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Datasheet for the decision of 2 March 2022

Case Number: T 0185/20 - 3.3.05

Application Number: 11701536.2

Publication Number: 2526046

IPC: C01B3/50, C01B32/50, F25J3/06

Language of the proceedings: EN

Title of invention:
Separation of carbon dioxide from a synthesis gas

Patent Proprietor:
BP Technology Ventures Limited

Opponent:
L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE

Headword:
Separation of carbon dioxide/BP Technology

Relevant legal provisions:
EPC Art. 100(a)
RPBA 2020 Art. 12(8)

Keyword:
Grounds for opposition - lack of patentability (no)
Decision in written proceedings

Decisions cited:
G 0002/97

Catchword:

Europäisches Patentamt
European Patent Office
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Beschwerdekammern

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Case Number: T 0185/20 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 2 March 2022

Appellant: (Opponent)	L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE 75 Quai d'Orsay 75007 Paris (FR)
Representative:	Air Liquide L'Air Liquide S.A. Direction de la Propriété Intellectuelle 75, Quai d'Orsay 75321 Paris Cedex 07 (FR)
Respondent: (Patent Proprietor)	BP Technology Ventures Limited Chertsey Road Sunbury on Thames TW16 7BP (GB)
Representative:	CMS Cameron McKenna Nabarro Olswang LLP Cannon Place 78 Cannon Street London EC4N 6AF (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 22 November 2019 rejecting the opposition filed against European patent No. 2526046 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	G. Glod
	R. Winkelhofer

Summary of Facts and Submissions

I. The appellant's (opponent's) appeal lies from the opposition division's decision rejecting the opposition against European patent No. 2 526 046 B1.

Independent claims 1 and 14 as granted (current main request) read as follows:

"*1. A method of separating a carbon-dioxide-rich liquid stream from a synthesis gas including carbon dioxide and hydrogen, the method comprising the steps of:*
a) carrying out a first cooling step to cool a synthesis gas feed stream such that a first two-phase mixture is formed;
b) passing the first two-phase mixture at a first pressure and a first temperature to a first separator,
c) carrying out a first separation to separate the first mixture into a first CO_2-rich liquid stream and a H_2-rich vapour stream;
d) pressurizing the H_2-rich vapour stream;
e) carrying out a second cooling step to cool the H_2-rich vapour stream such that a second two-phase mixture is formed,
f) passing the second mixture at a second pressure and a second temperature to a second separator, the second pressure being higher than the first pressure;
g) carrying out a second separation to separate the second mixture into a second CO_2-rich liquid stream and a further H_2-rich vapour stream"

"*14. An apparatus for separating carbon-dioxide rich liquid stream from a synthesis gas according to a*

method of any of claims 1 to 13, the apparatus including
a) two separator stages each arranged for separating a cooled two-phase mixture into a CO2-rich liquid fraction and a H_2-rich vapour fraction, the second separator stage being arranged downstream of the first separator stage such that a H2-rich vapour fraction from the first separator stage is fed to the second separator stage;
b) a compressor arranged between the two separator stages such that the separation in the second separator stage is operated in use at a pressure higher than a pressure at which the separation in the first separator stage is carried out."

II. The following documents cited in the impugned decision are of relevance here:

D1: US 2006/0107691 A1
D2: JPH5 64722 A
D2b: Translation of D2 submitted on 8 June 2018 and labelled "for information purposes only"

III. The oral proceedings before the board scheduled for 5 May 2022 were cancelled on 19 January 2022. On 8 February 2022, both parties were informed that a decision could be given in written proceedings considering the requests on file.

IV. The appellant's arguments, as far as relevant to the present decision, are summarised as follows.

D1 anticipated the novelty of the subject-matter of claim 1. Figure 2 showed that the pressure in the phase separator 72 had to be higher than the pressure in the phase separator 16 in view of compressor 66.

D2 anticipated the novelty of the subject-matter of claim 14. The apparatus mentioned in D2 was suitable for separating carbon dioxide and hydrogen.

The subject-matter of claims 1 and 14 lacked an inventive step in view of D1. The second separator could only be operated at a higher, lower or equal pressure compared with the first separator. In view of the teaching of paragraph [0013] and the presence of compressor 66 in Figure 2, the higher pressure was most obvious.

The subject-matter of claim 14 lacked an inventive step in view of D2 since it was obvious to adapt the apparatus of D2 to hydrogen.

V. The respondent refuted these arguments.

VI. The appellant requests that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requests that the appeal be dismissed, alternatively that the patent be maintained in amended form on the basis of one of auxiliary requests 1 to 5 submitted with the reply to the appeal.

