appeal or reply may be admitted only at the discretion of the Board, and in exercising its discretion the Board shall take into account *inter alia*:

"whether the party has demonstrated that any such amendment, prima facie, overcomes the issues raised by ... the Board and does not give rise to new objections."

4.3 Claim 1 of the fourth auxiliary request comprises the added feature:

"a means for holding information about the relationship between the mass to charge ratio of the ion and the frequency of the RF voltage".

This corresponds to the feature referred to above under point 2.5(a).

4.4 Under point 3.8 of its communication the Board raised the objection that claim 1 of the main request was defined at a different level of generality to that of the passage of the description on which it appeared to be based, and that, as a result, the requirements of Article 123(2) EPC appeared not to be met. Since certain features disclosed in the said passage, i.e. those referred to above under points 2.5(b) and 2.5(c), are still not defined in claim 1 of the fourth auxiliary request, it would be for the appellant to explain how such an amendment "prima facie, overcomes the issues raised by ... the Board", as required by Article 13(1) RPBA.

4.5 The appellant argued at oral proceedings that it was implicit in claim 1 of the fourth auxiliary request that there must be some means for the controller to interact with the means for holding information to use the information stored.

4.6 As used in Article 13(1) RPBA the expression *prima facie* means "at first sight; on the face of it; as it appears at first without investigation" (Oxford English Dictionary). In the present case, the alleged compliance of claim 1 of the fourth auxiliary request with the requirements of Article 123(2) EPC rests on an argument that certain features which are not explicitly defined in the claim should nevertheless be regarded as implicitly present. In the Board's view, the validity

of such an argument must be regarded as debatable, at the very least. Hence the appellant's argument does not persuade the Board that its amendment *prima facie* overcomes the issues raised.

4.7 The fourth auxiliary request is therefore not admitted into the proceedings (Article 13(2) RPBA in combination with Article 13(1) RPBA).

5. *Fifth auxiliary request: Admission into the proceedings*

5.1 The fifth auxiliary request was filed at oral proceedings before the Board, hence after the notification of the summons to oral proceedings. Article 13(2) RPBA 2020 therefore applies:

"Any amendment to a party's appeal case made ... after notification of a summons to oral proceedings shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned."

5.2 As noted above, the Board raised new objections under Article 123(2) EPC in its communication under Article 15(1) RPBA 2020 dated 6 May 2022, and the appellant filed its response to this communication, including the fourth auxiliary request, with its letter of 22 June 2022. The Board does not dispute (see above, point 4.1) that the new objections might be seen as giving rise to "exceptional circumstances" within the meaning of Article 13(2) RPBA, so that admitting the fourth auxiliary request into the proceedings was not precluded by this specific provision, even if it was not admitted for other reasons (see above, points 4.2 to 4.7).

5.3 The Board cannot, however, see any comparable "exceptional circumstances" which would apply to the fifth auxiliary request, filed during oral proceedings before the Board. Had the appellant wished to rely also on the fifth auxiliary request, the Board sees no reason why it could not have been filed along with the fourth auxiliary request, and the decision to file only a single additional auxiliary request with this letter was entirely in the hands of the appellant.

5.4 In this regard, the Board agrees with the conclusions drawn in T 1707/17, which were summed up in the "Catchword" as follows:

"Article 13(2) RPBA 2020 requires the party not only to explain why the case involves exceptional circumstances, but also to explain why its amendment, in terms of both content and timing, represents a justified response to these circumstances. In particular, where a party seeks to amend its case at a very late stage in the proceedings, the cogent reasons referred to in Article 13(2) RPBA 2020 should include reasons why it was not possible to file such an amendment earlier".

In the present case the Board sees no "cogent reasons" why the fifth auxiliary request could not have been filed earlier.

5.5 The appellant argues that the fifth auxiliary request was filed in response to an objection which was first raised during the oral proceedings, namely that a means for holding information about the relationship between the m/z ratio of the ion and the frequency of the RF voltage, and controlling the frequency of the RF voltage according to this relationship, were both

considered essential features of the claimed invention. Hence this request could not have been filed at an earlier opportunity.

5.6 According to the Board's understanding, the appellant is effectively arguing that the communication under Article 15(1) RPBA stated, or at least implied, that only the feature referred to above under point 2.5(a) was an essential feature and had to be imported into the claim, whereas at oral proceedings the Board stated that the feature referred to above under point 2.5(c) was also essential, and also had to form part of the claimed subject-matter. This is not an accurate assessment.

5.7 In fact, the Board made no reference to "essential features", either in its communication or at oral proceedings, but pointed out that the claimed term "configured" (for which there was no literal basis) could only be seen as being disclosed in combination with other features.

5.8 In particular, the Board cited under point 3.7 of its communication under Article 15(1) RPBA a passage of the application (page 5, lines 3 to 17) which it considered to disclose a controller automatically changing (i.e. being configured to change) the frequency of the RF voltage according to the mass-to-charge ratio of the ions. The Board concluded (point 3.8) that it was doubtful that there was an adequate basis in the passage on page 5, lines 3 to 17 for the subject-matter of claim 1 at the level of generality at which it was claimed, but made no definitive statement listing precisely which features gave rise to the differing levels of generality.

5.9 In paragraph 3.8 the Board stated the following:

"... the formulation in claim 1 of the present main request does not, for example, define any 'means for holding information about the relationship between the mass to charge ratio of the ion and the frequency of the RF voltage that yields a preferable (or if possible, optimal) transmission efficiency'".

5.10 The use of the expression "for example" does not imply that these are the only features giving rise to a difference in levels of generality, in fact the implication is quite the opposite. Even if this passage were misunderstood, and wrongly considered to represent an exhaustive list of features to be included in the claim, the Board does not see how the appellant could have come to the conclusion that only the "means for holding information" needed to be included, since the feature that the information held "yields a preferable (or if possible, optimal) transmission efficiency" is also explicitly cited.

5.11 The clear message of the Board's communication was that the subject-matter of claim 1 of the main request, which included the term "configured", was defined at a different level of generality to that disclosed in the passage (page 5, lines 3 to 17) which the Board regarded as providing a basis for this term. It was therefore open to the appellant to file one or more requests attempting to define the claimed subject-matter at the disclosed level of generality.

5.12 It was entirely the choice of the appellant to file only a single further auxiliary request, namely the fourth auxiliary request, and the Board can identify no exceptional circumstances within the meaning of Article

13(2) RPBA which would have prevented the appellant from filing its fifth auxiliary request at an earlier stage, or which could justify delaying the filing of such a request until the oral proceedings.

5.13 The fifth auxiliary request is therefore not admitted into the proceedings pursuant to Article 13(2) RPBA.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. Atienza Vivancos T. Häusser

Decision electronically authenticated