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**Datasheet for the decision
of 24 February 2022**

Case Number: T 1788/19 - 3.4.03

Application Number: 13003393.9

Publication Number: 2688087

IPC: H01J49/16

Language of the proceedings: EN

Title of invention:

Assembly for an electrospray ion source

Applicant:

Bruker Daltonics GmbH & Co. KG

Headword:

Relevant legal provisions:

EPC Art. 52(1), 56

RPBA 2020 Art. 12(3), 13(1), 13(2), 15(1)

Keyword:

Inventive step (main request and auxiliary request 6) - (no)
Late-filed requests (auxiliary requests 1 to 5) - admitted (no)

Decisions cited:

T 0939/92, T 0422/93, T 2486/16, T 2429/17

Catchword:



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Case Number: T 1788/19 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 24 February 2022

Appellant: Bruker Daltonics GmbH & Co. KG
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Representative: Boßmeyer, Jens
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 11 February
2019 refusing European patent application No.
13003393.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman T. Häusser
Members: S. Ward
G. Decker

Summary of Facts and Submissions

- I. The appeal is against the decision of the Examining Division refusing European patent application No. 13 003 393 on the grounds that the claimed subject-matter did not involve an inventive step within the meaning of Articles 52(1) and 56 EPC.
- II. At the end of the oral proceedings held before the Board the appellant confirmed its requests that the decision under appeal be set aside and that a patent be granted on the basis of the claims according to the main request filed with the statement of grounds of appeal, or according to one of auxiliary requests 1 to 5 filed with the letter dated 27 January 2022, or according to auxiliary request 6 filed as an auxiliary request with the statement of grounds of appeal. The appellant further requested the reimbursement of the appeal fee.
- III. The following documents are referred to:
- D1: US 5 349 186
D4: US 2009/0250608 A1
- IV. (a) Claim 1 of the main request reads as follows:
- "An assembly for an electrospray ion source, comprising:
a capillary (204; 304; 404; 504; 804) for guiding a flow of liquid which is to be electrosprayed into an ionization chamber (206; 306; 406; 506; 806);
a first tube (218; 318; 418; 518; 818) at least partially encasing the capillary (204; 304; 404; 504;*

804) such that a first conduit (208; 308; 408; 508; 808) for guiding a first gas is created proximate the capillary (204; 304; 404; 504; 804); and a hollow member (222; 322; 422; 522; 822) having an internal evacuated space and being located at an outer circumference of the capillary (204; 304; 404; 504; 804) such that heat transfer from the first gas flowing proximate the capillary (204; 304; 404; 504; 804) to the liquid in the capillary (204; 304; 404; 504; 804) is impeded."

Claim 14 of the main request reads as follows:

"An assembly for an electrospray ion source, comprising:
a capillary (604) for guiding a flow of liquid which is to be electrosprayed into an ionization chamber (606);
a first tube (618) at least partially encasing the capillary (604) such that a first conduit (608) for guiding a first gas is created proximate the capillary (604);
a second tube (626) at least partially encasing the first tube (618) such that a second conduit (628) for guiding a second gas is created proximate the first tube (618); and
a hollow member (622) having an internal evacuated space and being located at an interface between the first conduit (608) and the second conduit (628) such that heat transfer from the second gas flowing proximate the first tube (618) to the first gas in the first tube (618) is impeded."

(b) Claims 1 and 14 of auxiliary request 1 comprise the features of claims 1 and 14 of the main request respectively, plus the following additional feature:

"wherein the term 'evacuated' means a pressure of less than 100 mbar".

(c) Claim 1 of auxiliary request 2 comprises the features of claim 1 of the main request plus the following additional features:

"wherein the hollow member is:

(i) an at least partially hollow jacket or sleeve (222; 322; 422; 522; 822) disposed around the capillary (204; 304; 404; 504; 804), and the evacuated space is formed within the at least partially hollow jacket or sleeve (222; 322; 422; 522; 822), where the assembly may further comprise a tubular structure (350; 450; 550; 850) containing a stagnant gas (324; 424; 524; 824), the tubular structure (350; 450; 550; 850) being interposed between the hollow member (322; 422; 522; 822) and the outer circumference of the capillary (304; 404; 504; 804);

or

(ii) a double-layered wall of the capillary, and the evacuated space is formed within the double-layered wall".

Independent claim 11 of auxiliary request 2 is identical to claim 14 of auxiliary request 1.

(d) Claim 1 of auxiliary request 3 comprises the features of claim 1 of the main request plus the following additional features:

"wherein the hollow member is:

(i) an at least partially hollow jacket or sleeve (222; 322; 422; 522; 822) disposed around the capillary (204; 304; 404; 504; 804), and the evacuated space is formed

within the at least partially hollow jacket or sleeve (222; 322; 422; 522; 822);

or

(ii) a double-layered wall of the capillary, and the evacuated space is formed within the double-layered wall".

Independent claim 12 of auxiliary request 3 is identical to claim 14 of auxiliary request 1.

Claim 2 of auxiliary request 3 has been converted into a further independent claim.

(e) Claim 1 of auxiliary request 4 comprises the features of claim 1 of auxiliary request 2 plus the following additional feature:

"and wherein the capillary is removably disposed within one of the first tube, an evacuated sleeve, an evacuated jacket, and a tubular structure".

Independent claim 10 of auxiliary request 4 is identical to claim 14 of auxiliary request 1.

(f) Claim 1 of auxiliary request 5 reads as follows:

"An assembly for an electrospray ion source, comprising:

a capillary (404; 504) for guiding a flow of liquid which is to be electrosprayed into an ionization chamber (406; 506);

a first tube (418; 518) at least partially encasing the capillary (404; 504) such that a first conduit (408; 508) for guiding a first gas is created proximate the capillary (404; 504);

a second tube (426; 526) at least partially encasing the first tube (418; 518) such that a second conduit (428; 528) for guiding a second gas is created proximate the first tube (418; 518); and a hollow member (422; 522) having an internal evacuated space and being located at an outer circumference of the capillary (404; 504) such that heat transfer from the first gas flowing proximate the capillary (404; 504) to the liquid in the capillary (404; 504) is impeded;

wherein the hollow member is:

(i) an at least partially hollow jacket or sleeve (422; 522) disposed around the capillary (404; 504), and the evacuated space is formed within the at least partially hollow jacket or sleeve (422; 522), where the assembly may further comprise a tubular structure (450; 550) containing a stagnant gas (424; 524), the tubular structure (450; 550) being interposed between the hollow member (422; 522) and the outer circumference of the capillary (404; 504);

or

(ii) a double-layered wall of the capillary, and the evacuated space is formed within the double-layered wall;

and wherein the capillary is removably disposed within one of the first tube, an evacuated sleeve, an evacuated jacket, and a tubular structure".

Independent claim 9 of auxiliary request 5 is identical to claim 14 of auxiliary request 1.

(f) In auxiliary request 6, claim 1 is the sole independent claim and is identical to claim 1 of the main request.

- V. The main request on which the impugned decision was based is the same as the present main request. The findings of the Examining Division, insofar as they are relevant to the present decision, may be summarised as follows:

Claim 1 of the main request differed from D1 (Fig. 2A) only in the following feature: a hollow member having an internal evacuated space. The problem was "to provide an alternative way of providing thermal insulation between the liquid and the first gas". Claim 14 of the main request differed from D4 (Fig. 7) in the same feature. The problem was "to provide an alternative way of providing thermal insulation between the first gas and the second gas".

In both cases, since vacuum thermal insulation formed part of the skilled person's common general knowledge, the claimed subject-matter did not involve an inventive step.

- VI. Following the summons to oral proceedings, the Board sent the appellant a communication under Article 15(1) RPBA 2020 setting out its provisional views as follows:

There were several suitable starting points for the examination of inventive step; for claim 14 the Board chose to start from the embodiment of Fig. 3 of D4, and for claim 1 the Board chose to start from the embodiment of Fig. 10 of D4. In both cases the claimed subject-matter differed only in having a hollow member which had an internal evacuated space. The objective problem was to provide improved thermal insulation, and the Board concurred with the Examining Division that, since vacuum thermal insulation formed part of the common general knowledge in the art, the skilled person

would arrive at the claimed solutions without exercising an inventive step.

Objections under Article 84 EPC were also raised.

According to Rule 103(1)(a) EPC, there were several conditions to be met for the appeal fee to be reimbursed, the first of which was that the appeal should be allowable.

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

(i) The person of ordinary skill in the art could be assumed to be a mechanical engineer having a couple of years' experience with the design and construction of electrospray ion sources for application in mass spectrometry.

(ii) The distinguishing feature of independent claims 1 and 14 of the main request was: a hollow member having an internal evacuated space. The technical problem solved by this feature was to provide a lean and compact arrangement as well as more efficient thermal insulation.

(iii) An obviousness attack based solely on a distinguishing feature being allegedly part of common general knowledge was generally problematic, because for anyone confronted with such argument it was impossible to determine the ambit of this alleged common general knowledge in order to identify suitable fallback positions in the disclosure. If such an assessment of inventive step were deemed admissible, the examining body alleging the common general

knowledge would have disproportionate discretionary power.

(iv) D14 was an excerpt from a general reference textbook which disclosed that air gaps had an impact on how fast or slow heat was transferred from an inner point to an outer point of a nested tube assembly. However, this proven common general knowledge contained no pointer to replace an air gap with a different sort of passive thermal insulation, such as vacuum insulation.

(v) Of course the skilled person might be aware of specific applications of vacuum insulation, such as Dewar vessels, Thermos bottles or vacuum-insulated panels. However, there was no evidence on file that vacuum insulation would be deemed functional and suitable for any conceivable technical device and any conceivable technical field of application.

(vi) D4 provided an air gap as thermal insulation (paragraph [0036]). Heat dissipation or active cooling were suggested as further measures for countering the effect of overheating (paragraphs [0043] to [0047]), with no suggestion that a skilled person would look to other implementations of passive thermal insulation.

(vii) The embodiment of Figure 3 in D4 comprised an annular space located between conduit 44, which guided a heated gas flow 21, and an inner conduit, which guided gas flow 22. The annular space was open at a lower end and in fluid communication with the rest of the chamber 12. Although the annular space was not said explicitly to have thermally insulating effect, such an effect would be achieved.

There was no explicit suggestion in D4 to provide vacuum or pressure-related insulation, and in any case, a change along those lines would not lead to an assembly falling within the ambit of claim 14. The embodiment of Figure 3 was directed to electrospray ionisation at atmospheric pressure, defined as between about 100 Torr [=133.3 mbar] and about twice the local atmospheric pressure, or higher (paragraph [0033]). The skilled person might be inclined to lower the operating pressure of the chamber 12 (including the pressure in the annular space) to the lower boundary given in paragraph [0033] to provide some limited benefit to the thermal insulation. However, this would not result in a hollow member having an evacuated space, but an open annular gap at slightly sub-atmospheric pressure.

(viii) At the relevant date it was very difficult to conceive of a vacuum device that could operate in a small space at high temperatures. The invention provided such advantages, as noted in paragraph [0068] of the present application.

(ix) The assembly of Figure 10 in D4 included a heated gas supply 20 into the chamber 12, but no exhaust port which could be used to channel off excess gaseous matter from the chamber 12. Such a design did not seem practical as the gas load on downstream compartments would be significant. The embodiment of Figure 10 of D4 appeared to be rather a sketch requiring a multitude of mental steps on the part of the skilled person in order to turn it into an actual embodiment fit for practice.

(x) Auxiliary requests 1 to 5 should be admitted into the procedure as the Board raised new objections in its communication. These new grounds encompassed alleged non-compliance with Article 84 EPC as well as the

denial of inventive step of the subject-matter of the independent claims 1 and 14 over the embodiments represented in figures 10 and 3 of D4, respectively (rather than D1 and the embodiment of Figure 7 of D4, as in the contested decision).

(xi) Some of the arguments advanced by the Examining Division appeared for the first time in the reasons of the decision, thereby denying the appellant the opportunity to comment on them during the examination proceedings. This constituted a denial of the right to be heard (Article 113(1) EPC) and a substantial procedural violation within the meaning of Rule 103(1) (a) EPC, so that a reimbursement of the appeal fee would be equitable.

Reasons for the Decision

1. The appeal is admissible.
2. *Claim 14 of the Main Request: Inventive Step*
 - 2.1 In the embodiment of Fig. 3 and the associated text (paragraphs [0034] to [0042]), D4 discloses an assembly for an electrospray ion source (2), comprising a capillary (26) for guiding a flow of liquid (arrow 24) which is to be electrosprayed into an ionization chamber; a first tube (28) at least partially encasing the capillary such that a first conduit (between tube 28 and capillary 26) for guiding a first (nebulizing) gas (arrow 22) is created proximate the capillary; a second tube (formed by tubular electrical insulators 52 and 54) at least partially encasing the first tube such

that a second conduit (44) for guiding a second gas ("sheath gas", arrow 20) is created proximate the first tube.

At the interface between the first conduit and the second conduit there is provided an air gap formed between the outer surface of the tube 28 and the inner surface of the tubular insulator 54. This air gap (a cylindrical cavity filled with air, which may be referred to as a "hollow member") "can help to insulate the first gas and sample capillary from the second, heated gas" (see paragraph [0036]), i.e. it impedes the heat transfer from the second gas to the first gas.

- 2.2 Claim 14 therefore differs from the embodiment of Fig. 3 of D4 only in that the hollow member has "an internal evacuated space". The appellant agrees that this is the distinguishing feature of claim 14.
- 2.3 The appellant argues that this feature achieves two objectives: it provides a "lean and compact" arrangement and more efficient thermal insulation (statement of grounds of appeal, page 3, penultimate paragraph). The Board is not persuaded that the invention would provide the first of these alleged advantages. None of the claimed features would allow the dimensions of the assembly to be inferred, and hence hollow evacuated members of all shapes and sizes, including those which could not be described as "lean and compact", would fall within the ambit of claim 14.
- 2.4 The objective problem is therefore to provide improved thermal insulation.
- 2.5 The Examining Division concluded that the skilled person would be led to the claimed solution on the

basis of the common general knowledge familiar to the person skilled in the art. In order to assess this argument it is first necessary to establish which "art" we are talking about and who the skilled person is.

- 2.6 The appellant argues (statement of grounds of appeal, passage bridging pages 2 and 3) that the skilled person "can be assumed to be a mechanical engineer having a couple of years' experience with the design and construction of electrospray ion sources for application in mass spectrometry".

However, according to the problem-solution approach, the starting point for defining the appropriate "person skilled in the art" is the objective technical problem to be solved (see *Case Law of the Boards of Appeal*, 9th Edition, 2019, I.D.8.1.1, and in particular T 422/93, Headnote, point 1). In the present case, in view of the problem identified above (point 2.4), the skilled person would be a notional thermal engineer, skilled in the field of thermal insulation. Even if the "skilled person" were considered to be a group of people (Op. cit., I.D.8.1.2), which might include specialists in electrospray ion sources, in view of the posed technical problem of providing improved thermal insulation (as proposed by the appellant), this group would have to be assumed to include a notional thermal engineer. What is under discussion is therefore the common general knowledge in the art of thermal insulation.

- 2.7 The appellant accepts that the skilled person "may be aware of specific applications of vacuum insulation, such as the well-known Dewar vessel, ... the well-known Thermos™ bottle, as well as vacuum-insulated panels in the field of construction, all of which might be seen

as part of the common general knowledge" (statement of grounds of appeal, passage bridging pages 7 and 8).

However, the knowledge of the person skilled in thermal engineering would not be limited to a few examples of vacuum insulation which would be familiar to the average layperson. The skilled person would understand, in particular, the physical principle underlying these examples, that by reducing the pressure in a gas layer (e.g. by evacuating air from a sealed enclosure), the thermal insulation provided by the layer can be significantly increased compared with a similar gas layer at atmospheric pressure. Moreover, the skilled thermal engineer would be aware that this principle has much wider application than the examples given by the appellant.

2.8 Hence, the use of a vacuum layer in place of the insulating air layer of D4 would, at least in principle, be an obvious measure for the skilled person attempting to improve the thermal insulation.

2.9 Moreover, the Board does not believe that the skilled person would find any difficulty in practically implementing such a measure. Creating an internal evacuated space would generally require the space to be sealed. The air space in D4 is already sealed at the upper end, and, as pointed out by the Examining Division (Reasons, point 5.11, in relation to the embodiment of Fig. 7) it would be obvious to replace the air layer between the tubes by sealing a vacuum between the respective tubes. Alternatively, it would be equally obvious to consider an arrangement analogous to a classical Thermos flask, i.e. to replace the air layer by a cylindrical member having hollow walls

enclosing an evacuated space. Either of these measures would lead to the claimed subject-matter.

2.10 The counter-arguments of the appellant do not persuade the Board.

2.11 The Board does not accept that an inventive step attack based on a document representing the closest prior art in combination with common general knowledge is somehow inherently flawed. On the contrary, it is settled case law that common general knowledge may be used in the assessment of inventive step. The matter was put as follows under point 2.3 of the Reasons in T 939/92:

"It hardly needs re-stating that the question of inventive step can only be considered on the basis of the relevant state of the art, see Article 56 EPC. However, Article 54(2) EPC does not limit the state of the art to written disclosure in specific documents; rather it defines it as including all other ways ('in any other way') by which technical subject-matter can be made available to the public. Therefore, the absence of a reference to a particular document does not mean that there is no state of the art, as this could reside solely in the relevant common general knowledge, which, again, may or may not be in writing, i. e. in textbooks or the like, or be simply a part of the unwritten 'mental furniture' of the notional 'person skilled in the art'. It is also clear that in the case of any dispute as to the extent of the relevant common general knowledge this, like any other fact under contention, has to be proved, e.g. by documentary or oral evidence ...".

2.12 The Board also does not accept the appellant's argument that "it is impossible to determine the ambit" of

common general knowledge in a given field (statement of grounds of appeal, passage bridging pages 3 and 4). In many cases such knowledge is indisputable; where there is a dispute sources such as standard textbooks may be referred to.

2.13 In relation to the appellant's argument that the textbook article D14 does not mention vacuum insulation, the mere fact that a concept does not happen to appear in a particular textbook does not mean that it cannot be acknowledged as commonly known. Rather, the converse is the case: if a concept *does* appear in a standard textbook it would usually be acknowledged as commonly known, but to qualify as common general knowledge, there is no requirement that it should appear in every textbook in that field.

2.14 The appellant is correct in pointing out that D4 discloses other (active) means of cooling, such as a cooling gas (paragraph [0046]) or a heat pipe (paragraph [0047]), and it appears to be argued that the skilled person would be led by D4 to adopt the disclosed active measures rather than the claimed solution.

However, according to the problem-solution approach, the skilled person is tasked with solving the objective problem, which, according to the appellant, is to provide improved thermal insulation. The disclosed active measures do not represent a solution to this problem, and hence would not lead the skilled person away from the claimed solution. While the skilled person might consider additional cooling means such as those disclosed in D4, this has no bearing on the argument that it would be obvious to solve the

objective problem by incorporating the distinguishing feature of claim 14.

- 2.15 The appellant further argues that even if the skilled person were to consider reducing the pressure in the air gap as a means of solving the above problem, they would choose to do so in a way which would not lead to the claimed invention.

The chamber in Fig. 3 of D4 is described in paragraph [0034] as an "atmospheric pressure region 12", whereby the term "atmospheric pressure" is defined in paragraph [0033] to be a "pressure above the vacuum level, usually between about 100 Torr [133.3 mbar] and about twice the local atmospheric pressure, or higher."

The appellant argues that the skilled person might be inclined to lower the operating pressure of the chamber 12 to the lower boundary given in paragraph [0033] by increasing the outflow rate. The resulting slightly sub-atmospheric pressure (100 Torr) would also be established in the annular gap due to its open construction, but this could not be viewed as a vacuum pressure by virtue of the statement in paragraph [0033] of D4, and hence no internal evacuated space would be created as required by claim 1.

- 2.16 In the Board's view, this argument fails for a number of reasons.

Firstly, it is implicit that the pressure in the chamber 12 of Fig. 3 would not be chosen at random within the disclosed range, but carefully, with a view to providing the best conditions for efficient electrospray, taking into account the various flows into (sheath gas 21, nebulizing gas 22, liquid sample

24, drying gas 34) and out of (exhaust gases 40) the chamber. Having set the required chamber pressure on this basis, it is not plausible that the skilled person would then choose a means of improving the thermal insulation which would entail reducing the chamber pressure to the lowest value in the disclosed range, thereby destroying the optimised conditions for electrospray, especially as it would be evident to the skilled person that it is only the pressure in the air gap which needs to be reduced to solve the objective problem, not the pressure in the entire chamber.

It is also noted that the appellant's argument appears to be based on an uncritical acceptance of the terminology used in D4, in concluding that, even at the lowest disclosed pressure, the chamber 12 cannot be described as "evacuated". The term "evacuated", as used in the present application, is defined in paragraph [0013] of the description as "any pressure substantially below ambient and/or atmospheric pressure" (pressures of less than 100 mbar being said to be "suitable", and pressures lower than one millibar being particularly preferred). A chamber pressure reduced to 100 Torr, as disclosed in D4, must be considered to be substantially below standard atmospheric pressure (760 Torr), and hence a chamber at this pressure would, according to normal terminology and that of the present application, be "evacuated". The fact that the prior art document D4 adopts the somewhat eccentric definition that 100 Torr may be designated "atmospheric pressure" is irrelevant.

Finally, even if the Board were to accept the appellant's arguments in this regard (which, for the reasons given above, it does not) this would merely establish that reducing the pressure in the chamber

would be one obvious way of solving the objective problem. But this would not invalidate the argument that the solutions set out above under point 2.9 would also be obvious to the skilled person. An obvious solution to a technical problem is not rendered any less obvious by the existence of a further obvious solution.

2.17 The Board does not accept the argument that the skilled person would, at the priority date of the present application, have had difficulty in arriving at a suitable vacuum arrangement, for example, capable of operating at high temperatures, as set out in paragraph [0068] of the description. The Board sees no evidence that the skilled thermal engineer, using the common general knowledge in the art, would have encountered such difficulties, and this would appear to be borne out by the statement of the accompanying person at oral proceedings that the invention was put into practice using a vacuum insulation device which "existed in the market already", and was not the invention of the appellant. For completeness it is noted that if the Board had accepted this argument, an objection under Article 83 EPC would have arisen, since the application does not disclose the technical means whereby the alleged difficulties might be overcome.

2.18 For the above reasons, the Board judges that the subject-matter of claim 14 of the main request does not involve an inventive step within the meaning of Articles 52(1) and 56 EPC, and hence the main request cannot be allowed.

3. *Auxiliary requests 1 to 5: Admission into the proceedings*

3.1 Auxiliary requests 1 to 5 were filed after notification of the summons to oral proceedings, and hence, according to Article 13(2) RPBA 2020, they "shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned".

The appellant argued that the Board, in its communication under Article 15(1) RPBA 2020, had raised new objections, i.e. it had used different starting points for its analysis of inventive step and had raised an objection under Article 84 EPC. Auxiliary requests 1 to 5 were filed as a direct response to these new objections, and therefore should be admitted into the proceedings.

3.2 In the impugned decision the Examining Division found that claim 1 of the main request differed from the prior art only in the feature: "a hollow member having an internal evacuated space", and that the same applied to claim 14. The use of vacuum thermal insulation was common general knowledge, and hence the subject-matter of claims 1 and 14 did not involve an inventive step.

In its communication under Article 15(1) RPBA 2020 the Board concurred with these findings. The fact that the Board started from a different embodiment of D4 for claim 14, and from D4 rather than D1 for claim 1, does not constitute the raising of a "new objection", which would justify the filing of new requests.

In general, the mere fact that, in a communication under Article 15(1) RPBA 2020, the Board departs in some respects from the reasoning of the Examining Division on inventive step (while reaching the same conclusion) does not constitute "exceptional

circumstances" within the meaning of Article 13(2) RPBA 2020, nor does it open the door to the filing of new requests as a response (T 2486/16, reasons, point 6.6.3).

Any new requests aimed at overcoming the above inventive step objection by amendment of the claims should have been filed together with the statement of grounds of appeal, as part of the appellant's complete appeal case (Article 12(3) RPBA 2020).

- 3.3 The appellant also argued that auxiliary requests 1 to 5 should be admitted into the proceedings, as they were a direct response to a new objection under Article 84 EPC raised by the Board in its communication under Article 15(1) RPBA 2020.

Article 13(2) RPBA 2020 requires the appellant to provide cogent reasons why its new requests are justified in view of exceptional circumstances. In all of auxiliary requests 1 to 5, the second independent claim (claims 14, 11, 12, 10 and 9 in auxiliary requests 1, 2, 3, 4 and 5, respectively) has been amended only by the addition of the feature "wherein the term 'evacuated' means a pressure of less than 100 mbar". The appellant did not provide "cogent reasons", or indeed any reasons, why a new request comprising an independent claim thus amended could be considered a justifiable response to the Board's objection under Article 84 EPC, which had nothing to do with a failure to specify the meaning of the word "evacuated". The Board therefore fails to see any reason to admit these requests under Article 13(2) EPC 2020.

- 3.4 Moreover, in applying Article 13(2) RPBA 2020, the Board may also rely on the criteria set out in

Article 13(1) RPBA 2020 (see Supplementary publication 2 of the Official Journal EPO 2020, explanatory notes to Article 13(2) RPBA 2020, page 60, fourth paragraph; see also T 2429/17, Reasons for the Decision, point 2.2, second paragraph).

- 3.5 According to Article 13(1) RPBA 2020, 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."

- 3.6 As already noted, independent claims 14, 11, 12, 10 and 9 of the respective auxiliary requests 1 to 5 have been amended only by the addition of the feature "wherein the term 'evacuated' means a pressure of less than 100 mbar". It has also been noted above that this amendment has no relevance for the Board's objection under Article 84 EPC, nor is it seen how, *prima facie*, it could overcome the objection of lack of inventive step.

- 3.7 The appellant appeared to argue at oral proceedings that "a pressure of less than 100 mbar" was in contrast to a chamber pressure in D4 which was defined in paragraph [0033] to have a minimum value of 100 Torr [133.3 mbar]. However, the objection of the Examining Division was not based on any considerations related to the pressure in the chamber.

The Examining Division found that claim 14 of the main request differed from the prior art only in defining a hollow member having an internal evacuated space, and that this feature was not inventive. The Board agrees. Hence, auxiliary requests 1 to 5 could only meet the requirements of Article 13(1) RPBA 2020 if the amended feature specifying the pressure the internal evacuated space to be "less than 100 mbar" would *prima facie* render the claimed subject-matter inventive. No explanation has been given by the appellant why this is the case, nor can the Board see any reason to believe it to be so, especially given that 100 mbar is far from being a particularly high vacuum.

3.8 For the reasons given above, auxiliary requests 1 to 5 are not admitted into the proceedings (Articles 13(2) and 13(1) RPBA 2020).

4. *Claim 1 of auxiliary request 6: Inventive Step*

4.1 The embodiment of Fig. 10 of D4, which is seen as a suitable starting point for the inventive step analysis of claim 1 of auxiliary request 6, discloses an assembly for an electrospray ion source, comprising: a capillary (26) for guiding a flow of liquid which is to be electrosprayed into an ionization chamber; a first tube (52, 54) at least partially encasing the capillary such that a first conduit (between elements 52, 54) for guiding a first gas is created proximate the capillary; and a hollow member (the air-filled cavity between the inner wall of member 54 and the outer wall of the capillary 26) being located at an outer circumference of the capillary such that heat transfer from the first gas flowing proximate the capillary to the liquid in the capillary is impeded.

4.2 Claim 1 therefore differs from D4 only in that the hollow member has an internal evacuated space.

4.3 In this embodiment, in which the nebulizing gas is omitted, it is clear that the air gap between the inner wall of member 54 and the outer wall of the capillary 26 would in practice impede such heat transfer.

Moreover, it is, in the Board's view, derivable from D4 that this is the intention of providing such a gap. Firstly, it is apparent from the very general statement in paragraph [0036] beginning: "In some embodiments ...", that the disclosed concentric air spaces generally serve to provide thermal and electrical insulation. In addition, in exemplary embodiment 23 (paragraphs [0133] to [0139]), in which no nebulizing gas is disclosed, an air gap is disclosed for the purpose of insulating the capillary from the heated gas flow (exemplary embodiment 27).

4.4 The objective problem is therefore to provide improved thermal isolation, and the inventive step argument would proceed in essentially the same way as for claim 14 of the main request, with the same conclusion.

The appellant appeared to argue that Fig. 10 is not a suitable starting point as it lacks features which would be required in a real electrospray ion source, such as an outlet for exhaust gases. However, the figures of patent documents are generally schematic, and whether Fig. 10 of D4 includes all features which might be required for a practical implementation of the device cannot be seen as being relevant to the present discussion.

4.5 For the above reasons, the Board judges that the subject-matter of claim 1 of auxiliary request 6 does not involve an inventive step within the meaning of Articles 52(1) and 56 EPC, and hence auxiliary request 6 cannot be allowed.

5. *Requested reimbursement of the Appeal Fee*

5.1 According to Rule 103(1)(a) EPC an appeal fee shall be reimbursed where the Board of Appeal deems an appeal to be allowable, if such reimbursement is equitable by reason of a substantial procedural violation.

5.2 The first condition for an appeal fee to be reimbursed under this provision is therefore that the appeal is allowable. As this condition is not met in the present case the request for reimbursement must be refused.

Order

For these reasons it is decided that:

1. The appeal is dismissed.
2. The request for reimbursement of the appeal fee is refused.

The Registrar:

The Chairman:



S. Sánchez Chiquero

T. Häusser

Decision electronically authenticated