Reasons for the Decision

1. Procedural matters

The present decision is issued in writing in accordance with Article 12(8) RPBA 2020 with due consideration of the parties' rights pursuant to Articles 113 and 116 EPC.

The decision is based on the parties' submissions. The appellant did not request oral proceedings while the respondent's request was conditional. It would only have become effective if the board did not dismiss the appeal.

After an in-depth study of the case, the board saw that the decision could be issued in writing. Accordingly, the scheduled oral proceedings were cancelled.

The fact that oral proceedings were scheduled cannot raise any legitimate expectation of the appellant since the summons to oral proceedings is only a procedural act which does not provide any indication on the substance of the case. It is for organisational reasons that the summons is sent long in advance of the date set. The summons to oral proceedings does not indicate or imply that oral proceedings will definitely take place.

For convenience, the parties were additionally informed that a decision would be given without oral proceedings.

In view of the above considerations, there was no room for any further "warning" of the appellant of any kind

before the decision was handed down (see G 02/97, Reasons 4.2).

2. Article 100(a) EPC together with Article 54 EPC

The board sees no reason to deviate from the opposition division's conclusion.

2.1 The appellant has not provided any submission demonstrating why the opposition division's reasoning on page 5, last paragraph of the impugned decision relating to the possibility of expansion during degasification in phase separator 16 of D1 (paragraph [0009]) was erroneous. Therefore, the board agrees with the opposition division's conclusion that "*D1 does not disclose that the pressure remains unchanged between said inlet to the first separation stage (16) and the compressor (66)*" (Article 15(8) RPBA 2020). Consequently, it is not directly and unambiguously derivable that the pressure in the phase separator 72 is higher than in phase separator 16. D1 does not anticipate the novelty of the subject-matter of claim 1.

2.2 The opposition division also held that "*D2 does however not disclose any apparatus and more precisely any compressor suitable for pressurising a hydrogen-rich or even a hydrogen-containing vapour. The requirements for such a compressor (e.g. in terms of electrical requirements, resistance to corrosion, hydrogen embrittlement, leak tightness etc.) are different from those for an exhaust-gas compressor as disclosed in D2*". The appellant has not provided any reason why the opposition division's arguments were wrong. Nor can the board see any either. Therefore, D2 does not directly and unambiguously disclose a compressor for

pressurising a hydrogen-rich vapour fraction, and it does not anticipate the novelty of the subject-matter of claim 14.

3. Article 100(a) EPC together with Article 56 EPC

3.1 The invention defined in claim 1 relates to a method of separating a carbon-dioxide-rich liquid stream from a synthesis gas including carbon dioxide and hydrogen.

3.2 D1 is the closest prior art since it also relates to the separation of carbon dioxide and light components such as hydrogen (see for example paragraph [0007] of D1).

3.3 The problem to be solved according to the patent in suit is to provide a more energy efficient process (see paragraph [0014]).

3.4 Absent any evidence to the contrary, the problem is successfully solved by a process according to claim 1 characterised in that the second mixture is passed at a second pressure and a second temperature to a second separator with the second pressure being higher than the first pressure used in the first separator.

3.5 The board agrees with the opposition division (Reasons 3.1.3) that the problem proposed by the appellant is not in line with established case law (Case Law of the Boards of Appeal of the EPO, 9th edition, 2019, I.D. 4.3.1) since it includes a pointer to the solution.

3.6 Again, there is no reason to deviate from the opposition division's conclusion (Reasons 3.1.4, second paragraph) on the obviousness of the solution. D1 does not address the problem posed and does not provide a

pointer to the solution. The proposed solution is based on an inventive step.

3.7 As indicated by the appellant (page 4 of the statement of grounds, last sentence), the same arguments apply to claim 14.

3.8 Consequently, the subject-matter of claims 1 and 14 and claims 2 to 13 and 15, which directly or indirectly refer to claim 1 or 14, involves an inventive step in view of D1.

3.9 D2 is not an appropriate starting point since it does not deal with hydrogen. Therefore, the skilled person has no reason to change the setup of the apparatus so it can be used with hydrogen. This argument is based on an *ex post facto* analysis.

3.10 Consequently, the requirements of Article 56 EPC are also fulfilled.

4. Article 100(b) EPC

This ground is no longer raised by the appellant in their appeal (Article 12(3) RPBA 2020). Thus, there is no reason it should be dealt with in the appeal proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

C. Vodz E. Bendl

Decision electronically authenticated