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**Datasheet for the decision
of 15 April 2014**

Case Number: T 0867/11 - 3.3.05

Application Number: 06075589.9

Publication Number: 1666121

IPC: B01D39/20, C04B38/00

Language of the proceedings: EN

Title of invention:

Honeycomb filter and ceramic filter assembly

Patent Proprietor:

IBIDEN CO., LTD.

Opponents:

Saint-Gobain Centre de Recherches et
d'Etudes Européen
Notox A/s

Headword:

Honeycomb filter/IBIDEN CO LTD

Relevant legal provisions:

EPC Art. 76(1), 100(c), 123(2)

Keyword:

Divisional application - subject-matter extends beyond content
of earlier application (yes)

Decisions cited:

Catchword:



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Boards of Appeal
Chambres de recours**

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Case Number: T 0867/11 - 3.3.05

**D E C I S I O N
of Technical Board of Appeal 3.3.05
of 15 April 2014**

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 3 February 2011
revoking European patent No. 1666121 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman: G. Raths
Members: H. Engl
C. Vallet

Summary of Facts and Submissions

I. European patent application EP06075589.9, which is a divisional application of EP0096246.2 (EP-A-1 142 619), was granted with 17 claims. The date of mention of the grant of the patent was 21 January 2009 (Bulletin 2009/04).

II. Granted claim 1 reads:

"1. An elongated honeycomb filter (F100) formed from a sintered porous ceramic body, the honeycomb filter being characterized in that the only ceramic material used to form the filter is α -silicon carbide, and a ratio L/S between a filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0.06mm/mm^2 to 0.75mm/mm^2 ."

The patent also contains an independent claim 7 relating to a honeycomb filter assembly comprising a plurality of the ceramic filters of claim 1 and an independent claim 15 relating to an exhaust gas purification apparatus including the ceramic filter assembly of claim 7.

III. The European patent was opposed inter alia on the ground of added subject-matter (Article 100(c) EPC).

IV. The opposition division decided that claim 1 of the main request and of auxiliary requests 2 - 6 (probably intending to mean "1 to 6") contained a feature according to which the only ceramic material used to form the filter was α -SiC. However, the claimed filter also comprised the sealing paste for sealing the through holes. Since the application as originally

filed did not disclose α -SiC as a material for the through hole sealing paste, the claimed subject-matter extended beyond the original disclosure (Article 123(2) EPC).

V. This appeal lies from the decision of the opposition division, posted on 3 February 2011, revoking the European patent. The patentee (henceforth: appellant) requested that the patent be maintained in amended form based on one of the following sets of claims (main request and auxiliary requests 1 to 6).

VI. The respective claims 1 of these requests read as follows:

Main request:

"1. An elongated honeycomb filter (F100) formed from a sintered porous ceramic body, the honeycomb filter being characterized in that the filter is obtainable from a mixture comprising 51.5 wt.-% α -SiC powder having an average grain diameter of 10 μm , 22 wt.-% α -SiC powder having an average grain diameter of 0.5 μm , 6.5 wt.-% of an organic binder, 20 wt.-% water, a plastic agent and a lubricative agent, a ratio L/S between the filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0.06 mm/mm^2 to 0.75 mm/mm^2 , wherein the only ceramic material used to form the filter is α -SiC."

Auxiliary request 1:

"1. An elongated honeycomb filter (F100) formed from a sintered porous ceramic body, the honeycomb filter being characterized in that the filter is obtainable

from a mixture comprising 51.5 wt.-% α -SiC powder having an average grain diameter of 10 μm , 22 wt.-% α -SiC powder having an average grain diameter of 0.5 μm , 6.5 wt.-% of an organic binder, 20 wt.-% water, a plastic agent and a lubricative agent, a ratio L/S between the filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0.15 mm/mm^2 to 0.40 mm/mm^2 , wherein the only ceramic material used to form the filter is α -SiC."

Auxiliary request 2:

"1. An elongated honeycomb filter (F100) formed from a sintered porous ceramic body, the honeycomb filter being characterized in that the filter is obtainable from a wet mixture of 51.5 wt.-% α -SiC powder having an average grain diameter of 10 μm , 22 wt.-% α -SiC powder having an average grain diameter of 0.5 μm , 6.5 wt.-% of an organic binder, 20 wt.-% water, adding thereto a plastic agent and a lubricative agent; and said wet-mixture being extruded, wherein after drying the molded product with a microwave dryer, the through holes (12) of the molded product are sealed by a sealing paste made of silicon carbide; afterward, the sealing paste is dried with the dryer; after the end surface sealing process, the dried body is degreased at 400°C and then sintered for about three hours at 2,200 °C in an argon atmosphere at the normal pressure; a ratio L/S between the filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0.06 mm/mm^2 to 0.75 mm/mm^2 , wherein the only ceramic material used to form the filter is α -SiC."

Auxiliary request 3:

"1. An elongated honeycomb filter (F100) formed from a sintered porous ceramic body, the honeycomb filter being characterized in that the filter is obtainable from a wet mixture of 51.5 wt.-% α -SiC powder having an average grain diameter of 10 μm , 22 wt.-% α -SiC powder having an average grain diameter of 0.5 μm , 6.5 wt.-% of an organic binder, 20 wt.-% water, adding thereto a plastic agent and a lubricative agent; and said wet-mixture being extruded, wherein after drying the molded product with a microwave dryer, the through holes (12) of the molded product are sealed by a sealing paste made of silicon carbide; afterward, the sealing paste is dried with the dryer; after the end surface sealing process, the dried body is degreased at 400°C and then sintered for about three hours at 2,200 °C in an argon atmosphere at the normal pressure; a ratio L/S between the filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0,15 mm/mm² to 0,40 mm/mm², wherein the only ceramic material used to form the filter is α -SiC."

Auxiliary request 4:

"1. An elongated honeycomb filter (F100) formed from a sintered porous ceramic body, the honeycomb filter being characterized in that the filter is obtainable from a wet mixture of 51.5 wt.-% α -SiC powder having an average grain diameter of 10 μm , 22 wt.-% α -SiC powder having an average grain diameter of 0.5 μm , 6.5 wt.-% of an organic binder, 20 wt.-% water, adding thereto a plastic agent and a lubricative agent; and said wet-mixture being extruded, wherein after drying the molded product with a microwave dryer, the through holes (12) of the molded product are sealed by a sealing paste

made of silicon carbide; afterward, the sealing paste is dried with the dryer; after the end surface sealing process, the dried body is degreased at 400°C and then sintered for about three hours at 2,200 °C in an argon atmosphere at the normal pressure; a ratio L/S between the filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0.15 mm/mm² to 0.40 mm/mm², wherein L ranges from 140 to 200 mm, and wherein the only ceramic material used to form the filter is α-SiC."

Auxiliary request 5:

"1. An integral honeycomb filter assembly (49) produced by adhering with a ceramic seal layer (15) outer surfaces of a plurality of elongated rectangular pole-like honeycomb filters (F100), each of which is formed from a sintered porous ceramic body, the elongated rectangular pole-like honeycomb filter being characterized in that: a ratio L/S between the filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0.06 mm/mm² to 0.75 mm/mm², wherein the filter length L is 300 mm, and wherein the only ceramic material used to form the filter is α-SiC."

Auxiliary request 6:

"1. An integral honeycomb filter assembly (49) produced by adhering with a ceramic seal layer (15) outer surfaces of a plurality of elongated rectangular pole-like honeycomb filters (F100), each of which is formed from a sintered porous ceramic body, the elongated rectangular pole-like honeycomb filter being

characterized in that: a ratio L/S between the filter length L in a flow direction of a processed fluid and a filter cross-section S in a direction perpendicular to the flow direction is 0.75 mm/mm² and the height of the filter W1 is 20 mm and the width of the filter W2 is 20 mm or wherein the ratio L/S is 0.48 mm/mm² and the height of the filter W1 is 25 mm and the width of the filter W2 is 25 mm or wherein ratio L/S is 0.62 mm/mm² and the height of the filter W1 is 22 mm and the width of the filter W2 is 22 mm, wherein the length of the filter L is 300 mm, and wherein the only ceramic material used to form the filter is α -SiC."

VII. The documents cited in opposition and appeal proceedings included the following:

D1: EP 0 816 065 A1

D25: EP 0 639 699 A2

VIII. Oral proceedings were held on 15 April 2014 in the absence of both opponents, who had withdrawn their oppositions. Both opponents are no longer parties to these proceedings.

IX. The appellant's relevant arguments may be summarised as follows:

Claim 1 of the main request, according to which the only ceramic material used to form the filter was α -SiC, should be interpreted such that the basic filter structure without plugs was made only of α -SiC as ceramic material. As described in paragraph [0005] of the parent patent application EP-A-1 142 619, "*The honeycomb filter includes a plurality of cells extending along the axial direction of the honeycomb filter*".

Further, as described in paragraphs [006] and [0007] of said parent application, the honeycomb filter was prepared from a material including SiC, which was continuously extruded from a mold of an extruder to form an elongated square honeycomb molded product. After the honeycomb filter was cut into pieces of equal length, the cut pieces were sintered to form a filter. Accordingly, a honeycomb filter was a filter structure made of hollow channels or passages formed by partition walls of ceramic material (made of α -SiC as only ceramic material according to the patent in suit) through which exhaust gases and the like are forced to flow. Following said definition, a filter structure according to the patent in suit did not include sealing plugs at the end surface of one side of a filter arrangement of aligned sintered honeycomb filters. In other words, the sealing paste provided on the end surface of the filter structure was not a part of the filter made from α -SiC only.

The terms "honeycomb structure" or "honeycomb filter" described a structure of a number of channels (or passages) which are formed by partition walls, wherein the channels extend in parallel in the flow direction of the fluid or gas to be purified, but did not include the feature that the channels were closed at one end with a sealing paste. This was also clear from paragraph [0070] on page 7 of the parent application, where it was disclosed that a slurry including as only ceramic material α -SiC was kneaded and extruded to form the honeycomb molded product (in particular, page 7, lines 34 and 35). In this state of preparation of the inventive filter, i.e. the step of forming the basic filter structure via an extrusion process, no sealing paste was provided, but the filter product was already

denominated a honeycomb molded product. Thus, it was clear from the parent application as filed that the filter made of α -SiC as the only ceramic material should be interpreted such that the basic filter structure and thus the ceramic material slurry to prepare the honeycomb molded product was made from α -SiC as the only ceramic material.

Further evidence for the fact that in the field of the invention a honeycomb filter was to be interpreted as a filter structure of aligned passages without sealing or plugs at one end of the passages was for example shown with reference to D25. Here, on page 3, lines 22 to 24, the term "honeycomb structure" was described in detail.

Therefore, the requirements of Article 123(2) EPC were met.

- X. The appellant requested that the contested decision be set aside and that the patent be maintained on the basis of the claims of the main request or alternatively on the basis of the claims of auxiliary requests 1 to 6, all filed with letter dated 7 January 2011.

Reasons for the Decision

- 1. Amendments (all requests)
 - 1.1 The patent in suit is a divisional application of European patent application EP-A-1 142 619 ("the earlier application").

According to Article 76(1) EPC, a European divisional application may be filed only in respect of subject-

matter which does not extend beyond the content of the earlier application as filed.

Article 100(c) EPC stipulates that an opposition may be filed on the ground that the subject-matter of a divisional application extended beyond the content of the earlier application as filed.

- 1.2 In the board's judgment, the subject-matter of current claim 1 extends beyond the original disclosure of the parent application as filed. The offending feature is:

"...the only ceramic material used to form the filter is α -SiC."

The earlier application only describes the exclusive use of alpha-silicon carbide in example 1-1 of embodiment 1, which described the manufacture of a honeycomb molded product (see paragraph [0070]):

"51.5 wt% of α silicon carbide powder having an average grain diameter of 10 micrometers and 22 wt% of α silicon carbide powder having an average grain diameter of 0.5 μ m".

In the board's judgment:

(1) the earlier application as filed contains no other disclosure of the exclusive use of alpha-silicon carbide in the manufacture of a filter based on the molded honeycomb product, and

(2) the claimed honeycomb filter not only comprises the elongate molded and sintered honeycomb product made of α -SiC, but also the sealing bodies (plugs) formed from a sealing paste. Without such sealing bodies, the

parallel passages of the elongate body formed by partition walls would be open at both ends, such that the body would not function as a filter. Any porous ceramic honeycomb structure intended to function as a particle filter necessarily requires appropriate end sealing structures (*cf.* the description, paragraph [0048], in particular column 6, lines 46 and 47, and Figure 3 of the opposed patent showing the sealing bodies 14; D1, page 5, line 50, to page 6, line 5; in particular, page 5, line 53, and page 6, line 1, Figures 1 to 5).

The appellant's argument that document D25 disclosed a honeycomb structure having a large number of parallel passages formed by partition walls and not having any sealing bodies at the ends is without merit. The honeycomb structure disclosed in D25 is clearly not a filter, but a catalyst carrier (see page 3, lines 20 to 26; page 4, lines 53 and 54; Figure 13).

The sealing paste used for making the sealing bodies 14 is described in paragraph [0070] (page 7, lines 40 to 55) of the earlier application as being composed of sintered porous silicon carbide. There is no disclosure of the material of the sealing paste comprising α -SiC.

The term "silicon carbide" cannot be restrictively interpreted as " α -SiC". The appellant itself pointed to the importance of the definition of " α -SiC" (letter of 14 June 2011, page 4, item 4, paragraphs 2 and 3) by differentiating between " α -SiC" and " β -SiC". Therefore, "silicon carbide" is not a proper basis which could give support to " α -SiC".

Hence, a claim directed to a honeycomb filter including sealing plugs that consists only of α -SiC has no direct

and unambiguous basis in the earlier application.

2. This deficiency affects all pending requests.

All the requests violate Articles 123(2) and 76(1) EPC and are therefore not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Vodz

G. Rath

Decision electronically authenticated