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**Datasheet for the decision
of 20 February 2020**

Case Number: T 1012/16 - 3.3.02

Application Number: 09764573.3

Publication Number: 2488285

IPC: B01D61/06, B01D61/10

Language of the proceedings: EN

Title of invention:
OPTIMIZED WORK EXCHANGER SYSTEM

Patent Proprietor:
AQUALYNG AS

Opponent:
Wagner & Geyer Partnerschaft

Headword:

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - (yes)
Inventive step - all requests (no)

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1012/16 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 20 February 2020

Appellant: Wagner & Geyer Partnerschaft
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80538 München (DE)

Respondent: AQUALYNG AS
(Patent Proprietor) Lyng Industrial Park
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 20 January 2016
rejecting the opposition filed against European
patent No. 2488285 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman M. O. Müller
Members: M. Maremonti
L. Bühler

Summary of Facts and Submissions

I. The appeal by the opponent (hereinafter "appellant") lies from the decision of the opposition division to reject the opposition against European patent No. 2 488 285.

II. The contested patent in its granted form contains 13 claims, independent claim 1 of which reads as follows:

"1. An optimized work exchanger system without a physical barrier between the fluids, the system comprised of:

at least two vertical vessels each enclosing at least two fluids of different salinities in direct contact but separated by a mixing interface comprised of the two fluids;

at least one tank;

at least one valve to control the flow of fluids in and out of the vessels;

for each vessel, two pairs of multiple-orifice distribution plates each comprising a first multiple-orifice distribution plate and a second multiple-orifice distribution plate, wherein said distribution plates within a pair are offset so that the orifices of one distribution plate are not aligned with the orifices of the other distribution plate, and wherein the pairs of distribution plates are located at opposite ends of a vessel."

Claims 2 to 12 define specific embodiments of the system of claim 1, while claim 13 defines a method of making an optimised work exchanger system.

III. The following document was among those cited during the opposition proceedings:

O1: English translation of JP 1978-124178 A

The opposition division came to the following conclusions:

- The grounds for opposition under Article 100(a), (b) and (c) EPC did not prejudice the maintenance of the patent as granted.
- In particular, the subject-matter of claim 1 as granted involved an inventive step in view of O1 taken as the closest prior art.

IV. In its statement of grounds of appeal, the appellant contested the reasoning of the opposition division and maintained, *inter alia*, that the claimed subject-matter was not novel over document O1 or at least not inventive in view of O1 taken as the closest prior art.

V. In its reply to the statement of grounds of appeal, the patent proprietor (hereinafter "respondent") rebutted the views of the appellant and submitted that none of the grounds for opposition under Article 100 EPC prejudiced the maintenance of the contested patent as granted.

VI. The parties were summoned to oral proceedings in accordance with their respective requests.

In preparation for the oral proceedings, the board issued a communication in which it expressed its preliminary opinion on relevant issues of the case.

VII. Oral proceedings before the board were held on 20 February 2020, during which the respondent filed a

set of claims to be considered as its third auxiliary request.

VIII. The parties' requests

The appellant requested that the appealed decision be set aside and the patent be revoked.

It also requested that the third auxiliary request, filed by the appellant during the oral proceedings before the board, not be admitted.

The respondent requested that the appeal be dismissed.

Alternatively, it requested that the decision under appeal be set aside and that the patent be maintained on the basis of either the first or the second auxiliary request, filed by letter dated 30 October 2015, or of the third auxiliary request, filed during the oral proceedings on 20 February 2020.

During the oral proceedings, the respondent also requested that the appellant's inventive-step objection, raised during the oral proceedings and based on document O1 in combination with the common general knowledge of the skilled person, not be admitted.

As regards this request, the board did not base its decision on this inventive-step objection of the appellant. Therefore, a decision on the admittance of this objection was not needed.

IX. The arguments of the appellant, where relevant to the present decision, may be summarised as follows.

Claim 1 of the third auxiliary request - novelty:

- Document O1 disclosed a work exchanger system comprising all the features of claim 1 at issue.

- In particular, figure 2 clearly showed two pairs of multiple-orifice distribution plates located at opposite ends of a vessel. An inspection of figure 2, in particular an enlarged view of it as submitted during the oral proceedings before the board, clearly revealed that the distribution plates within each pair were offset in the sense that the orifices of one distribution plate were not aligned with the orifices of the other distribution plate.
- It had to be concluded that the subject-matter of claim 1 was anticipated by O1.

Claim 1 of the third auxiliary request - inventive step:

- Even if the subject-matter of claim 1 differed from O1 in that the distribution plates within each pair located at opposite ends of the vessel were offset, no technical effect was linked to this distinguishing feature.
- The effect put forward by the appellant, i.e. that a stable mixing interface was created which was free to move undisturbed between the two pairs of multiple-orifice distribution plates, was not tenable. In fact, no indication was provided in the contested patent that such an effect derived from the offset position of the distribution plates within the defined pairs. Moreover, claim 1 did not exclude that additional multiple-orifice distribution plates were present within each vessel. Indeed, such an embodiment was even defined in claim 3 of the third auxiliary request, wherein additional pairs of plates were claimed which did not even need to be offset.

- Without any technical effect, it would have been an obvious design alternative for the skilled person to provide the distribution plates within a pair in some kind of offset arrangement so that the orifices of one distribution plate were not aligned with the orifices of the other distribution plate. In particular, there were only two options: either the orifices were aligned or the orifices were not aligned.
- It had to be concluded that no inventive step derived from the claimed arrangement of the distribution plates.

X. The arguments of the respondent, where relevant to the present decision, may be summarised as follows.

Claim 1 of the third auxiliary request - novelty:

- Figure 2 of O1 was extremely schematic. No conclusion could be drawn about the alignment of the orifices within the pairs of distribution plates located at opposite ends of the vessel.
- Therefore, it had to be concluded that the subject-matter of claim 1 was novel over O1.

Claim 1 of the third auxiliary request - inventive step:

- The feature distinguishing the subject-matter of claim 1 from O1 was that the distribution plates within each pair located at opposite ends of the vessel were offset so that within a pair the orifices of one distribution plate were not aligned with the orifices of the other distribution plate.

- This distinguishing feature improved the functioning of the work exchanger. In particular, it promoted the creation of a stable mixing interface, or "virtual septum", which was free to move undisturbed between the two pairs of multiple-orifice distribution plates located at opposite ends of the vessel. This also applied to the embodiment defined in claim 3.
- In contrast, in the arrangement of figure 2 of O1, the fluids had to repeatedly pass through numerous multiple-orifice plates distributed regularly along the length of the vessel. This inevitably disturbed the fluids and prevented a stable mixing interface from forming. This also resulted in reduced efficiency.
- The technical problem should thus be formulated according to this technical effect.
- There was no suggestion in O1 that a stable mixing interface might be desirable. There was also no suggestion in O1 to alter the arrangement of plates disclosed in figure 2 so as to arrive at the claimed invention.
- It had to be concluded that the subject-matter of claim 1 at issue involved an inventive step.

Reasons for the Decision

Third auxiliary request - claim 1

1. During the oral proceedings before the board, the respondent filed a third auxiliary request. Claim 1 according to this request reads as follows, with the

amendments compared to claim 1 as granted (II, *supra*) highlighted by the board:

"1. An optimized work exchanger system **that operates** without a physical barrier between the fluids, the system comprised of:

~~at least two vertical vessels each enclosing at least two fluids of different salinities~~ **wherein the two fluids are a solute and a concentrate and wherein the two fluids are in direct contact but separated by a virtual septum that is a mixing interface zone** comprised of the two fluids;

at least one tank;

at least one valve to control the flow of **each of the fluids in and out of each of the vessels**;

for each vessel, two pairs of multiple-orifice distribution plates each comprising a first multiple-orifice distribution plate and a second multiple-orifice distribution plate, wherein said distribution plates within a pair are offset so that the orifices of one distribution plate are not aligned with the orifices of the other distribution plate, and wherein the pairs of distribution plates are located at opposite ends of a vessel."

2. The appellant requested that this third auxiliary request not be admitted.

The board decided to admit the third auxiliary request into the proceedings. However, since it was found not to be allowable (see *infra*), the reasoning leading to its admittance does not need to be included in the present decision.

Third auxiliary request - claim 1 - novelty under Article 54 EPC

3. The appellant (IX *supra*) objected to the novelty of claim 1 of the third auxiliary request in view of document O1. In particular, figure 2 of O1 showed that the distribution plates within each pair located at opposite ends of the vessel were offset in the sense that the orifices of one distribution plate were not aligned with the orifices of the other distribution plate.
- 3.1 The board disagrees. Figure 2 of O1 (page 395) shows an exemplary vessel used within the work exchanger system depicted in figure 1 of O1 (page 394). The figure shows several multiple-orifice distribution plates (20) disposed along the vessel. In particular, *pairs* of such plates are located at opposite ends of the vessel. This was not disputed by the respondent.
- 3.2 However, the board considers figure 2 to be highly schematic, in particular regarding the position of the orifices depicted in the figure. In fact, O1 does not refer in its disclosure to the position of the orifices within the plates, but merely identifies these as "*multiple-orifice plates*" (page 391, right column).
- 3.3 Therefore, the board concludes that from figure 2 of O1, it cannot be directly and unambiguously concluded that the multiple-orifice distribution plates of the pairs located at opposite ends of the vessel are "*offset so that the orifices of one distribution plate are not aligned with the orifices of the other distribution plate*" as required by claim 1 at issue.
- 3.4 As a consequence, the subject-matter of claim 1 of the third auxiliary request is novel over the disclosure of O1 (Article 54 EPC).

Third auxiliary request - claim 1 - inventive step under Article 56 EPC

4. The closest prior art

4.1 Both parties indicated document O1 as representing the closest prior art for the subject-matter of claim 1 at issue. In view of the issues addressed in O1 and the work exchanger system disclosed there, the board sees no reason to take a different stance.

4.2 In fact, O1 discloses (figure 1 on page 394 and its description from page 389 to page 391) a work exchanger system, comprising two vertical vessels, which operates in the same way as the system shown in figure 1 of the contested patent (paragraphs [0011] to [0014] and [0067] to [0075]). Several valves control the flow of the fluids in and out of the vessels. In order for such a system to work, it is necessary to keep the two fluids within each vessel separated, i.e. to minimise the mixing between the fluids. However, given the nature of the fluids involved, namely raw salt water and concentrate (pages 388 and 389 of O1), some mixing at the interface between the two fluids is unavoidable in the absence of any physical barrier. This was not disputed by the respondent.

As mentioned under 3.1 above, O1 further shows in figure 2 (page 395) two pairs of multiple-orifice distribution plates (20) located at opposite ends of an exemplary vessel used in the system shown in figure 1.

4.3 Thus, the board regards document O1 as a suitable starting point for the assessment of inventive step.

5. The technical problem
- 5.1 The respondent confirmed at the oral proceedings that the sole feature distinguishing the subject-matter of claim 1 at issue from the work exchanger system of O1 was that the distribution plates within each of the pairs located at opposite ends of the vessel were offset so that the orifices of one distribution plate were not aligned with the orifices of the other distribution plate.
- 5.2 The respondent put forward that the technical effect of this distinguishing feature was an improved work exchanger system which allowed the creation of a stable mixing interface, or "virtual septum", which was free to move undisturbed between the two pairs of multiple-orifice distribution plates located at opposite ends of the vessel. The technical problem had to be formulated according to this technical effect.
- 5.3 The board disagrees for the following reasons.
 - 5.3.1 Asked at the oral proceedings, the respondent could not indicate any passage of the contested patent in which the technical effect put forward would be disclosed to be associated to the above-mentioned distinguishing feature.
 - 5.3.2 The contested patent (paragraphs [0026] and [0043]) instead teaches that the multiple-orifice distribution plates direct and distribute fluids evenly over the cross-sectional area of the work exchanger pressure vessel and facilitate the formation of a virtual septum, i.e. the mixing interface between the fluids. Therefore, the formation of the mixing interface is disclosed in the contested patent as being due to the multiple-orifice distribution plates *as such*, and not to the claimed requirement that pairs of plates at

opposite ends of the vessel are offset within the meaning of claim 1 at issue. In fact, such pairs of offset plates at opposite ends of the vessel are shown in figures 3 and 4, but no technical effect is described in the contested patent as being associated to the particular plate arrangement shown in these figures.

- 5.3.3 The respondent argued (*X supra*) that in the arrangement of figure 2 of O1, the fluids had to repeatedly pass through numerous multiple-orifice plates distributed along the length of the vessel. This inevitably disturbed the fluids and prevented the formation of a stable mixing interface.

However, the presence of additional multiple-orifice plates located along the vessel is not excluded by the wording of claim 1. Rather, the presence of additional plates is even described in paragraph [0061] of the contested patent and claimed in claim 3 of the third auxiliary request.

- 5.3.4 The board thus concludes that the technical effect of the sole distinguishing feature put forward by the respondent (5.2 *supra*) is not derivable from the teaching of the contested patent. Nor has it been proven by the respondent by means of additional evidence.

- 5.4 In the absence of any technical effect, the objective technical problem starting from the system of O1 has to be formulated as the mere provision of a further work exchanger system.

6. Obviousness of the claimed solution

6.1 The solution to the above-mentioned technical problem defined in claim 1 is that the multiple-orifice distribution plates of the pairs located at opposite ends of the vessel of 01 are *"offset so that the orifices of one distribution plate are not aligned with the orifices of the other distribution plate"*.

6.2 For the reasons set out above, this arrangement of the plates is not linked to any technical effect; it therefore has to be regarded as an arbitrary choice among equivalent possibilities that the skilled person would consider in 01, according to the circumstances, when seeking a solution to the posed technical problem. This arbitrary choice cannot form the basis for an inventive step over the disclosure of the closest prior art.

6.3 The board thus concludes that the subject-matter of claim 1 of the third auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

Higher ranking requests - claim 1 - inventive step under Article 56 EPC

7. The subject-matter of claim 1 of the patent as granted (wording under II, *supra*, main request), and of claim 1 of each of the first and second auxiliary requests, is broader than the subject-matter of claim 1 of the third auxiliary request.

It follows that the same reasoning leading to the conclusion of lack of inventive step of the subject-matter of claim 1 of the third auxiliary request also applies to claim 1 as granted and to claim 1 of each of the first and second auxiliary requests. This

conclusion was not disputed by the respondent at the oral proceedings.

The board thus concludes that the subject-matter of claim 1 as granted, and of claim 1 of each of the first and second auxiliary requests, does not involve an inventive step within the meaning of Article 56 EPC either.

Conclusion

8. None of the respondent's requests is allowable under Article 56 EPC.

Order

For these reasons it is decided that:

1. The appealed decision is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



N. Maslin

M. O. Müller

Decision electronically authenticated