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**Datasheet for the decision
of 16 May 2007**

Case Number: T 1020/02 - 3.3.06

Application Number: 97306167.4

Publication Number: 0824034

IPC: B01D 53/22

Language of the proceedings: EN

Title of invention:
Vapor permeation system

Applicant:
BEND RESEARCH, INC.

Opponent:

-

Headword:
Vapor permeation/BEND RESEARCH

Relevant legal provisions:
EPC Art. 54, 111(1)

Keyword:
"Novelty: main request (no), first auxiliary request (yes)"

Decisions cited:

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Catchword:

-



Case Number: T 1020/02 - 3.3.06

DECISION
of the Technical Board of Appeal 3.3.06
of 16 May 2007

Appellant:

BEND RESEARCH, INC.
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Representative:

Hill, Richard
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Decision under appeal:

**Decision of the Examining Division of the
European Patent Office posted 21 May 2002
refusing European application No. 97306167.4
pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P.-P. Bracke
Members: G. Dischinger-Höppler
J. Van Moer

Summary of Facts and Submissions

I. This appeal is from the decision of the Examining Division to refuse the European patent application No. 97 306 167.4. The decision under appeal was based on the claims as filed containing two independent process Claims 1 and 20. Claim 1 reads:

"1. A process for the removal of a first vapor from a fluid feed stream containing a mixture of vapors, said process comprising the steps:

- (a) providing a membrane having feed and permeate sides and that is selectively permeable to said first vapor;
- (b) directing said fluid feed stream to the feed side of said membrane and withdrawing a retentate stream depleted in said first vapor and withdrawing a permeate stream enriched in said first vapor from the permeate side of said membrane; and
- (c) directing a gas-phase fluid sweep stream to the permeate side of said membrane, said sweep stream flowing countercurrent to the flow of said fluid feed stream, wherein the partial pressure of said first vapor in said sweep stream is sufficiently low that the ratio of the partial pressure of said first vapor in said sweep stream to the partial pressure of said first vapor in said retentate stream is less than 0.9."

Claim 20, while worded as a second independent process claim differs from Claim 1 essentially in that it refers to a specific embodiment already enshrined within the ambit of Claim 1. It reads

"20. A process for the removal of water vapor from a gas-phase feed stream containing a mixture comprising water and organic vapors, wherein said organic vapors comprise predominantly organic compounds with boiling points greater than 0°C but less than 200°C, and wherein the feed stream has a condensation temperature of greater than 40°C at 1 atmosphere and said feed stream is maintained at a temperature greater than said condensation temperature, and wherein the pressure of said feed stream is greater than 0 bar (gage) and less than 10 bar (gage), said process comprising the steps:

- (a) providing a hollow fiber module having a feed and retentate ends and feed and retentate ports and at least two permeate ports, said hollow fiber module comprising a plurality of hollow fiber membranes arranged substantially parallel to each other and sealed into a chamber, said hollow fiber membranes comprising a selective layer on a support layer;
- (b) directing said gas-phase feed stream to the feed port of said hollow fiber module, withdrawing a retentate stream depleted in water vapor from said retentate port, and withdrawing a permeate stream enriched in water vapor from a permeate port located near the feed end of said module; and

(c) directing a gas-phase fluid sweep stream to a permeate port located near the retentate end of said module, said sweep stream flowing countercurrent to the flow of said gas-phase feed stream, wherein the partial pressure of water vapor in said sweep stream is sufficiently low that the ratio of the partial pressure of water vapor in said sweep stream to the partial pressure of water vapor in said retentate stream is less than 0.9."

II. In its decision, the Examining Division held that the subject-matter of Claim 1 was not novel over the disclosure of

D1 JP-A-5 177 111 (filed by a third party together with an English translation of the Japanese text).

The Examining Division, in particular, held that the only feature in dispute between the Applicant and the third party, namely the operation in counter-current flow mode of a hollow fibre membrane module, was clearly and unambiguously disclosed in the figures of D1.

III. With its statement of grounds of appeal filed under cover of a letter dated 19 September 2002, the Applicant, now Appellant filed amended sets of claims in two auxiliary requests (sets A and B), provided arguments in support of its opinion that the contested decision was wrong and requested that oral proceedings be scheduled in case the Board was minded to take the

view that the subject-matter claimed in the main request was not novel over the disclosure of D1.

It was argued that the figures of D1 did not clearly and unambiguously disclose that the gas-phase fluid sweep stream was directed to the permeate side of the membrane and flows counter-current to the flow of the fluid feed stream as necessitated by Claims 1 and 20 of the main request (i.e. claims as filed).

The Appellant further argued that the description of D1 was silent with respect to the issue of a counter-current flow and the translation relied on by the third party was inaccurate in the assertion that according to D1 the sweep stream was run "simultaneously" with or "at the same time" as the feed stream. Reference in this regard was made to a declaration from Mr Steve Vlasta Vitek, a technical translator.

- IV. In a communication dated 8 December 2006 and annexed to the summons for oral proceedings held on 16 May 2007, the Board gave reasons for its preliminary opinion that the subject-matter of Claims 1 and 20 of the main request was anticipated by the disclosure of D1.

In particular, the Board indicated that it appeared from the file that the only question in relation to novelty of the subject-matter of Claims 1 and 20 of the main request is whether there is a direct and unambiguous disclosure in D1 that the sweep stream is flowing counter-current to the flow of the feed stream.

Concerning this question, it appeared from the file that there is a dispute between the Applicant

(Appellant) and the third party in relation to the correct English translation of the original Japanese text.

The Board further indicated

- that it identified in Figures 1 and 2 of D1 a separation membrane module (4) illustrated as a hollow-fibre bundle within a reactor having a feed inlet port (a), a carrier gas feed port (b), a permeate (= water vapour) discharge port (c) and a retentate (= product) discharge port (d);
- that the hollow fibres appeared to be sealed within the reactor at (13) so that the interior of the individual fibres provides an open passage from port (a) to port (d) as a first space within the reactor and that a second space is formed between the fibres separated from the first space by the fibre walls (membranes) to provide an open passage from port (b) to port (c);
- that it appeared from this arrangement that the feed stream and the permeate stream are necessarily flowing counter-currently to each other;
- that it seemed also necessary that the carrier gas is flowing in the same direction as the permeate stream, hence counter-currently to the feed stream since, as indicated in the figures, the carrier gas is fed into the space where the permeate stream is flowing; and
- that this interpretation of the figures appeared to be corroborated by the description of D1, where it is

stated that the carrier gas is fed to the permeation side of the membrane to allow the carrier gas to flow on the permeation side of the membrane (page 13, paragraph [0015]).

The Board further indicated that the initial version of the English translation of D1 filed by the third party seemed not in contradiction to the above interpretation of the figures since according to this version the carrier gas is fed "concurrently" to the permeation side of the membrane which appeared to have the meaning that carrier gas and permeate are flowing in the same direction, hence co-currently to each other.

Since, further, the carrier gas in the figures of D1 appeared to be equivalent to the sweep stream according to Claims 1 and 20, the Board concluded that the subject-matter of Claims 1 and 20 seemed to be anticipated by D1 (Article 54 EPC).

Concerning the auxiliary requests, the Appellant was requested to indicate in the application as filed the basis for the amendments made and the reasons why, in the Appellant's opinion, the objections made in the decision under appeal were overcome by the amendments.

- V. Under cover of a letter dated 8 February 2007, the Appellant filed two further amended sets of claims, one to replace the previous second auxiliary request (set B), the other as a new third auxiliary request (set C) while maintaining the claims as originally filed as the main request and re-filing the claims of set A as the first auxiliary request.

Claim 1 of the first auxiliary request (set A) differs from that of the main request in that in step (a) the term " a membrane" has been replaced by "a hollow fiber composite membrane comprising a crosslinked polyamide selective layer on a support layer, said membrane".

Claim 20 of the first auxiliary request differs in essence from that of the main request by introducing in step (a) the term "composite" between "of hollow fiber" and "membranes arranged" and the term "crosslinked polyamide" between "said hollow fiber membranes comprising a" and "selective layer on a support layer;".

Further, the Appellant explained why, in its opinion, the auxiliary requests met the requirements of Articles 123(2) and 54 EPC.

- VI. The Appellant requested in writing that the decision under appeal be set aside and that the case be remitted to the first instance for further prosecution on the basis of the claims as filed as the main request or, alternatively, on the basis of the claims filed with the letter dated 8 February 2007 in the first (Set A), second (Set B) or third (Set C) auxiliary request.
- VII. Under cover of a letter dated 1 May 2007, the Appellant informed the Board that it would not attend the oral proceedings.
- VIII. At the end of the oral proceedings held in the absence of the Appellant, the Board gave its decision.

Reasons for the Decision

1. *Main Request*

1.1 In the communication dated 8 December 2006, the Board indicated the reasons why it held that the subject-matter of Claims 1 and 20 of the main request was not novel over the disclosure of D1.

1.2 The Appellant did not reply in substance to these objections or attend the requested oral proceedings which were scheduled for and held on 16 May 2007. Since there was no attempt by the Appellant to refute the objections raised in the above communication, the Board has no reasons to depart from its preliminary opinion expressed in said communication with regard to the main request.

1.3 Having regard to the above, the Board concludes that the subject-matter of Claims 1 and 20 according to the Appellant's main requests is not novel as required by Article 52(1) EPC in combination with Article 54 EPC.

2. *First auxiliary request*

Claims 1 and 20 of the first auxiliary request differ from those of the main request in essence by defining the membrane provided in step (a) as a hollow fiber composite membrane comprising a **crosslinked polyamide** selective layer on a support layer (point V above).

The membrane used in D1 is either made from an aromatic polyimide alone or is a composite separation membrane produced by forming a thin film of aromatic polyimide

on the surface of a porous material (e.g. pages 15 to 16, paragraph [0020]). The composition of the porous material is not disclosed in D1.

The Board concludes, therefore, that D1 does not disclose a membrane comprising a crosslinked polyamide selective layer on a support layer.

Consequently, the subject-matter claimed in the main request is found to be novel over the prior art disclosed in D1.

3. *Remittal*

The application in suit was refused solely on the ground of lack of novelty of the subject-matter claimed in the main request in view of D1. Whether the subject-matter of the claims of the first auxiliary request is novel over other pieces of prior art and whether the application with the amended claims meets the other requirements of the EPC, in particular those of Articles 123(2) and 56 EPC, has not yet been established.

Since it is the function of appeal proceedings to give a judicial decision upon the correctness of a separate earlier decision taken by a first-instance department (see Case Law of the Boards of Appeal, 5th ed. 2006, VII.D.1), the Board finds it appropriate to make use of its power under Article 111(1) EPC and remits the case to the first instance for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution on the basis of the claims according to the first auxiliary request.

The Registrar:



G. Rauh

The Chairman:



P.-P. Bracke