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**Datasheet for the decision
of 17 September 2021**

Case Number: T 1857/19 - 3.3.05

Application Number: 15173873.9

Publication Number: 3108953

IPC: B01D53/047, B01D53/26

Language of the proceedings: EN

Title of invention:

METHOD AND APPARATUS FOR COMPRESSING AND DRYING A GAS

Applicant:

Ateliers François

Headword:

Compressor and PSA dryer/Ateliers François

Relevant legal provisions:

EPC Art. 123(2), 84

RPBA 2020 Art. 13(2), 11

Keyword:

Decisions cited:

T 2222/15, T 1480/16, T 1569/17, T 0995/18

Catchword:

Regarding the question under which circumstances the mere deletion of a category of claims is not to be considered an amendment of a party's appeal case or could - at least - be seen as exceptional circumstances under Article 13(2) RPBA 2020, see reasons 1.1



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Case Number: T 1857/19 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 17 September 2021

Appellant: Ateliers François
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 1 March 2019
refusing European patent application No.
15173873.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman P. Guntz
Members: S. Besselmann
J. Roider

Summary of Facts and Submissions

- I. The appeal in this case lies from the examining division's decision to refuse European patent application No. 15173873.9. The patent application concerns a method and an apparatus for compressing and drying a gas.
- II. The following documents are of relevance here:
D1 US 2014/190349 A1
D4 US 6,221,130 B1
D1 was cited in the impugned decision. D4 was acknowledged in the application (page 2, line 13).
- III. The examining division decided that the requirements of Article 84 EPC were not met because the claims did not contain all the features essential for defining the invention.
- IV. The applicant (now appellant) appealed against this decision, maintaining the set of claims of 17 April 2018 dealt with in the decision under appeal.
- V. The board issued a summons to oral proceedings, and issued a communication pursuant to Article 15(1) RPBA 2020. The board provisionally concurred with the examining division's finding that the independent claims did not contain all the features essential for defining the invention. It raised additional objections under Articles 123(2) and 84 EPC.
- VI. In reply (9 June 2021), the appellant maintained and resubmitted the claims of 17 April 2018 as the main

request and additionally filed three auxiliary requests.

It also provided a prior-art document relating to the pressure swing adsorption drying of compressed air.

D5 Carter J.W., Wyszynski M.L., "The Pressure Swing Adsorption Drying of Compressed Air", Chemical Engineering Science Vol. 38, No. 7, 1983, 1093-1099

VII. Oral proceedings were held on 17 September 2021. During the oral proceedings, the appellant filed a fourth auxiliary request, which was limited to the method claims of the first auxiliary request. At the end of the oral proceedings, the appellant maintained this fourth auxiliary request as the main and sole request and withdrew all the other requests.

VIII. The independent claim reads as follows:

"Method for compressing and drying a gas, comprising the steps of:

- compressing the gas in a multistage compressor (1) having at least three successive compressor stages (1a, 1b, 1c), a first stage gas inlet (4), a final stage gas outlet (6) delivering a final stage compressed gas, a first interstage portion (1ab) operating at a first intermediate pressure and a second interstage portion (1bc) operating at a second intermediate pressure which is greater than the first intermediate pressure,

- drying the final stage compressed gas by an adsorption method, said adsorption method comprising feeding the final stage compressed gas into a first chamber (10) comprising a first regenerable adsorbent (13), said first chamber delivering a dried gas at a dried gas outlet (40) for a user, and regenerating a

second regenerable adsorbent contained in a second chamber (20) by feeding said second chamber with a part of the dried gas from the dried gas outlet (40) and by venting the second chamber into at least one of the at least one interstage gas inlets of the multistage compressor, characterized in that the said adsorption method is a Pressure Swing Adsorption (PSA) method, and in that the step of venting the second chamber (20) comprises two sequential sub-steps: a first sub-step wherein the second chamber (20) is vented into a second interstage gas inlet (5b) of the second interstage portion (1bc), and a second sub-step wherein the second chamber (20) is vented into a first interstage gas inlet (5a) of the first interstage portion (1ab)."

Claims 2 and 3 relate to preferred embodiments.

