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**Datasheet for the decision
of 12 February 2019**

Case Number: T 2647/16 - 3.3.05

Application Number: 04792936.9

Publication Number: 1676622

IPC: B01D39/20, B01D53/94,
B01J32/00, B01J35/04

Language of the proceedings: EN

Title of invention:
HONEYCOMB STRUCTURE BODY

Patent Proprietor:
IBIDEN CO., LTD.

Former Opponent:
Saint-Gobain Centre de Recherches et
d'Etudes Européen
Young Thought Limited

Headword:
Octagonal cross-sectional shape/IBIDEN

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

T 1180/12

Catchword:



Beschwerdekammern

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Chambres de recours

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Case Number: T 2647/16 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 12 February 2019

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 11 October 2016
revoking European patent No. 1676622 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman E. Bendl
Members: A. Haderlein
 P. Guntz

Summary of Facts and Submissions

- I. This is the second appeal concerning the patent in suit. The appeal was filed by the appellant (patent proprietor) against the decision of the opposition division to revoke the patent.
- II. In the first appeal proceedings, the present board, albeit in a different composition, held in its decision T 1180/12, that the main request dated 20 July 2012 complied with the requirements of Articles 123(2) and (3) EPC and 54(1), (2) EPC and remitted the case to the opposition division for further prosecution.
- III. In its (second) decision the opposition division held in particular that the subject-matter of claim 1 of the main request dated 26 August 2016 and corresponding to the main request dated 20 July 2012 did not comply with the requirement of inventive step in view of
- E10: WO 03/020407 A2 and
E3: EP 1 502 639 A1 (corresponding to
WO 2003/080218 A1 published on 2 October 2003)
- IV. Both opponents had withdrawn their oppositions prior to the filing of the present appeal.
- V. The board issued a communication pursuant to Article 15(1) RPBA.
- VI. In reply to this communication, the appellant filed
- E19: Oguy, K., et al., Improving of the filtration and regeneration performance by the SiC-DPF with the layer coating of PM oxidation catalyst, SAE International, 2008

and withdrew all pending auxiliary requests.

VII. The sole independent claim 1 of the main (sole) request reads as follows:

"1. A pillar-shaped honeycomb structural body (20) mainly made of porous ceramics, in which a plurality of through holes (21) are placed in parallel with one another in the length direction with a partition wall (23) interposed therebetween,

wherein

said plurality of through holes (21) comprises:

a group of large capacity inlet-side through holes (21a), whose ends are sealed by plugs (22) at the outlet side such that the total sum of areas on cross sections perpendicular to the length direction is made relatively greater; and

a group of small capacity outlet-side through holes (21b), whose ends are sealed by plugs (22) at the inlet side such that the total sum of areas on the cross sections thereof is made relatively smaller, the inlet-side through holes (21a) having an octagonal cross-sectional shape and the outlet-side through holes (21b) having a square shape, which are arranged alternately, the numbers of through holes of the two types being the same,

supposing that the aperture rate on the inlet side is X (%) and that the total sum of thermal capacities of the plugs which seal the group of inlet-side through holes at 500°C per 11.8 cm² of the end face on the outlet side containing the group of the outlet-side through holes is represented by Y (J/K),

the relationship indicated by the following inequalities (1) and (2) being satisfied.

$$0.0157X - 0.0678 < Y < 1.15X - 5 \dots (1)$$

$$35 \leq X \leq 60 \dots (2)''$$

- VIII. Dependent claims 2 to 5 relate to particular embodiments of the subject-matter of independent claim 1.
- IX. The arguments of the appellant, as far as relevant to the present decision, may be summarised as follows:

E3 rather than E10 represented the closest prior art. Starting from E3, the subject-matter of claim 1 involved an inventive step. It differed from the honeycomb filter of E3 at least by the inlet through holes having an octagonal cross-sectional shape. The problem to be solved was the avoidance of crack formation. This problem was credibly solved as evidenced by E19. It was not obvious to use inlet through holes having an octagonal cross-sectional shape in E3 even when considering E10.

- X. The appellant requests that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the claims of the main (sole) request dated 26 August 2016.

