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**Datasheet for the decision
of 28 February 2012**

Case Number: T 0426/10 - 3.3.05

Application Number: 98904447.4

Publication Number: 968050

IPC: B01J 3/00

Language of the proceedings: EN

Title of invention:

Multiautoclave for combinatorial synthesis of zeolites and other materials

Patent Proprietor:

SINVENT A/S

Opponent:

Symyx Technologies, Inc.

Headword:

Multiautoclave II/SINVENT

Relevant legal provisions:

EPC Art. 52(1), 56

Keyword:

"Inventive step (yes): device not suggested by prior art"

Decisions cited:

T 1158/04

Catchword:

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Case Number: T 0426/10 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 28 February 2012

Appellant: SINVENT A/S
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 23 December 2009
revoking European patent No. 968050 pursuant to
Article 101(3)(b) EPC.

Composition of the Board:

Chairman: G. Rath
Members: B. Czech
C. Vallet

Summary of Facts and Submissions

I. The appeal is from the decision of the opposition division posted 23 December 2009 revoking European patent No. 0 968 050.

II. Independent claim 1 of the patent as granted reads as follows:

"1. A multiautoclave reactor vessel for use at elevated pressures comprising:

a central block (2) having a plurality of perforations (1), wherein said perforations are through-going perforations,

a cover means (7a,7b) on both sides of said central block (2), operatively associated with a sealing means (3a, 3b, 4, 5), for engagement with said central block to seal the open ends of said perforations forming a multitude of chambers,

a sealing means (3a, 3b, 4, 5), operatively associated with the covers means (7a,7b), to form a pressure tight seal when said cover means (7a, 7b) is brought into position by a locking means (11, 12), and

locking means (11,12) acting in concert with the cover means (7a, 7b) to engage the sealing means (3a, 3b, 4, 5) so as to define a plurality of reaction chambers."

III. In the opposition proceedings, the opponent relied inter alia on the following prior art documents:

D1: US 5 342 581 A;

D6: US 5 282 543 A;

D7: US 4 728 502 A;

D9: WO 98/07026 A1; and

D11: US 5 716 584 A.

- IV. Substantiated objections were raised by the opponent under Article 100(a) EPC, alleging lack of novelty or at least lack of inventive step.
- V. In its first decision posted 4 August 2004, the opposition division found that, taking into account the general knowledge as illustrated e.g. by D6, the subject-matter of claim 1 lacked novelty over the disclosure of document D1, in particular since it was "impossible to recognise a difference between the broadly claimed multiautoclave according to claim 1 of the opposed patent and the multi-well plate according to Fig.10 of D1".
- VI. This decision was appealed by the patent proprietor. In decision T 1158/04 of 5 June 2007 handed down by the present board in a different composition, it was decided that none of the prior art documents that the opponent considered to be novelty-destroying for the subject-matter of claim 1 as granted, i.e. *inter alia* documents D1, D6, D7 and D9, disclosed a multiautoclave according to claim 1 as granted. The board remitted the case to the opposition division for further prosecution.
- VII. The opposition proceedings were continued. Upon a corresponding invitation by the opposition division, the opponent submitted (with its letter of 10 July 2008) that the subject-matter of claim 1 was not inventive in

- view of the teaching of document D1 taken alone, of document D9 taken alone, or of a the combined teachings of documents D1 and D6.
- VIII. In the decision under appeal, the opposition division found that the subject-matter of claim 1 as granted was obvious in view of document D1 taken alone, and that the amended claims according to the three auxiliary requests then on file did not meet the requirements of Article 123(2) EPC. Moreover, the opposition division held that multiautoclaves as claimed having "bolts" as "fasteners" were obvious in view of document D1 in combination with document D7 or document D11.
- IX. Under cover of its statement of grounds of appeal dated 30 April 2010, the appellant filed four sets of amended claims as auxiliary requests 1 to 4. It argued in essence that the skilled person would not consider document D1 at all when addressing the problem of increasing the efficiency of autoclave processes. The independent claims 1 according to the auxiliary requests comprised additional features further delimiting the claimed subject-matter from the cited prior art.
- X. The respondent did not file a reply to the statement of grounds of appeal.
- XI. In a communication issued in preparation for the oral proceedings, the board questioned whether document D1 was actually to be considered to represent the closest prior art, rather than the autoclaves mentioned in the description. In a further communication, the board drew the parties' attention to certain parts of a document

cited in the description and referred to in a letter of the opponent of 28 April 2004, namely document D20: WO 96/11878 A1.

XII. Oral proceedings took place on 28 February 2012, in the absence of the respondent, who had previously announced that it would not be represented.

At the oral proceedings, the appellant essentially argued that starting from the closest prior art as acknowledged in paragraph [0006] of the patent in suit, the technical problem consisted in increasing the efficiency in the running of autoclave processes. The previously used autoclaves were bulky, expensive and cumbersome to scale up. The claimed multiautoclave enabled filling, heating and pressurising many reaction vessels in a single device of simple construction. Although an improvement in efficiency was something always sought by the skilled person, nobody had thought of taking the route according to the invention. A multiautoclave as claimed was not suggested by the prior art including documents D1, D7, D8, D9 and D11. The skilled person could only arrive at a device as claimed with the benefit of hindsight considerations.

XIII. The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, in the alternative, that the patent be maintained on the basis of the claims according to one of the first to fourth auxiliary requests filed under cover of the statement of grounds of appeal dated 30 April 2010.

The respondent requested in writing that the appeal be dismissed.

Reasons for the Decision

Main request

1. Added subject-matter

The board is satisfied that the claims as granted are not objectionable under Article 100(c). This was no longer in dispute after the opposition division's first decision.

2. Novelty

In decision T 1158/04, the board decided that the subject-matter of claim 1 as granted was novel over the disclosures of the documents invoked as novelty-destroying by the opponent, including D1, D6, D7 and D9.

2.1 No other novelty objection was raised by the opponent after said decision was handed down. The board is satisfied that none of documents D11 (see point 3.6.4 below) and D20 (see point 3.6.2 below), which were not considered in decision T 1158/04, anticipates a "*multiautoclave*" according to present claim 1. Since this was not in dispute, a detailed reasoning need not be given.

2.2 The subject-matter of claims 1 to 16 is thus novel (Articles 52(1) and 54(1)(2) EPC).

3. Inventive step

3.1 The invention

The invention is concerned with an apparatus for simultaneously carrying out multiple reactions at elevated pressures, i.e. a multiautoclave reactor vessel.

3.2 The closest prior art

3.2.1 For the board, the closest prior art, acknowledged in paragraph [0006] of the description of the patent in suit, consists in a multitude of conventional, i.e. distinct, autoclave reactor vessels, which may each be filled with different reaction mixtures and placed in an oven so as to perform a multitude of reactions under pressure simultaneously.

3.2.2 The respondent considered the device according to Figure 10 of D1, comprising multiple reaction vessels, to represent the closest prior art. The board does not accept this view since D1 neither discloses an autoclave reactor vessel for use at elevated pressures (see decision T 1158/04, point 1.4 of the reasons) nor addresses problems associated with carrying out reactions under elevated pressures.

3.3 The technical problem

Starting out from the closest prior art identified under point 3.2.1 above, the technical problem can be seen in providing a device permitting a large number of chemical reactions, to be carried out at elevated

pressures within a relatively short time, such as combinatorial zeolite syntheses for screening purposes. Reference is made to page 2, lines 43 to 44, and page 3, and page 3, lines 52 to 54 of the patent in suit.

3.4 The solution

As a solution to the said technical problem, the patent in suit proposes the multiautoclave reactor vessel according to claim 1, which is characterised in that it comprises

a central block (2) having a plurality of perforations (1), wherein said perforations are through-going perforations,

a cover means (7a,7b) on both sides of said central block (2), operatively associated with a sealing means (3a, 3b, 4, 5), for engagement with said central block to seal the open ends of said perforations forming a multitude of chambers,

a sealing means (3a, 3b, 4, 5), operatively associated with the covers means (7a,7b), to form a pressure tight seal when said cover means (7a, 7b) is brought into position by a locking means (11, 12), and

locking means (11,12) acting in concert with the cover means (7a, 7b) to engage the sealing means (3a, 3b, 4, 5) so as to define a plurality of reaction chambers."

3.5 Success of the solution

The proposed solution undisputedly solves the stated technical problem. More particularly, the claimed multiautoclave permits carrying out a plurality of reactions in parallel in a device of relatively simple construction, requiring only small amounts of reagents,

easy to clean, easy to scale up as required, not requiring complicated locking mechanisms, and lending itself to automation (see paragraphs [0006], [0010] and [0012]).

3.6 Non-obviousness of the solution

3.6.1 It remains to be decided whether the claimed solution is obvious in view of the cited prior art invoked by the opponent and the opposition division.

3.6.2 Document D20 is also concerned with devices for combinatorial syntheses of *inter alia* inorganic materials, such as zeolites, for subsequent screening. In D20, it is envisaged to carry out hydrothermal syntheses at temperatures up to 400°C and to pressurise the array of small reaction regions on a substrate under a gaseous atmosphere (page 4, lines 20 to 28; page 20, lines 2 to 11; page 47, line 33, to page 48, line 5). Example F (pages 70 to 72) describes the synthesis of an array of zeolites, the substrate used comprising 16 wells of 1 cm x 1 cm x 2cm. The reactants are supplied using an automated pipette and the substrate is thereafter placed in a "sealed container" having a temperature of about 100°C.

D20, as pointed out in the patent in suit on page 3, lines 5 to 9, does not expressly describe an autoclave system for performing syntheses under elevated pressure. For the board, considering the approach adopted in example F of D20, this document orients the skilled person in a direction which does not lead to a "multiautoclave" in the sense of claim 1. Example F of D20 mentions placing the multi-well substrate in a

"sealed container" at an elevated temperature. Hence, the concept is to seal the container, rather than the individual wells in the substrate. Moreover, although document D20 teaches the isolation of reaction regions by appropriate design of the substrate (see e.g. page 20, first paragraph), the specific embodiment described in example F does not foresee closing the individual wells so as to permit the formation of different atmospheres in the individual wells during the syntheses reactions. So, D20 does not give a hint to the technical solution proposed by the patent in suit.

- 3.6.3 Document D1 does not disclose a multiautoclave in the sense of claim 1. Moreover, it does not address autoclave reactions at elevated pressures (see decision T 1158/04, point 1.4 of the reasons).

For the board, the skilled person thus had no motivation to consider this particular document at all. Moreover, document D1 contains nothing that could prompt the skilled person to design a multiautoclave having a structure as shown in Figure 10 of D1.

- 3.6.4 Documents D7 and D11 were referred to by the opposition division in arguing that bolts were known fastening means that had previously been used in apparatuses operating at high pressure or temperature, respectively.

D7 discloses an apparatus for carrying out chemical syntheses of oligonucleotides, inter alia "at high fluid pressures" (column 3, lines 3 to 5), comprising a compressed stack of superimposed plates or discs 15 to 26, which plates are rotatable relative to one another

before carrying out a synthesis (see decision T 1158/04, point 3.3.1 of the reasons).

However, even assuming the for the sake of argument that the stack of individually rotatable plates 15 to 26 of the apparatus shown in the figures of D7 can be considered as a central block with through-going perforations, there is no disclosure in this document of sealing (in the sense of present claim 1) the respective open ends of the fluid passages extending through the central stack of plates (see decision T 1158/04, points 2.1 and 3.3.2 of the reasons).

Document D11 discloses a device for the synthesis of compounds in an array, optionally at temperatures of up to 150°C (see the abstract).

However, document D11 does not address carrying out reactions under elevated pressure and does not even implicitly require seals withstanding elevated pressures.

Hence, none of the documents D7 and D11 suggests providing a "multiautoclave" with all the features of claim 1.

3.6.5 The opponent also considered that the claimed subject-matter was obvious in view of document D9 taken alone.

D9 relates to a device for investigating catalytic chemical reactions, optionally under elevated temperature or pressure, comprising a multitude of miniaturised reactors arranged in parallel (see decision T 1158/04, reasons point 3.5.1).

However, the apparatus disclosed in document D9 differs in several constructional aspects, identified in decision T 1158/04 (point 3.5.2 of the reasons), from a "*multiautoclave*" according to present claim 1 as construed by the board. Inter alia, the reactor chambers are of a flow through type and hence not sealed (closed) at their open ends in the sense of claim 1. Moreover, D9 does not disclose means that could be assimilated to the locking and sealing means of instant claim 1. D9 does not suggest modifications that would lead to a "*multiautoclave*" as defined in claim 1.

- 3.6.6 Document D6 was merely referred to by the opponent because it mentioned "autoclavable" materials, i.e. materials suitable for being used as seal materials in autoclaves.

The actual apparatus disclosed in document D6 also differs in several constructional aspects, identified in decision T 1158/04 (point 3.2.2 of the reasons), from a "*multiautoclave*" according to present claim 1. In particular, the apparatus disclosed in D6 does not comprise sealing means, operatively associated with the covers means, to form a pressure tight seal when said cover means is brought into position by a locking means, whereby both open ends of perforations through a central block are closed. Document D6 does not suggest modifications that would lead to a "*multiautoclave*" as defined in claim 1.

- 3.6.7 The board is thus not convinced that having regard to the state of the art, the claimed subject-matter is obvious to a person skilled in the art. The subject-

matter of claim 1 and, consequently, of claims 2 to 16 dependent thereon, involves an inventive step (Articles 52(1) and 56 EPC).

4. Hence, the appellant's main request is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is maintained as granted.

The Registrar

The Chairman

C. Vodz

G. Raths