IX. The appellant's arguments, where relevant to the decision, can be summarised as follows:

The independent claim contained all the features essential for solving the technical problem, which was to reduce noise, improve the energy efficiency and reduce the risk of entraining adsorbent when venting the second chamber of the PSA dryer in the context of compressing and drying a gas. Features which were not essential to solving this particular problem did not need to be mentioned in the claim. It was not always necessary to identify technical features or steps in detail. Features or steps for removing humidity if at all necessary were well known in the art (D1, Fig. 2: coolers 52 and knock out drums 54) and their presence in claim 1 was not required. The invention was not about providing a particularly dry gas. Moreover, the claim had to be interpreted with a "mind willing to

understand". An interpretation of the claim according to which residual moisture would indefinitely accumulate within the system without - at some point during the operation - being released outside the system would be technologically illogical, and therefore had to be excluded.

The appellant raised no objection to the case being remitted to the examining division, provided that the set of claims on file was fully and finally decided upon by the board regarding the issues under Articles 84 and 123(2) EPC.

- X. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the sole request on file, submitted during the oral proceedings as fourth auxiliary request, or that the case be remitted to the examining division for further prosecution.

Reasons for the Decision

- 1. Article 13(2) RPBA 2020
 - 1.1 The claims under consideration are the method claims of the former first auxiliary request of 9 June 2021, which was filed to address the objections under Article 123(2) EPC newly raised in the board's communication pursuant to Article 15(1) RPBA 2020; to be faced with new objections constitutes extraordinary circumstances in the sense of Article 13(2) RPBA 2020.

In comparison with this former first auxiliary request, all apparatus claims were deleted. The claims are thus limited to the method claims, i.e. to the claim

category which was the principal subject of the discussion. The circumstances of the case are therefore similar to those in T 1480/16, Reasons 2.3, and T 995/18, Reasons 2, in which the deletion of the claims did not change the factual and legal framework and was thus not considered an amendment to a party's appeal case.

This distinguishes the case from those underlying decisions T 2222/15 (Reasons 29 to 30) and T 1569/17 (Reasons 4.3.4), where the deletion of a claim category shifted the case substantially, thereby giving rise to new issues to be decided upon.

Even if the deletion of a claim category were always to be considered an amendment, the fact that it significantly enhances procedural economy by *clearly* overcoming existing objections without giving rise to any new issues could be seen as exceptional circumstances in the sense of Article 13(2) RPBA 2020.

The request is thus taken into account.

2. Article 123(2) EPC

- 2.1 Claim 1 has been limited to the subject-matter of claim 5 as originally filed, further specifying that drying is performed by an adsorption method which is a pressure swing adsorption (PSA) method as disclosed in the application as originally filed (page 4, line 7). The wording of the claim has been aligned with that of the originally-filed claims, thereby overcoming the board's objections under Article 123(2) EPC raised against the claims of 17 April 2018.

2.2 Claims 2 and 3 are based on claims 2 and 6 as originally filed. Their combination with claim 1 at issue (claim 5 as originally filed) may be taken from the back-references in the originally filed claims.

2.3 The requirements of Article 123(2) EPC are met.

3. Article 84 EPC

3.1 It was not under debate that all the features which are necessary to solve the technical problem with which the application is concerned need to be specified in the independent claim (see also Case Law of the Boards of Appeal of the EPO, 9th edition, 2019, II.A.3.2). In its decision, the examining division found that this requirement was met neither with regard to the general technical problem of drying a compressed gas, nor with regard to the more specific technical problem of reducing the risk of entraining adsorbent dust and that of damaging the adsorbent, and reducing noise.

3.2 *Drying a compressed gas*

3.2.1 The application is concerned with compressing and drying a gas (page 3, lines 15-20). It aims at improving prior-art methods for drying a compressed gas, acknowledged in general terms in the application, for instance pressure swing adsorption (PSA) drying. It is taught that the PSA method is used in a new and specific way, namely by venting the regeneration gas into one or several interstages of the multistage compressor instead of into the atmosphere, so that the compressed gas used to this end is not wasted into the atmosphere (page 4, first full paragraph; page 8, first paragraph; page 16, last sentence).

This is reflected in the method steps specified in claim 1.

3.2.2 Venting the second (i.e. the regeneration) chamber into interstage gas inlets of the multistage compressor implies that the entire amount of humidity desorbed from the second chamber is reintroduced into the system instead of being vented into the atmosphere, as observed by the examining division. According to the impugned decision, it would have been necessary to specify in the claim, as an essential feature of the invention, how this humidity was eventually removed from the system. Otherwise, production of dried gas would no longer be possible. The examining division acknowledged that water might condense, but considered that water separators were not standard in multistage compressors. It held that condensed water would therefore be entrained and transported into the first (adsorption) chamber of the PSA dryer.

3.2.3 However, it is implicit in the claim that the final-stage compressed gas fed into the first (adsorption) chamber does not contain condensed liquid water. Moreover, the board agrees with the appellant that an interpretation of the claim according to which residual moisture would indefinitely accumulate within the system without - at some point during the operation - being released outside the system would be technologically illogical.

Dealing with humidity and ultimately condensation in a multistage compressor is a normal measure for the skilled person, in particular when aiming at high compressed gas pressures as is the case here (page 1, first paragraph and claim 3). As argued by the

appellant, suitable means for removing condensate are generally known. For instance, interstage coolers and water separators are employed in the prior-art process of D1, albeit not in conjunction with each compressor stage (Figures 2 and 3 of D1). D1 was cited as the closest prior art by the examining division during the examination proceedings and will need to be mentioned in the description. Document D4, already acknowledged in the application, also discloses a multistage compressor in which interstage coolers and water separators are employed (figures).

3.2.4 Reintroducing the humidity from the second (regeneration) chamber of the PSA dryer into the multistage compressor is merely one of the factors affecting the humidity and thus the amount of condensate that may need to be removed in the multistage compression process. This amount also depends on, for instance, the humidity content of the inlet gas and the pressure and the temperature of the gas delivered by the final stage of the compressor.

3.2.5 The need to implement measures for removing yet more humidity or condensate does not go beyond the usual design of a multistage compression process. In the circumstances of this case, it is therefore not necessary to specify such measures as essential features in the claim.

3.3 *Specific technical problems*

3.3.1 According to another aspect of the impugned decision, which concerned differently-worded claims than those under consideration here, essential features were also lacking insofar the technical problem was to reduce the

risk of entraining adsorbent dust and of damaging the adsorbent, and to reduce noise.

- 3.3.2 According to the application, these technical problems are addressed by the two sub-steps defined in the characterizing portion of the claim (see paragraph bridging pages 10-11). In the first sub-step, the second chamber is vented into a second interstage gas inlet of the second interstage portion. In a second sub-step, it is vented into a first interstage gas inlet of the first interstage portion.
- 3.3.3 The wording under consideration here ("venting") implies that the second chamber is at about the same pressure as the second interstage portion in the first sub-step, and at about the same pressure as the first interstage portion in the second sub-step. As specified in the claim, the second interstage portion is at a greater pressure than the first interstage portion, the latter being at a greater pressure than the uncompressed gas.
- 3.3.4 Even if the pressure or pressure difference is not defined in absolute values, the sub-steps indicated thus have the consequence that the pressure difference in the second chamber is smaller than in the case of venting it into the atmosphere (to uncompressed gas pressure). It is also smaller than in the case of venting it into the first interstage portion only. This smaller pressure difference is taught as reducing the risk of entraining adsorbent and/or of damaging the adsorbent, and as reducing the noise.
- 3.3.5 Claim 1 therefore also contains all the features which are taught as being essential for solving the specific technical problem of reducing the risk of entraining

adsorbent and/or that of damaging the adsorbent, and reducing the noise.

3.4 In conclusion, the requirements of Article 84 EPC are met.

4. Remittal

4.1 Even though the requirements of Article 123(2) EPC and 84 EPC are met, examination of the other requirements of the EPC, in particular those pursuant to Articles 54 and 56 EPC, is needed. These were not dealt with in the impugned decision. In view of the primary object of the appeal proceedings, which is to review the decision under appeal in a judicial manner (Article 12(2) RPBA 2020), the circumstances of this case qualify as a special reason for remittal within the meaning of Article 11 RPBA 2020.

The appellant raised no objection to the case being remitted.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division for further prosecution on the basis of the sole request submitted as fourth auxiliary request during the oral proceedings.

The Registrar:

The Chairman:



C. Vodz

P. Guntz

Decision electronically authenticated