Reasons for the Decision

Inventive step

1. The invention concerns a pillar-shaped honeycomb structural body.
2. Concerning the closest prior art, while in the impugned decision the opposition division considered E10 as the

closest prior art, the appellant submitted that E3 rather than E10 should be considered as such.

- 2.1 The board considers E10 to constitute a reasonable starting point for assessing inventive step for the following reasons:

While E10 does not specifically address the problem of crack formation in the plugs as mentioned in the patent in suit (paragraph [0008]), this specific problem is also not addressed in E3. Rather, E3 addresses the more general problem of crack formation in the filter (see paragraph [0035]).

Moreover, if there are several prior-art documents suitable as a starting point for assessing inventive step and it turns out that there is lack of inventive step starting from that prior art, it is not sufficient to argue that another prior-art document is a more promising springboard in order to discard the first document as the closest prior art as correctly pointed out by the opposition division (see item 3.1.3 of the impugned decision).

It follows that the subject-matter also needs to involve an inventive step starting from E10 in order to show that the requirement of Article 56 EPC is complied with.

- 2.2 It is uncontested that the sole distinguishing feature over E10 is the octagonal cross-sectional shape of the inlet-side through holes (cf. item 3.4 of the impugned decision).

3. According to the patent in suit, the problem to be solved is the avoidance of crack formation (see

paragraphs [0098] and [0008])).

4. According to claim 1 of the main request, it is proposed to solve this problem by a pillar-shaped honeycomb structural body having inlet-side through holes characterised in that the inlet-side through holes have an octagonal cross-sectional shape.
5. It needs to be assessed whether the proposed solution actually solves the problem posed.
 - 5.1 As correctly pointed out by the opposition division (see impugned decision, item 3.4, second paragraph), the patent does not contain data comparing inlet-side through holes having an octagonal cross-sectional shape according to claim 1 with those having a square cross-sectional shape. Instead, different honeycomb structural bodies all having inlet-side through holes having an octagonal cross-sectional shapes are compared for crack formation expressed as "Regenerating limit value" (see paragraph [0098] and Figs. 3(a) to 3(d)).
 - 5.2 E19 bears a date of 2008, i.e. a date after the filing date of the present patent, and therefore cannot be considered state of the art. It was submitted by the appellant as evidence to show that the problem was effectively solved. Indeed, E19 shows in Fig. 9 that regeneration efficiency in terms of time spent for regenerating the filter is improved for an octagonal cross-sectional shape ("OS") compared to a square cross-sectional shape ("Square") (see also E19, page 5, left-hand column, first paragraph) at a given cell density (see page 2, left-hand column, last paragraph).

As convincingly argued by the appellant, in order to raise the regeneration efficiency of a square-shaped

honeycomb structural body to be the same as the octagonal-shaped one, it would be necessary to carry out the regeneration process at higher temperatures. High temperatures, however, lead to a higher probability of cracks occurring in the honeycomb structural body.

It is also credible, as submitted by the appellant, that the temperature distribution along the wall of the inlet-side through holes in a plane perpendicular to the direction of the inlet-side through hole is generally more even with an octagonal-shaped cross-section than with a square-shaped cross-section. The more even the temperature distribution, however, the more likely is the avoidance of cracks.

It is therefore credible that the problem is solved by the proposed solution. Thus, the problem does not need reformulation.

5.3 As to obviousness, E3 discloses in Fig. 9 a configuration comprising inlet through holes having an octagonal cross-sectional shape. But E3 does not teach that the use of this shape would improve resistance to crack formation when compared to a square cross-sectional shape. Moreover, the "strength" of the honeycomb filter depicted in Fig. 9 of E3 is said to be "low" (see Table 2). There is therefore nothing in E3 that would teach the skilled person to use an octagonal-shaped cross-section in order to avoid crack formation.

5.4 For these reasons, it is concluded that the subject-matter of claim 1 is not obvious in view of the cited prior art. The same holds true for the subject-matter of dependent claims 2 to 5.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of the main (sole) request dated 26 August 2016 and a description to be adapted, where necessary.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated