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Datasheet for the decision of 21 February 2025

Case Number: T 1402/23 - 3.3.05

Application Number: 14807741.5

Publication Number: 3003535

IPC: B01D53/26

Language of the proceedings: EN

Title of invention:
SYSTEM AND METHOD FOR DRYING COMPRESSED GAS

Patent Proprietor:
Ingersoll-Rand Industrial U.S., Inc.

Opponent:
Atlas Copco Airpower N.V.

Headword:
DRYING COMPRESSED GAS/Ingersoll-Rand Industrial

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 12(4), 13(2)

Keyword:

Inventive step - (no)
Amendment to case - amendment overcomes objection (no)
Amendment after notification of Art. 15(1) RPBA communication - exceptional circumstances (no)

Decisions cited:

G 0002/10, T 2843/19, T 0823/96, T 0002/83

Catchword:

Europäisches Patentamt
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Case Number: T 1402/23 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 21 February 2025

Appellant: (Opponent)	Atlas Copco Airpower N.V. Boomsesteenweg 957 2610 Antwerpen-Wilrijk (BE)
Representative:	Nederlandsch Octrooibureau P.O. Box 29720 2502 LS The Hague (NL)
Respondent: (Patent Proprietor)	Ingersoll-Rand Industrial U.S., Inc. 800-A Beaty St. Davidson, NC 28036 (US)
Representative:	Murgitroyd & Company 165-169 Scotland Street Glasgow G5 8PL (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 23 May 2023 rejecting the opposition filed against European patent No. 3003535 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	J. Roider
	R. Winkelhofer

Summary of Facts and Submissions

I. The appeal lies from the opposition division's decision to reject the opposition against the European patent EP 3 003 535 B1.

II. The following documents, which were already cited in the opposition proceedings, are relevant here:

D4 Dale Oesterling, Van Air Systems, *Heat of Compression Dryers Operating Cost*, 25 June 2012

D5 ZEKS Compressed Air Solutions – Eclipse Heat-Of-Compression Air Dryers, four pages, 2012

III. Independent claims 1 and 12 and dependent claims 7 and 8 of the main request in the appeal proceedings (patent as granted) read as follows, with the independent claims having feature numbers indicated in the left-hand column:

F.1.1 *"1. A gas compressing system (10) comprising:*
F.1.2 *a compressor (20) operable to provide a flow of compressed gas and water vapor (25);*
F.1.3 *a first desiccant tower (35A) including a first quantity of desiccant (65);*
F.1.4 *a second desiccant tower (35B) separate from the first desiccant tower (35A) and including a second quantity of desiccant (65);*
F.1.5 *a first moisture separator (40A);*
F.1.6 *a second moisture separator (40B) separate from the first moisture separator (40A);*
F.1.7 *a dry gas outlet;*

F.1.8 *a first set of no more than three valves (50) each movable between an open position and a closed position; and*

F.1.9 *a second set of no more than three valves (50) each movable between an open position and a closed position,*

F.1.10 *wherein the flow of compressed gas and water vapor (25) flows along a flow path in order from the compressor (20) to the first desiccant tower (35A), to the first moisture separator (40A), to the second desiccant tower (35B) and out the dry gas outlet when each of the valves (50) of the first set of valves is open and each valve (50) of the second set of valves is closed, and*

F.1.11 *wherein the flow of compressed gas and water vapor (25) flows in order from the compressor (20) to the second desiccant tower (35B), to the second moisture separator (40B), to the first desiccant tower (35A) and out the dry gas outlet when each of the valves (50) of the first set of valves is closed and each valve (50) of the second set of valves is opened."*

"7. The gas compressing system (10) of claim 1, wherein the first set of valves includes three and only three valves (50) and the second set of valves includes three and only three valves (50)."

"8. The gas compressing system (10) of claim 1, further comprising an additional valve (50) and a heater (80) positioned within the flow path between the compressor (20) and the first desiccant tower (35A), wherein the heater (80) is operable to heat the flow of

compressed gas and water vapor (25) when the additional valve (50) is open."

F.12.1 *"12. A method of providing dry compressed gas at a dry gas outlet, the method comprising:*

F.12.2 *providing a first desiccant tower (35A) and a second desiccant tower (35B), each tower including an inlet (55) and an outlet (60);*

F.12.3 *operating a compressor (20) to compress a quantity of gas to produce a flow of compressed gas and water vapor (25) at a high temperature;*

F.12.4 *passing the flow of compressed gas and water vapor (25) along a flow path through the first desiccant tower (35A) from the outlet (60) to the inlet (55) to cool the flow of compressed gas and water vapor (25);*

F.12.5 *regenerating desiccant (65) in the first desiccant tower (35A) as the flow of compressed gas and water vapor (25) passes there through;*

F.12.6 *passing the flow of compressed gas and water vapor (25) through the second desiccant tower (35B) from the inlet to the outlet, the desiccant (65) in the second desiccant tower (35B) adsorbing a portion of the water vapor (25) from the flow of compressed gas and water vapor (25);*

F.12.7 *directing the flow of compressed gas and water vapor (25) from the outlet (60) of the second desiccant tower (35B) to the dry gas outlet;*

F.12.8 *periodically transitioning a first group of no more than three valves (50) from an open position to a closed position and*

F.12.9 *a second group of no more than three valves (50) from a closed position to an open position to redirect the flow of compressed gas and*

water vapor (25) from the compressor to the outlet (60) of the second desiccant tower (35B) to regenerate desiccant (65) in the second desiccant tower (35B), from the inlet (55) of the second desiccant tower (35B) to the inlet (55) of the first desiccant tower (35A) to remove a portion of the water vapor (25) from the flow of compressed gas and water vapor (25), and from the outlet (60) of the first desiccant tower to the dry gas outlet."

IV. Claim 1 of auxiliary requests 1 and 2 has been amended to replace the feature "*no more than three valves*" with "*three and only three valves*" in all instances.

V. For claims 1 and 10 of auxiliary request 3, claims 1 and 12 as granted have likewise been amended to replace the feature "*no more than three valves*" with "*three and only three valves*" in all instances.
They also contain the following additions at their end.

The addition at the end of claim 1 reads:

"and wherein the system further comprises an additional valve (50) and a heater (80) positioned within the flow path between the compressor (20) and the first desiccant tower (35A), wherein the heater (80) is operable to heat the flow of compressed gas and water vapor (25) when the additional valve (50) is open."

The addition at the end of claim 10 reads:

"wherein the method further comprises the steps of: positioning an additional valve (50) and a heater (80) within the flow path between the compressor (20) and the first desiccant tower (35A); and heating the flow

of compressed gas and water vapor (25) with the heater (80) when the additional valve (50) is open."

VI. The appellant (opponent) argued that the subject-matter of the main request was not inventive starting from D4, in view of the common general knowledge (Article 56 EPC).

The auxiliary requests should not be admitted because they were not substantiated and constituted an amendment to the case (Article 12(3) and (5) RPBA). Moreover, auxiliary request 3 *prima facie* did not meet the requirements of Article 123(2) EPC, Article 83 EPC and Article 84 EPC. The subject-matter of auxiliary request 3 also lacked an inventive step.

The appellant further argued that its submissions after the board's communication under Article 15(1) RPBA should be admitted and considered in the proceedings. In particular, the case had been reallocated to a new patent attorney within the patent law firm representing the appellant. Since the copy of the respondent's reply as served on the appellant by the board did not have a time limit on it, no date had been included in the system monitoring the time limits.
The state of the case therefore was not transmitted in full in the course of the reallocation. The appellant only became aware of the mistake when the communication under Article 15(1) RPBA was received.

The appellant also argued that the case should be remitted to the opposition division because the division had not admitted D5, which had been filed in combination with the offer of a witness for establishing the position of the valves.
It was also appropriate to remit the case in order for

auxiliary request 3 to be assessed.

VII. The patent proprietor (respondent) essentially argued that the patent met the requirements of the EPC.

VIII. Substantive requests

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

The respondent requests that the appeal be dismissed or, in the alternative, that the patent be maintained on the basis of one of auxiliary requests 1 to 5, submitted with the reply to the appeal.

Reasons for the Decision

1. Main request

1.1 Novelty, Article 54(1) and (2) EPC

As apparent from the assessment under Article 56 EPC and the reasons given (see below), the requirements of Article 54(1) and (2) EPC are fulfilled.

1.2 Inventive step, Article 56 EPC

The patent in suit is directed to a compressed-air dryer that uses the heat of compression (HOC) to dry the compressed gas.

1.2.1 Document D4, cited by the appellant as a starting point for an inventive step objection, is suitable for this purpose as it also relates to HOC dryers for drying

compressed air.

1.2.2 The technical problem the patent aims to solve is to reduce complexity and also the associated pressure drop in the gas compressing system (reply to the appeal, page 9, lines 19-21).

1.2.3 It is proposed to solve this technical problem with the features of claim 1, which differs from D4 on account of two sets of no more than three valves, each movable from an open position to a closed position so that the mode of operation shown in the figure of D4 on page 2 is switched to the mirrored one.

Contrary to the respondent's view, the subject-matter of claim 1 does not differ from D4 on account of all the elements included in features F1.8-F1.11.
In the figure on page 2, D4 shows the gas flow path starting from the air compressor in red, changing to orange and finally to blue at the HOC dryer outlet.
The whole concept of HOC dryers is based on periodic switching between mirrored flow paths.
The skilled person knows that the HOC system also has the mirrored flow path to alternate between the dryers' drying and regeneration modes.
Thus, contrary to the respondent's view, the flow path and the mirrored flow path of the air to be dried are disclosed both explicitly and implicitly in D4 (see features F1.10 and F1.11).

In this context, the appellant argued that a skilled person would have recognised the need to switch between the modes of operation in D4 and could only have concluded that two sets of three valves with an open and a closed position could be used for that purpose.

This is not persuasive either.

The term "implicit disclosure" relates solely to matter which is not explicitly mentioned but which is a clear and unambiguous consequence of what is explicitly mentioned (T 823/96, reasons 4.5).

Direct and unambiguous disclosure must also be distinguished from the question of what may be rendered obvious by the disclosure in the light of the common general knowledge (ibid.). Only the criteria of the gold standard summarised in point 4.5 of G 2/10 are to be considered.

Neither the figure on page 2 of D4 nor the corresponding text indicates the position of any valve.

Although it seems that the process can be implemented with a minimum of two sets of three valves each having an open position and a closed position, there is no direct and unambiguous disclosure that this is actually implied in D4.

1.2.4 By minimising the number of valves, the technical problem is solved.

1.2.5 Obviousness

D4 shows a process diagram, which does not disclose the valves required for its implementation.
Moreover, D4 discloses that a significant disadvantage of HOC systems is the increased pressure drop (D4, page 2, third paragraph).

Knowing that valves cause an additional pressure drop, the skilled person has an incentive to minimise the

number of them.

The only task required of the skilled person is to appropriately position the minimum number of valves to enable switching between these two flow paths.

In doing so, they would consider six appropriately positioned valves, each having an open and a closed position, to solve the technical problem.

The patent does not disclose any embodiments with fewer than six valves each having an open and a closed position, nor have any been exemplified by the respondent, and nor are any apparent.
Therefore, the number of six valves (two sets of three valves each having one open and one closed position) is the absolute minimum number of required valves each having an open and a closed position.

An inventive step is thus not apparent.

The respondent argued, to the contrary, that D4 did not provide any details about either gas flow path or valve placements. Moreover, there were a number of reasons for the pressure drop, such as the increased piping length and the passage through two beds, when compared with a traditional heated dryer. It had been shown that the skilled person needed 15 steps in order to arrive at the claimed subject-matter.

This is not persuasive either.

As already discussed above, the flow paths are disclosed in D4.

Moreover, the increased piping length and the passage

through two beds are an inherent feature of HOC dryers when compared with a traditional heated dryer and are therefore an accepted drawback of that drying concept.

Claim 1 of the request at issue does not define the position of the valves. This implies that the skilled person is able to achieve the result defined by the subject-matter of claim 1 without any inventive activity.
Nothing else needs to be done to achieve the subject-matter of claim 1 when starting from D4. T 2/83, which was cited by the respondent and deals with unrecognised problems, is therefore not pertinent. The need to switch from one flow configuration to the other is not an unrecognised problem in D4.

Contrary to the respondent's assertion, no hindsight consideration is apparent.

2. Auxiliary requests 1 and 2, Article 12(4) RPBA

The subject-matter of claim 1 of these requests was amended by replacing the feature "*no more than three valves*" with "*three and only three valves*".
The auxiliary requests filed during the opposition proceedings did not contain this amendment.

Auxiliary requests 1 and 2 therefore constitute an amendment within the meaning of Article 12(4) RPBA and may only be admitted and considered at the board's discretion. In exercising such discretion, the board takes into account, *inter alia*, the suitability of the amendment to address the issues which led to the decision under appeal.

It is immediately apparent that claim 1 of auxiliary requests 1 and 2 suffers from the same deficiency under Article 56 EPC as claim 1 of the main request.

The respondent argued, to the contrary, that three and only three valves was the optimum. This was not just to ensure the lowest possible pressure drop, but it was also an optimum number from the perspective of control and responsiveness.

This is not convincing.

The respondent is invoking an effect allegedly provided by the specific number of valves, in support of the presence of an inventive step.
However, this argument fails simply because there is nothing in the application as filed to suggest that three and only three valves was an optimum number from the perspective of control and responsiveness (see Case Law of the Boards of Appeal, 10th edition, 2022, I.D. 4.4.3(a)).

Auxiliary requests 1 and 2 therefore could not be admitted into the proceedings (Article 12(4) RPBA).

3. Auxiliary request 3

3.1 Admission of auxiliary request 3, Article 12(3) and (5) RPBA

3.1.1 The appellant argued that the amendments were not sufficiently substantiated, in particular as to where the inventive step lay.

However, point 9.1 of the reply to the appeal states

the basis for the amendments.

Point 9.2 further states that two sets of exactly three valves along with an additional valve and heater are not disclosed or suggested in the cited prior-art documents.

In the absence of any objection by the appellant against the patentability of the additional valve and the heater in the case at issue, the indication that the valve and heater are not disclosed or suggested in the cited prior-art documents constitutes sufficient reasoning concerning patentability.

Moreover, point 41 of the statement of grounds of appeal sets out the appellant's view that the patent in suit was only sufficiently disclosed if the first and second sets of valves contained three and only three valves.

It is therefore immediately apparent that the appellant considers that the amendments in the independent claims of auxiliary request 3 overcome the objection under Article 83 EPC as raised in the statement of grounds of appeal.

In the case in hand, the reasons given for the amendments are therefore sufficient.

3.1.2 The amendments are also suitable to address the issues which led to the decision under appeal.

As set out in the previous point and confirmed by the appellant in the course of the proceedings, the amendment in auxiliary request 3 overcomes the objection raised by the appellant under Article 100(b)

EPC in its statement of grounds of appeal.

The considerations under Article 56 EPC regarding the main request *prima facie* do not apply to auxiliary request 3 because it has been amended so as to include an additional valve and a heater according to dependent claim 8 as granted. Dependent claim 8 as granted was, however, not objected to under Article 56 EPC in the statement of grounds of appeal.

Unlike auxiliary requests 1 and 2, the amendment is therefore *prima facie* suitable to address the issues which led to the decision under appeal.

3.1.3 The appellant further argued that the amendment *prima facie* introduced a lack of clarity (Article 84 EPC), led to a new aspect of insufficient disclosure (Article 83 EPC) and did not meet the requirements of Article 123(2) EPC. While the independent claims required exactly two sets of three valves, an additional valve was associated with the heater. This rendered the claims unclear and left the skilled person at a loss as to how to implement these conflicting requirements. Moreover, dependent claims 7 and 8 as granted were separate specific embodiments, dependent only on claim 1. Including both of them infringed Article 123(2) EPC.

However, the amendment does not give rise to these new objections.

As argued by the respondent, the two sets of three valves must be suitable for switching between the flow configurations. The additional valve is associated with the heater and thus has a completely different function. The two sets of three valves and the

additional valve are therefore different entities with different functions which do not interfere.
No lack of clarity or lack of sufficiency of disclosure is apparent.

The amendments originate from dependent claims 7 (three and only three valves) and 8 (additional valve and heater) of the application as filed, which also correspond to claims 7 and 8 of the patent as granted. Furthermore, some of the dependent claims were deleted and the remaining claims renumbered.

Although claims 7 and 8 are formally dependent on claim 1 only, as emphasised by the respondent, they relate to different aspects and functions of the HOC dryer. They merely individually restrict claim 1.
The skilled person is not presented with new technical information by a system comprising the features of both claim 7 and claim 8.

3.1.4 Auxiliary request 3 was therefore to be considered.

3.2 Admission of objections by the appellant, Article 13(2) RPBA

Auxiliary request 3 was filed with the reply to the appeal on 16 February 2024. Article 15(1) RPBA in the version in force since 1 January 2024 stipulates that the board must issue the communication no earlier than one month after the receipt of the written reply to the appeal. This provision is meant to leave a minimum amount of time for the appellant to respond to the respondent's reply to the appeal.

However, the appellant did not submit any observations

against auxiliary request 3 or against dependent claims 7 and 8 of the patent as granted before the communication under Article 15(1) EPC was issued.

It was only after the notification of the communication under Article 15(1) RPBA that the appellant submitted arguments against auxiliary request 3.

These arguments are an amendment to the case, which is to be assessed under Article 13(2) RPBA and requires, in particular, exceptional circumstances in order to be taken into account.

No such exceptional circumstances are apparent, however.

Failing to transfer all the data when reallocating the case to a new patent attorney within the same patent law firm, as invoked by the appellant, does not qualify as exceptional circumstances. It is noteworthy that the error was only discovered at the time of notification of the communication under Article 15(1) RPBA, not by a satisfactory system for monitoring time limits in the eight months between the submission of the respondent's reply to the appeal and the notification of the communication under Article 15(1) RPBA (see the case law on re-establishment of rights in that context; Case Law of the Boards of Appeal, 10th edition, 2022, III.E 5.4).

The new objections against auxiliary request 3 therefore could not be admitted into the proceedings.

3.3 Remittal

The appellant's request for remittal was related to hearing a witness to establish the position of the valves in view of D5 (statement of grounds of appeal, paragraphs 73 and 74).

Since the subject-matter of claim 1 of the main request is not inventive because the skilled person can establish the position of the valves (see above), and the appellant did not raise any objections against auxiliary request 3 in time, there is no scope for remittal.

As for the other objections against Article 13(2) RPBA discussed above, no exceptional circumstances are apparent.

The requests to admit D5 and to remit the case to the opposition division therefore cannot be granted.

3.4 *Prima facie*, none of the objections against auxiliary request 3 were validly raised or are convincing.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of auxiliary request 3 submitted with the reply to the appeal, and the description to be adapted.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated