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Datasheet for the decision of 6 June 2018

Case Number: T 2161/15 - 3.3.06

Application Number: 07821989.6

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Language of the proceedings: EN

Title of invention:
Method and device for gas purification by means of partial condensation, and method for operating the device

Applicants:
1) Air Liquide Deutschland GmbH
2) L'air Liquide Société Anonyme pour l'étude et l'exploitation des procédés Georges Claude

Headword:
Method and device for gas purification / AIR LIQUIDE

Relevant legal provisions:
EPC Art. 52(1), 54, 84
RPBA Art. 12(4)

Keyword:
Clarity and support by the description - (no) - (main request and auxiliary request II)
Novelty - (no) - (main request, claim 10)
Admissibility of auxiliary request I - (no)

Decisions cited:

Catchword:

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Beschwerdekammern

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Case Number: T 2161/15 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 6 June 2018

Appellant: (Applicant 1)	Air Liquide Deutschland GmbH Hans-Günther-Sohl-Strasse 5 40235 Düsseldorf (DE)
Appellant: (Applicant 2)	L'air Liquide Société Anonyme pour l'étude et l'exploitation des procédés Georges Claude 75, Quai d'Orsay 75321 Paris Cédex 07 (FR)
Representative:	KNH Patentanwälte Neumann Heine Taruttis PartG mbB Postfach 10 33 63 40024 Düsseldorf (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 July 2015 refusing European patent application No. 07821989.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Santavicca
Members:	L. Li Voti
	J. Hoppe

Summary of Facts and Submissions

I. The appeal lies from the decision of the Examining Division to refuse European patent application no. 07 821 989.6.

II. In its decision, the Examining Division found
- that independent claim 10 of the main request, filed with letter of 8 September 2013, lacked clarity (Article 84 EPC) and novelty (Articles 52(1), 54(1) and (2) EPC) over D1 (EP 1 045 215 A2);
- that the amendments in claim 10 of auxiliary request I, filed at 11:06 during the oral proceedings held on 11 December 2014, did not overcome the clarity objections (Article 84 EPC) raised against Claim 10 of the main request;
- that auxiliary request I was thus not admissible under Rule 137(3) EPC;
- that the Applicant did not approve the application documents sent for grant with the Rule 71(3) EPC communication dated 13 March 2015;
- that, therefore, in the absence of either allowable or agreed requests, the application was to be refused under Article 97(2) EPC.

In particular, as regards the clarity of claim 10 of the main request, the Examining Division found (reasons, 2.1 and 2.2)
- that according to the wording of the claim the heat exchanger (1) had to be **designed** so that the specific **gas flow** described thereafter in the claim was attained;
- that it was not evident whether said gas flow was merely (a) a **consequence** of the heat exchanger features recited in the preceding part of the claim or (b) whether the heat exchanger required **additional** device

features (not specified in the claim), which enabled to attain the specific gas flow;
- that, as regards case (a), claim 10 did not explain how, in the interior space (3), the first and second groups of tubes (6,7) were located *in relation to each other and in relation to end regions (4,5)* in order to create the necessary two specific gas flow paths, nor did claim 10 explain the spatial relationships between the tube groups and inlet(2)/outlet(10); and
- that the spatial relationships shown in figures 1 and 2 and described at page 7, line 5 to page 8, line 7 were **NOT** reflected in the wording of claim 10;
- that, as regards case (b), it appeared (i) that a particular arrangement of device features was needed to ensure condensation and removal of foreign substances (see page 7, line 20 to page 8, line 1) and (ii) that the gas deflection and recirculation was achieved by **lateral slots or openings in the second group of tubes** (page 4, lines 4-10);
- that such features were not recited in claim 10;
- that, thus, further features of the heat exchanger needed to be defined to ensure the sought-for gas flow and foreign substance removal to take place.

III. With its statement setting out the grounds of appeal (dated 13 November 2015), the Appellant contested the findings in the decision under appeal.
It *inter alia* argued that the subject-matter of claim 10 of the main request was novel over D1. Moreover, as to the clarity of independent claim 10 according to each of main request and auxiliary request I, it argued

- that it was admissible and in compliance with Article 84 EPC to define features in terms of their function, even where only one example of the feature was given in the description, provided that the skilled person would

appreciate that other means could be used for the same function; in the present case, the skilled person would have understood that there were different ways to design the heat exchanger in order to attain the functions indicated in its claim (page 4, last paragraph; page 5, second paragraph; page 6, last but one paragraph);
- that, for instance, the description (pages 3-4) and figures 1 and 2 described/showed various means to attain gas deflection and recirculation (page 6, last paragraph to page 7, second paragraph);
- that claim 10 clearly defined the functional features which the claimed device had to satisfy, and there was no doubt that in the light of common general knowledge the patent application provided more than adequate information to the skilled person on how said functional features could be performed (page 7, last paragraph);
- that claim 10 of auxiliary request I defined further device features aside from functional features (page 12, last paragraph).

The Appellant requested (then) that the decision under appeal be set aside and that a patent be granted
- on the basis of claims 1 to 17 according to the main request filed with the letter of 18 September 2013, or
- on the basis of claims 1 to 16 according to auxiliary request I filed at 11:06 during the oral proceedings of 11 December 2014, and re-submitted with letter dated 19 January 2015, or
- on the basis of claims 1 to 16 according to auxiliary request II filed at 11:06 during the oral proceedings of 11 December 2014, and re-submitted with letter dated 19 January 2015.

The Appellant also, auxiliarily, requested oral proceedings, if the main request could not be granted.

IV. The independent claims 1 and 10 according to the **main request** read as follows:

"*1. Method for purifying a foreign-substance-laden gas flow of the foreign substance, with the gas flow being conducted through a heat exchanger (1) and being placed in thermal contact with a cooling medium in order to freeze and/or condense the foreign substance out, characterized in that the purification takes place in only one tube heat exchanger (1), through the interior space (3) of which the gas flow is conducted from a first end region (4) to a second end region (5), and here is cooled by means of contact with a first group (6) of tubes which are traversed by the cooling medium, and in that the gas flow, in the second end region (5), is directly deflected again and is conducted back through the interior space (3) of the heat exchanger (1) to the first end region (4) through a second group (7) of tubes while undergoing an exchange of heat with the gas flow flowing into the interior space (3).*"

"*10. Device for purifying a foreign-substance-laden gas flow of the foreign substance, said device comprising:*

- *a substantially closed cooling medium circuit (25), and*
- *a heat exchanger (1) having:*
  - *an interior space (3),*
  - *a first end region (4) and a second end region (5),*
  - *at least two groups (6,7) of tubes which run through the interior space (3) from the first end region (4) to a second end region (5), said at*

least two groups comprising a first group (6) and a second group (7),

○ a gas flow inlet (2) at the first end region and a purified gas outlet (10),

characterized:

● in that the first group of tubes (6) is part of the cooling medium circuit (25),

● in that the purified gas outlet (10) is in the first end region (4), and

● in that the heat exchanger (1) is designed:

● so that a foreign-substance-laden gas flow entering the heat exchanger (1) via the gas flow inlet (2) traverses the interior space (3) from the first end region (4) to the second end region (5) while in contact with the first group of tubes (6), and

● so that thereafter the gas flow is recirculated from the second end region (5) to the purified gas outlet (10) in the first end region (4) through the second group of tubes (7)."

Auxiliary request I comprises an independent claim 1 identical to claim 1 of the main request and an independent claim 10, amended as follows (amendments with respect to claim 10 of the main request made apparent by the Board):

"*10. Device for purifying...said device comprising:*

...

a heat exchanger (1) having:

...

a first end region (4) ***with a first dome (18)*** *and a second end region (5)* ***with a second dome (19),***

...

characterized:

...

so that thereafter the gas flow is recirculated... through the second group of tubes (7), ***by means of a deflection (9), from the interior space (3) of the heat exchanger to that part of the dome (19) in which the second group (7) of tubes ends."***

Auxiliary request II comprises an independent claim 1 identical to claim 1 of the main request.

V. The Appellant was summoned to oral proceedings according to its request to this end.

VI. In its communication, dated 22 March 2018, issued in preparation for oral proceedings, the Board expressed its provisional opinion concerning the admissibility of the claim requests and the allowability of their pending claims.

In particular, the Board *inter alia* objected that independent claims 1 and 10 of the main request lacked clarity and/or support by the description (Article 84 EPC). Moreover, even though the subject-matter of claim 10 appeared to be novel over D1, it did not appear to be novel over D3 (EP 1 602 401 A1), acknowledged in the description of the present application as filed.
Moreover, auxiliary request I did not appear to be admissible (Article 12(4) RPBA), and its independent claims 1 to 10 still lacked clarity and/or support by the description (Article 84 EPC).
Furthermore, claim 1 of auxiliary request II, which was identical to claim 1 of the higher ranking requests, called the same objections raised against these higher ranking requests.

VII. In a letter dated 3 May 2018, in reply to the summons to oral proceedings, the Appellant stated:

"Our request for oral proceedings as an auxiliary request is herewith repealed and it is kindly requested to make a decision according to the file. We declare herewith that the applicant will not be represented in the oral proceedings already scheduled for June 6, 2018."

VIII. The Board cancelled the scheduled oral proceedings.

Reasons for the Decision

Main request

1. Device of Claim 10 - Clarity and support by the description (Article 84 EPC)

1.1 Claim 10 (full wording under IV, *supra*) concerns a device for purifying a gas flow. In particular, the device contains a heat exchanger (1) which is characterized also functionally, according to a mode of using it, as appearing from the wording of the following last three features of claim 10:
- "...the heat exchanger (1) is designed:
- so that a foreign-substance-laden gas flow entering the heat exchanger (1) via the gas flow inlet (2) traverses the interior space (3) from the first end region (4) to the second region (5) while in contact with the first group of tubes (6), and
- so that thereafter the gas flow is recirculated from the second end region (5) to the purified gas outlet (10) in the first end region (4) through the second group of tubes (7)".

1.2 As regards clarity, claim 10 is objectionable for the following reasons (detailed by the Board in its communication in preparation for oral proceedings, points 2.1.3 and 2.1.4):

1.2.1 "The second part of the functional characterization mentions a recirculation **without defining which structural means** of which apparatus comprised in the claimed device are present for suitably recirculating the gas flow through the so-called second group of tubes (7) from the second end region (5) to the outlet (10) in the first end region (4).

1.2.2 The only structural features implied by this passage appear to concern means (**not specified**) for recirculating the gas flow into the second group of tubes (7), **the structural features of which are however unclear**, as the claim does not even specify if these means, if any, are internal or external to the heat exchanger, or for example present as a separate circuit with further, not defined apparatuses.

1.2.3 On the other hand, this passage appears to imply a (**not further specified**) circuitry (positional) relationship between the second group of tubes (7) and the gas outlet (10) in the first end region (4). The position of the gas outlet (10) with respect to the second group of tubes (7) in the first end region (4) is thus unclear."

1.2.4 The Appellant did not reply to the objections raised in the Board's communication. The Board has no reason to depart from its preliminary opinion that claim 10 lacks clarity (Article 84 EPC).

1.2.5 Therefore, claim 10 lacks clarity (Article 84 EPC).

1.3 As to support by the description, Claim 10 is objectionable for the following reasons (already stated by the Board in its communication in preparation for oral proceedings, point 2.1.5):

1.3.1 "...the application (page 1, line 31; page 4, lines 1-10; page 7, lines 28-32; figures 1-3, reference symbol 9) appears to disclose the necessity of embodying a direct deflection (9) for the gas flow within the heat exchanger (dome partition or tube plate holes), thus even without any external piping connection between the external nozzles of the heat exchanger, hence means for reversing the direction of the circulation of the flow of gas without letting it pass, for example, in a second heat exchanger, or even through any e.g. blower.

1.3.2 Moreover, it seems essential (page 7, lines 22-34; figure 1) that the two groups of tubes (6) and (7) are positioned in separate parts of the heat exchanger so that they can be traversed separately by different media, namely, the group of tubes (6) by the cooling medium, which leaves the heat exchanger through the outlet (24), and the group of tubes (7) by the purified gas, which leaves the heat exchanger through the outlet (10), both outlets (24) and (10) being present in the dome (20) of the first end region (4) but in separate partitioned volumes thereof.

1.3.3 Furthermore, the heat exchanger appears to have to comprise an outflow for the condensate (page 5, lines 19-20 and page 8, lines 1-3; figures 2-3; reference symbol 11)."

1.3.4 The Appellant did not reply to the objections raised in the Board's communication. The Board has no reason to depart from its preliminary opinion that claim 10 lacks support by the description (Article 84 EPC).

1.3.5 Even if the Board were to come to admit, *arguendo* in favour of the Appellant, that the skilled person would have appreciated, as argued by the Appellant in its statement, that other means than those exemplified in the application can be used for serving the same function, and that there are different ways to design the claimed heat exchanger in order to fulfil the functions indicated in the claim, these alternative means/ways, as explained in points 1.2 and 1.3 above, **are not reflected in, nor derivable from the wording** of claim 10. Thus, Claim 10 does not define all of the structural elements of the claimed device and does not define all the essential structural features thereof.

1.3.6 Therefore, the device of Claim 10 lacks support by the description (Article 84 EPC).

2. Claim 1 - Clarity and support by the description (Article 84 EPC)

2.1 Claim 1 (full wording under IV, *supra*) concerns a method for purifying a gas flow from foreign substances.

2.1.1 In particular, the claimed method reads: "Method for purifying a foreign-substance-laden gas flow of the foreign substance, with the gas flow **being conducted through a heat exchanger (1)** and being placed in thermal contact with a cooling medium in order to freeze and/or condense the foreign substance out..., characterized in that **the purification takes place in**

only one tube heat exchanger (1)... through...which the gas flow... is cooled by means of contact with a first group (6) of tubes... is conducted back through ...a second group (7) of tubes..."

2.1.2 The method of claim 1 is objectionable for the following reasons (already raised by the Board in its communication in preparation for oral proceedings, points 2.2.1 and 2.2.2):

"The claim requires generically (lines 3-4) that the gas flow is placed in thermal contact with a cooling medium in order, i.e. with the goal, to freeze and/or condense the foreign substance out of the gas. However, the claim does not contain any process steps relating **explicitly** to the condensation of the foreign substance and to its separation from the gas flow, which appear to be essential features of the purification method of the present application (see, for example, page 1, lines 27-30; page 5, lines 19-23; page 6, lines 2-6; page 7, lines 7-9; page 7, line 34-page 8, line 3)."

Thus, the method of claim 1 does not contain all of its essential features, and is not supported by the description (Article 84 EPC).

2.1.3 Although the Board, in its communication (point 2.2.3), stated the following:

"As claim 1 mentions the presence of groups of tubes (6) and (7) in only one **tube** heat exchanger (1) without directly defining the kind of heat exchanger first mentioned in the claim "...t*he gas flow being conducted through a heat exchanger (1)*...", it appears that the first mentioned "heat exchanger" should be amended to

read "tube heat exchanger" in or for it to be clear and supported by the description.",

the Appellant did not reply to these concerns.

2.1.4 Consequently, the Board has no reason to depart from its preliminary opinion and maintains that claim 1 lacks clarity and support by the description (Article 84 EPC).

3. Novelty

3.1 The device defined in Claim 10 according to the Main Request is objectionable for lack of novelty for the following reasons (already stated in the Board's communication, points 3.2 and 3.3):

3.1.1 "D3 appears to disclose (figure 1; paragraphs [0027]-[0029]) a device comprising:
- a heat exchanger (20) with an interior space and two groups of tubes (19,11) which run from a first end region to a second end region of the interior space, the first group of tubes (19) being part of a substantially closed cooling medium circuit (13, 14, 15, 17, 18);
- a gas flow inlet (4) at the first end region and a gas outlet (12) also in the first end region;
- and means (5), (6), (7), (8), (10) for recirculating the gas (and thus inverting (deflecting) the gas flow within the heat exchanger (20)) through external piping and through the second group of tubes (11) from the second end region to the purified gas outlet (12)."

3.1.2 The Appellant has not replied to this objection.

3.1.3 In the absence of a reply to the novelty objection raised in its communication, the Board has no reason to depart from it preliminary opinion.

3.1.4 Therefore, the Board maintains that D3 discloses a device having all the features of claim 1 at issue, which thus lacks novelty (Articles 52(1) and 54 EPC).

4. In view of the above findings, the main request is not allowable.

Auxiliary request I

5. Admissibility (Article 12(4) RPBA)

5.1 Auxiliary request I is identical to Auxiliary Request I filed at 11:06 during the oral proceedings before the Examining Division.

5.2 This claim request was not admitted by the Examining Division under Rule 137(3) EPC, as the amendments to claim 10 were not found to be able to overcome the clarity deficiency under Article 84 EPC raised against claim 10 of the main request.

5.3 The Board finds in this respect that the Examining Division decision concerning the admissibility of late filed amendments and requests based thereon was correct.

It still appears that the amendments to claim 10 cannot overcome all the clarity deficiencies present in claim 10 of the main request.

5.4 In fact, as already noted in the Board's communication in preparation for oral proceedings (points 6.1 and 6.2):

5.4.1 "Claim 10 at issue differs from claim 10 of the main request insofar as it reads "...a first end region (4) **with a first dome (18)** and a second end region (5) **with a second dome (19)**,..."and "...so that the gas flow is recirculated..., **by means of a deflection (9), from the interior space (3) of the heat exchanger to that part of the dome (19) in which the second group (7) of tubes ends.**"

5.4.2 Even though claim 10 at issue requires additionally that "the gas flow is recirculated by means of a deflection (9) from the interior space (3) of the heat exchanger", it does not yet define how the end region (5) is constructed, let alone how the deflection (9) connects the mentioned parts, so that it is not clear how the sought-for function can be served as originally described.

5.4.3 Therefore, for the Board, the decision (point 5.3) that auxiliary request I did not appear to be admissible cannot be reverted.

5.5 As the Appellant did not reply in substance to the Board's objections expressed in its communication in respect of the claim request at issue, the Board has no reason to depart from its preliminary opinion.

5.6 The Board thus decides not to admit Auxiliary request I into the proceedings (Article 12(4) RPBA).

6. Auxiliary request II

6.1 As stated in the Board's communication in preparation for oral proceedings (point 8):

"...claim 1 according to auxiliary request II is identical to claim 1 of the higher ranking requests. Therefore, the deficiencies identified in points 2.2.1-2.2.3 above apply likewise."

6.2 As claim 1 at issue is identical to claim 1 of the main request, dealt with above, and as the Appellant did not reply to the objections raised in the Board's communication in this respect, the Board has no reason to depart from its preliminary opinion.

6.3 Therefore, claim 1 at issue lacks clarity and support by the description (Article 84 EPC).

7. Consequently, also Auxiliary Request II is not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Magliano G. Santavicca

Decision electronically authenticated