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**Datasheet for the decision  
of 4 December 2017**

**Case Number:** T 0356/10 - 3.3.05

**Application Number:** 98119173.7

**Publication Number:** 0908226

**IPC:** B01D59/04, B01J19/32

**Language of the proceedings:** EN

**Title of invention:**

Process and apparatus for separation of stable isotope compound

**Patent Proprietor:**

Taiyo Nippon Sanso Corporation

**Opponents:**

SULZER Chemtech AG  
Cambridge Isotope Laboratories, Inc.

**Headword:**

Distillation process/TAIYO NIPPON SANZO CORP.

**Relevant legal provisions:**

EPC Art. 84

**Keyword:**

Claims - clarity after amendment (no) - clarity in opposition  
appeal proceedings

**Decisions cited:**

T 0656/07, G 0003/14

**Catchword:**



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Case Number: T 0356/10 - 3.3.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.05**  
**of 4 December 2017**

**Appellant:** Cambridge Isotope Laboratories, Inc.  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
22 December 2009 concerning maintenance of the  
European Patent No. 0908226 in amended form.

**Composition of the Board:**

**Chairman**            E. Bendl  
**Members:**            H. Engl  
                             P. Guntz

## Summary of Facts and Submissions

I. The present appeal, filed by opponent 2 (henceforth: the appellant), lies from the interlocutory decision of the opposition division to maintain European patent No. 0 908 226 B1 in amended form.

II. Claim 1 of the main request underlying the opposition division's decision reads as follows:

*"1. A process for separation of a stable isotope compound by separation comprising distillation of a vapour mixture or a liquid mixture characterized in that the process includes separation by liquefaction and distillation of a vapour mixture or a liquid mixture containing a stable isotope compound including stable isotope atoms, and is performed using a distillation column (11) that is packed orderly with an ordered packing, and the ratio of the boil-up flow rate and draw-off flow rate in the distillation column (11) during distillation is in the range from 900 to 2000, wherein the stable isotope atom is  $^{13}\text{C}$  and the stable isotope compound is  $^{13}\text{CO}$ ."*

III. The opposition division decided that the claims of the main request complied with the provisions of the EPC. In particular, the requirement of Article 84 EPC was met because the passage of the description as originally filed from page 8, line 12 to page 10, line 12, explained *"the term 'ordered packing' with reference to preferred embodiments of a 'promoting-fluid-dispersion type' ordered packing in Figures 6, 7 and 8 of the description as originally filed"*. The term "ordered packing" used in the claims was, in the

opposition division's view, therefore both clear and supported by the description.

- IV. With the grounds of appeal the appellant (opponent) *inter alia* raised an objection of lack of clarity.
- V. The board issued a communication stating its preliminary view, in which it held that *inter alia* the requirements of Article 84 EPC did not appear to be met.
- VI. The respondent (proprietor) responded to both the appellant's grounds and to the board's preliminary view and submitted with reply dated 9 May 2017 a set of claims to replace the set of claims then on file.

No request for oral proceedings was made by the respondent in any of its submissions.

- VII. The independent process claim of the amended request reads as follows:

"1. *A process for separation of a stable isotope compound by separation comprising distillation of a vapor mixture or a liquid mixture characterized in that*

*the process includes separation by liquefaction and distillation of a vapor mixture or a liquid mixture containing a stable isotope compound including stable isotope atoms, and is performed using a distillation column (11) that is packed orderly with an ordered packing, and*

*the ratio of the boil-up flow rate and draw-off flow rate in the distillation column (11) during distillation is in the range from 900 to 2000, wherein*

*the stable isotope atom is  $^{13}\text{C}$  and the stable isotope compound is  $^{13}\text{CO}$ , and*

*the ordered packing is a "promoting-fluid-dispersion-type" structured packing having a shape such that the descending liquid and the ascending vapor flow over the surface of the formed packing along the direction of the bulk flow, while at the same time the liquid and vapor flows are directed in a direction perpendicular to the direction of bulk flow, thereby accomplishing mass transfer while promoting mixing of the liquid and vapor flows."*

