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Datasheet for the decision of 18 November 2014

Case Number: T 0213/12 - 3.3.05

Application Number: 00962888.4

Publication Number: 1241138

IPC: C01G1/08, C06D5/00, B60R21/26, C01G3/08, C06D5/06

Language of the proceedings: EN

Title of invention:
BASIC METAL NITRATE, METHOD FOR PRODUCING THE SAME, AND GAS-GENERATING AGENT COMPOSITION

Patent Proprietor:
Daicel Chemical Industries, Ltd.

Opponent:
NIPPON KAYAKU CO., LTD.

Headword:
GAS-GENERATING AGENT/DAICEL

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - obvious alternative

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
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Case Number: T 0213/12 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 18 November 2014

Appellant: (Opponent)	NIPPON KAYAKU CO., LTD. 11-2, Fujimi 1-chome Chiyoda-ku, Tokyo 102-8172 (JP)
Representative:	Wibbelmann, Jobst Wuesthoff & Wuesthoff Patent- und Rechtsanwälte Schweigerstrasse 2 81541 München (DE)
Respondent: (Patent Proprietor)	Daicel Chemical Industries, Ltd. Mainichi Intecio 3-4-5, Umeda Kita-ku, Osaka-shi Osaka 530-0001 (JP)
Representative:	Grünecker, Kinkeldey, Stockmair & Schwanhäusser Leopoldstrasse 4 80802 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 6 December 2011 maintaining European patent No. 1241138 in amended form.**

Composition of the Board:

Chairman	G. Raths
Members:	J.-M. Schwaller
	P. Guntz

Summary of Facts and Submissions

I. The present appeal lies from the decision of the opposition division maintaining European patent No. 1 241 138 on the basis of the second auxiliary request filed during the oral proceedings of 11 October 2011, independent claim 1 of which reads as follows:

"*1. A gas generating composition comprising*

(a) a tetrazole derivative selected from the group consisting of tetrazole, 5-aminotetrazole, 5,5-bi-1H-tetrazole, 5-nitroaminotetrazole, zinc salt of 5-aminotetrazole, copper salt of 5-aminotetrazole, bitetrazole, potassium salt of bitetrazole, sodium salt of bitetrazole, magnesium salt of bitetrazole, calcium salt of bitetrazole, diammonium salt of bitetrazole, copper salt of bitetrazole and melamine salt of bitetrazole, or a guanidine derivative selected from the group consisting of guanidine, mono-, di-, or tri-aminoguanidine nitrate, guanidine nitrate, guanidine carbonate, nitroguanidine, dicyandiamide, nitroaminoguanidine, and nitroaminoguanidine nitrate as fuel; and

(b) a basic metal nitrate having a particle diameter of 0.5 to 40 µm, wherein the basic metal nitrate is at least one selected from the group consisting of a basic copper nitrate, a basic cobalt nitrate, a basic zinc nitrate, a basic manganese nitrate, a basic iron nitrate, a basic molybdenum nitrate and a basic bismuth nitrate, as an oxidising agent;

wherein the composition comprises 40 to 90 weight.% of component (b)."

II. In the contested decision, the opposition division argued in essence as follows:

The late-filed documents

E7: US 4 994 212 and

E8: US 5 084 218

were *prima facie* relevant and therefore admitted into the proceedings.

Documents E9 to E13 were not relevant for the claimed particle size, and so they were to be disregarded.

The claimed subject-matter met the requirements of Article 56 EPC because, starting from document

E4: US 5 608 183,

the problem to be solved was to prevent a decrease in the decomposition temperature for gas-generating compositions, and the skilled person had no incentive to select the particle size disclosed in E7 or E8 because these documents did not concern compositions comprising basic metal nitrates and guanidine or tetrazole derivatives.

III. With its grounds of appeal, the appellant requested that the documents

E9: US 3 902 934

E13: WO 95/04672

be reconsidered as to their relevance and admitted into the appeal proceedings. It also argued that the subject-matter of claim 1 as maintained by the opposition division lacked inventive step in the light of document E4 either taken alone or in combination with the teaching of document

E5: WO 97/16397,

E7, E8, E9 or E13.

IV. In response to the grounds of appeal, the respondent reiterated its request that none of documents E7 to E16 be admitted into the proceedings.

V. With a letter dated 27 November 2012, the appellant submitted an experimental report.

VI. On 8 January 2014, the respondent submitted that said report was late-filed, and so should not be admitted into the proceedings.

VII. Further observations were received from the appellant on 21 February 2014 and from the respondent on 17 October 2014.

VIII. During the oral proceedings, which took place on 18 November 2014, the inventive step issue was extensively discussed.

IX. After closing the debate, the chairman established the parties' requests as follows:

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

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. Inventive step

1.1 Claim 1 relates to a gas-generating composition comprising a tetrazole or a guanidine derivative as the fuel and a basic metal nitrate as the oxidizing agent.

1.2 Gas-generating compositions used to inflate automotive airbags are disclosed in document E4 that the parties took as a starting point for assessing inventive step. The board can agree.

An objective of E4 is to avoid noxious gases and to provide compositions which burn at lower temperatures, an attribute desirable in compositions used in inflator modules with aluminium housing (E4, column 1, line 23, lines 30 to 35).

In its examples 1 and 2, E4 specifically discloses the preparation of gas-generating compositions comprising basic copper(II) nitrate (47.87 and 58.9 wt %, respectively) and guanidine nitrate (42.13 and 41.1 wt %, respectively) by mixing a slurry comprising these components and water, said slurry being then extruded and spheronised into prills of 2 mm in diameter.

1.3 According to the patent in suit, the problem of the invention is the provision of a gas generating composition which is (1) high in storage stability before actuation, as well as (2) in safety at the time of handling, and (3) that has, during actuation, a low

combustion temperature, (4) a high burning rate, (5) small amounts of carbon monoxide and nitrogen oxides formed and (6) good combustion stability (paragraph [0011]).

For the opposition division, the objective problem over the disclosure of document E4 was to provide a gas-generating composition which prevented a decrease in the decomposition temperature, and so had higher storage stability, or in other words was an improvement over the gas-generating composition according to document E4.

1.4 As a solution to this problem, the patent proposes the composition according to claim 1, characterised in particular in that the basic metal nitrate has a particle diameter of 0.5 to 40 µm.

1.5 For evaluating the success of the solution, the following data were available:

(1) Table 3 of the patent in suit displays combustion temperatures of 1732 K, 1743 K, 1764 K, 1785 K, 1835 K and 1889 K, whereas the combustion temperatures according to the table of E4 (column 4) are 1760 K, 1889 K and 1955 K.

(2) An experimental report dated 27 November 2012 provided by the appellant including the following details:

The compositions are as follows:

44.2% by weight of guanidine nitrate (GN);
52.8% by weight of a basic copper nitrate (BCN) and;
3.0% by weight of guar gum,

wherein compositions (i)-(iii) comprise BCN having the following particle diameters (see also below table):

Composition (i): BCN with **45.9 µm** (comparative example)
Composition (ii): BCN with **0.076 µm** (comparative example)
Composition (ii): BCN with **about 2.5 µm** (according to contested patent)

Compositions (i)-(iii) were charged into an aluminium container and a thermal stability test is performed at 110°C. The weight loss ratio after 405 hours is shown in the below table.

	weight loss ratio after 405 hours
(i) BCN having a particle diameter of 45.9 µm	0.01%
(ii) BCN having a particle diameter of 0.076 µm	0.02%
(iii) BCN having a particle diameter of about 2.5 µm	0.01%

(3) The board observes the following:

(a) a comparison between the combustion temperatures of the patent in suit and of E4 is not conclusive; at least it is not possible to assume that the decomposition temperature has been lowered so that an improvement is achieved.

(b) Since document E4 does not disclose the particle size of the basic metal nitrate and since the range of 0.5 to 40 µm is the striking characteristic feature according to the patent in suit, the experimental report is of high relevance.

This report shows that regardless of whether the particle size is lower than 0.5 µm (composition ii), higher than 40 µm (composition i) or within the range of 0.5 to 40 µm (composition iii), the weight loss ratio after 405 hours is more or less always the same.

The respondent was aware of these results and could have presented counter-evidence.

In the absence of such evidence and in light of the results available, the board concludes that there is no improvement in terms of thermal stability when the particle size of the basic copper nitrate falls within the terms of claim 1.

Under these circumstances, it is necessary to reformulate the problem less ambitiously, as the provision of an alternative gas-generating composition.

1.6 It now has to be assessed whether the proposed solution was obvious in the light of the state of the art, or in other words whether the skilled person had enough information about the size of the particle.

1.6.1 In this respect, the board notes that it is conventional in the art of gas-generating compositions for airbags to use the oxidising agent in particulate form, and in particular with particle sizes falling within the terms of claim 1 at issue.

1.6.2 Document E13 (claim 1) discloses for instance a solid gas-generating composition comprising a basic metal nitrate as the oxidising agent. E13 moreover discloses that the particle size for both the fuel and the oxidising agent preferably ranges from about 0.1 microns to about 50 microns.

1.6.3 Similarly, document E9, discloses a gas-generating composition for an airbag with the particularly preferred average particle size being less than about 15 microns (see E9, claim 1 and column 2, lines 50 to 52).

1.6.4 For the board, since the choice of the claimed range of particle sizes does not give rise to any particular effect and since the particle sizes defined in claim 1 at issue are conventional in the art, the skilled person looking for an alternative to the gas-generating composition disclosed in document E4 would seriously contemplate using the particle sizes disclosed in E9 and E13, and so arrive without any inventive skill at the subject-matter of claim 1 at issue.

1.7 It follows from the above considerations that, having regard to the state of the art, the subject-matter of claim 1 at issue does not involve an inventive step.

The requirements of Article 56 EPC are not met.

2. Since the set of claims on which the opposition division proposed to maintain the patent no longer meets the requirements of the EPC and since these claims are the only ones on file, there is no longer any basis for maintaining the patent, which therefore has to be revoked.

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 G. Raths

Decision electronically authenticated