VIII. The arguments of the appellant, as far as relevant to the present decision, may be summarised as follows:

- The term in claim 1 according to which the distillation column was "packed orderly with an ordered packing" was not clear to a person skilled in the art, in particular when interpreted in the light of the paragraph [0031] of the patent specification;

- Said paragraph [0031] specified that a column was packed orderly such that computational formulae which followed in the description below (see paragraph [0051] *et seq*) could be applied. The particular formulae contained parameters A1, A2 and A3, which were to be determined experimentally, as set out in paragraph [0061] of the patent, and which were different for each packing; it was thus impossible to determine to what extent the said formulae applied to any specific packing; furthermore, in the absence of accurate values for the physical values employed in the computation, it was impossible to perform the requisite computer simulations.

IX. The arguments of the respondent, as far as relevant to the present decision, may be summarised as follows:

- The objections raised by the appellant under Article 84 EPC were inappropriate in opposition appeal proceedings, as Article 84 EPC was not included in the grounds for opposition under Article 100 EPC;
- According to paragraph [0030] of the patent in suit, a "formed packing may be classified into ordered and random packing". Accordingly, a "formed packing" in the present patent was a generic term that included an ordered packing and a random packing. In addition, paragraph [0033] described "[o]rdered packing, and in particular, 'promoting-fluid-dispersion type' structured packing, are preferably employed as the formed packing in the present invention", which means the inclusion relationships of: "formed packing" > "ordered packing" > "'promoting-fluid-dispersion type' structured packing". Accordingly, there was no inconsistency between paragraphs [0030] and [0033].
- Claim 1 at issue had been amended so as to define the ordered packing as being a "'promoting-fluid-dispersion type' structured packing". In a distillation column the liquid generally tended to shift toward a column wall especially when random packings were randomly packed in a distillation column. In contrast, when "promoting fluid-dispersion type" structured packings were orderly packed in a distillation column, it was possible to mix reflux liquid and an ascending vapor in the cross-sectional direction perpendicular to a column axis, and to prepare a uniform state thereof. An example of an orderly packing, i.e. a "promoting-fluid-dispersion type" structured packing in a distillation column, was clearly disclosed in Figure 6 of the patent. As described above, the claim feature "packed orderly with a 'promoting-fluid dispersion type' structured packing" in the present patent meant arranging "promoting fluid-dispersion type" structured



packings in a distillation column in such a manner as to realize the uniformly mixing function, and the patent document and the figure clearly described one example of this claim feature. Accordingly, this claim feature was clear to a person skilled in the art with reference to the patent document and common general knowledge.

- The formulae (1) to (10) were used to calculate the parameters for the distillation column packed with an ordered packing. When an ordered packing was packed orderly, the reflux liquid and the flow of the ascending vapour became uniform in the distillation column packed in such a manner, as disclosed in paragraph [0033] of the specification. In this uniform condition, the said formulae could be applied. In contrast, when a random packing was packed randomly, non-uniform flow conditions resulted and formulae (1) to (10) produced erroneous results. Therefore, "to what extent the formulae apply to any specific packing" could be determined by a person skilled in the art based on the information given in the patent itself and common general knowledge.

- The said formulae (1) to (10) involved the three coefficients A1, A2 and A3 as well as the various physical values concerning the compounds to be distilled and concerning the distillation column; they did not involve any physical value concerning the packing; accordingly, there was no specific limitation to a packing in the said formulae, as long as the aforementioned uniform condition in the distillation column was achieved; moreover, the coefficients A1, A2 and A3 could be determined using a formula designated "(9)", which additionally involved Sherwood's number, Reynold's number and Schmidt's number; the latter numbers could be obtained from formulae designated by numbers "(2)", "(3)" and "(4)", respectively, using

standard computational techniques. An empirical result of A3 was also referred to.

X. Opponent 1 (party as of right) did not file requests or observations concerning the substance of the appeal.

XI. The parties' requests were as follows:

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

The respondent requested that the patent be maintained on the basis of the set of claims filed with letter dated 9 May 2017.

## **Reasons for the Decision**

1. Article 84 EPC

1.1 The feature in claim 1 as amended during opposition proceedings, according to which the distillation column is "packed orderly with an ordered packing", is based on original claim 1 and the description, paragraphs [0023] and [0024] of the application documents as originally filed (published as EP 0 908 226 A2).

In contrast, granted claim 1 concerned a distillation process in which the distillation column was "packed orderly with a formed packing".

Therefore, given the change of the wording from "formed" to "ordered", the board considers that amendments in substance have been made to claim 1 during the opposition procedure. The board is therefore empowered to examine whether these amendments give rise

to any contravention of the EPC, including Article 84 EPC (see G 3/14, catchword, and T 656/07, paragraph 2.3, final sentence).

- 1.2 As already pointed out in the board's preliminary opinion, the claim feature "packed orderly with an ordered packing" is both *per se* and in the context of the claim unclear. The board shares the view already expressed by the opposition division in the decision under appeal (see item 15) that the description has to be consulted in order to establish the meaning of this feature.

According to paragraph [0030] of the patent in suit, "formed packings" may be classified into "ordered" and "random" packings. The following paragraph [0031] makes clear that the wording used in claim 1 was intended to have a special meaning, as it starts with the text "**[i]n the present invention the phrase 'packing orderly ... using a formed packing' means ...**" (emphasis added by the board). This passage defines a column to be "packed orderly" when it involves a "formed packing" packed in such a manner that the computational formulae (1) to (10) which followed below (see paragraph [0051] *et seq*) can be applied.

Consequently, for the purpose of claim interpretation, a distillation column which is "packed orderly with an ordered packing" is defined as having a formed packing such that the said formulae can be applied.

- 1.3 However, the patent is silent about any criteria for judging whether, or not, the above requirement is met and therefore whether the said formulae can be applied.

According to the respondent, when an ordered packing was packed orderly, the reflux liquid and the flow of the ascending vapour become uniform in the distillation column packed in such a manner. In this uniform condition, the said formulae can be applied. In contrast, when a random packing was packed randomly, non-uniform flow conditions resulted and formulae (1) to (10) produced erroneous results.

However, no criteria have been disclosed for judging which circumstances/conditions, apart from the two extremes referred to above, would allow to apply the formulae and consequently to decide whether the calculated results were correct or wrong.

- 1.4 In the respondent's view the criterion "to what extent the formulae apply to any specific packing" could be determined by a person skilled in the art based on the information given in the patent itself and common general knowledge.

To the board, this argument is not convincing, because it only shifts the problematic criteria to the reflux and flow conditions in the distillation column where uniform flow conditions should prevail. The board considers that establishing uniform flow conditions in a column is the purpose of any packing, be it random or non-random (ordered). The patent fails to provide criteria for deciding which flow conditions are considered uniform "enough" in order to allow the computational formulae to be successfully applied. No evidence is on file that such criteria form part of common general knowledge.

- 1.5 This deficiency is not removed by the additional claim feature as inserted by the respondent into claim 1 at

issue, according to which "*the ordered packing is a 'promoting-fluid-dispersion-type' structured packing*", and by the further functional definition of the shape of the packing with respect to its intended effect on directing vapour and liquid, as the above considerations concerning the formulae still apply. The respondent did not indicate that the insertion of the additional features avoided the need to determine whether the formulae can be applied or not.

1.6 Due to the above lack of clarity the skilled person is unable to decide when he or she is working within respectively outside the scope of the claimed process.

1.7 Consequently, the subject-matter of claim 1 of the sole request contravenes Article 84 EPC. The request is not allowable.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated