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**Datasheet for the decision
of 29 September 2010**

Case Number: T 0522/09 - 3.2.06
Application Number: 96909361.6
Publication Number: 0765993
IPC: F01N 3/28
Language of the proceedings: EN

Title of invention:

Monolith holding material, method for producing the same,
catalytic converter using the monolith, and method for
producing the same

Patentee:

Mitsubishi Chemical Corporation, et al

Opponent:

SAFFIL AUTOMOTIVE LIMITED

Headword:

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Relevant legal provisions:

EPC Art. 100(b), 83, 84, 123(2)
EPC R. 43, 69
RPBA Art. 13(1)

Relevant legal provisions (EPC 1973):

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Keyword:

"Main request and 2nd auxiliary request: claim 1 - sufficiency
- no (additional operating parameters or conditions
necessary)"

"Auxiliary requests 1, 3-6: late-filed, not admitted (claim 1:
added subject-matter)"

Decisions cited:

T 0818/03

Catchword:

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Case Number: T 0522/09 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 29 September 2010

Appellant:
(Patent Proprietors) Mitsubishi Chemical Corporation
14-1, Shiba 4-chome
Minato-ku
Tokyo 108-0014 (JP)

Nippon Steel Corporation
6-3, 2-chome
ote-machi
Chiyoda-ku
Tokyo 100-0004 (JP)

Representative: HOFFMANN EITLE
Patent- und Rechtsanwälte
Arabellastraße 4
D-81925 München (DE)

Respondent:
(Opponent) SAFFIL AUTOMOTIVE LIMITED
381 Fulwood Road
Sheffield
South Yorkshire S10 3GB (GB)

Representative: Moore, Christopher Mark
HLBBshaw Limited
Merlin House
Falconry Court
Baker's Lane
Epping
Essex CM16 5DQ (GB)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 17 December 2008
revoking European patent No. 0765993 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. de Crignis
K. Garnett

Summary of Facts and Submissions

- I. European patent No. 0 765 993, granted on application No. 96 909 361.6, was revoked by the opposition division by decision announced during the oral proceedings on 2 December 2008 and posted on 17 December 2008.

Claim 1 as granted reads as follows:

"A process for producing a monolith-holding element for use in a catalytic converter comprising

- a cylindrical monolith supporting a catalyst for cleaning exhaust gases thereon,
- a metal casing which accommodates the monolith therein and is connected to exhaust pipes, and
- the monolith-holding element which is fitted into the clearance between the outer surface of the monolith and the inner surface of the metal casing, which process comprises:

(i) a first step of impregnating an alumina fiber mat having a bulk density of 0.05 to 0.20 g/cm³ and having a first uncompressed thickness with a solution containing an organic binder capable of being dissipated by thermal decomposition;

(ii) a second step of compressing the alumina fiber mat impregnated with the organic binder-containing solution in the thickness direction so as to produce a second compressed thickness thereof which is

1/1.25 or less times the first uncompressed thickness;

(iii) a third step of removing the solvent of the organic binder-containing solution in the alumina fiber mat while maintaining the second compressed thickness of the alumina fiber mat and leaving the organic binder within the compressed alumina fiber mat, to provide a monolith-holding element which, in the ordinary uncompressed state, has a thickness of 1 to 1.5 times the second compressed thickness of the alumina fiber mat,

wherein when the organic binder contained in the monolith-holding element is thermally decomposed,

- the monolith-holding element exhibits a thickness restoring property when its opposite surfaces are kept in an open, uncompressed condition, and
- the restoration surface pressure of the monolith-holding element is in the range of 0.05 to 3 MPa (0.5 to 30 kg/cm²) when it is kept under a compressed condition such that its thickness corresponds to the clearance between the outer surface of the monolith and the inner surface of the metal casing."

II. The opposition division rejected the main request for reasons of lack of sufficient disclosure (Article 100(b) EPC). The subject-matter of claim 1 as granted was held not to be sufficiently disclosed because the restoration surface pressure of example 10 lay outside

the claimed range although all the steps (i) to (iii) of the claimed process were fulfilled for the example. The opposition division concluded that additional operating parameters or conditions were necessary to obtain the desired result, and that these were not indicated. Furthermore, it held that the subject-matter of claim 1 of the auxiliary request, which included a further feature excluding example 10 from the scope of protection, was novel (Article 54 EPC) but lacked an inventive step (Article 56 EPC) over the prior art disclosed in

D1 US-A-4 011 651.

- III. On 26 February 2009 the patent proprietor (appellant) filed an appeal against this decision and simultaneously paid the appeal fee. With the statement setting out the grounds of appeal, received at the European Patent Office on 24 April 2009, the appellant filed a main request corresponding to the claims as granted and three auxiliary requests.
- IV. In a communication of 4 May 2010, sent as an annex to the summons to oral proceedings, the Board questioned the disclosure of the subject-matter of claim 1 of all requests filed with the grounds of appeal.
- V. In a response dated 27 August 2010 the appellant filed new first and third to sixth auxiliary requests.
- VI. Oral proceedings were held on 29 September 2010.

The appellant requested that the decision under appeal be set aside and the patent be maintained as granted,

alternatively on the basis of the first auxiliary request filed during the oral proceedings, the second auxiliary request filed with the grounds of appeal, the third auxiliary request filed during the oral proceedings, the fourth auxiliary request filed with the letter of 27 August 2010, the fifth auxiliary request filed during the oral proceedings or the sixth auxiliary request filed with the letter dated 27 August 2010.

The respondent (opponent) requested that the appeal be dismissed.

The subject-matter of claim 1 of the first auxiliary request differs from the subject-matter of claim 1 of the main request in that the different thicknesses are additionally defined by specifying them with the letters A, B, C and D, as disclosed in the description, paragraphs [0038] - [0041] and in Figure 3. Moreover, the feature "the ratio of the thickness C of the monolith-holding element to the clearance D being in the range of 1.0 to 2.0 times" is added.

The subject-matter of claim 1 of the second auxiliary request differs from the subject-matter of claim 1 of the main request in that the subject-matter of granted claim 2 ("the content of the organic binder is in the range of 10 to 30 parts by weight based on 100 parts by weight of the alumina fiber mat") is included.

The subject-matter of claim 1 of the third auxiliary request combines the amendments of the first and second auxiliary requests.

The subject-matter of claim 1 of the fourth auxiliary request differs from the subject-matter of claim 1 of the third auxiliary request in that it additionally specifies the alumina fibre mat which is impregnated in the first step of the process as an alumina/silica-based polycrystalline fibre mat.

The subject-matter of claim 1 of the fifth auxiliary request differs from the subject-matter of claim 1 of the fourth auxiliary request in that it additionally limits the second compressed thickness B to the range of $1/2$ to $1/15$ of the first uncompressed thickness A, the thickness C to being in the range of 3 to 10 mm and the clearance D to being in the range of 2 to 8 mm.

Moreover, the following feature is added:

"wherein the restoration surface pressure is measured after the organic binder in the monolith-holding element is thermally decomposed with the opposite surfaces kept in an open state to permit the monolith-holding element to be restored, the monolith-holding element is compressed by means of a face plate until reaching the thickness D, upon which the pressure applied onto the face plate to conduct the compression is the restoration surface pressure".

The subject-matter of claim 1 of the sixth auxiliary request differs from the subject-matter of claim 1 of the fourth auxiliary request in that the following feature is added to step (i):

"the alumina fibers constituting the mat being mullite fibers containing 72% by weight of alumina".

VII. The arguments of the appellant may be summarised as follows:

The view of the opposition division that the subject-matter of claim 1 as granted was not sufficiently disclosed (because the restoration surface pressure of example 10 lay outside the claimed range) related to the fact that an essential feature was said to be missing in the claim, which was a matter of clarity but was not a ground for opposition. Consistent with such view, the Board in T 818/03 held the lack of an essential feature in the wording of a claim to concern a lack of clarity (Article 84 EPC), which did not represent a ground for opposition.

Nine out of the ten examples given in the patent constituted guidance for the skilled person in how to perform the invention. Accordingly, the skilled person would gain enough information from the description and the examples of the opposed patent about how to measure the restoration surface pressure and how to combine the bulk density and the compression ratio to obtain the desired surface pressure. The finding of the opposition division that additional operating parameters or conditions were necessary to obtain the desired result within the claimed process concerned only parameters and conditions that the skilled person could easily establish for himself.

The method for determining the restoration surface pressure was disclosed in paragraph [0060] of the patent in suit. The skilled person would know from paragraphs [0045] and [0046] that the base mat had to exhibit a certain resiliency. The skilled person could

follow the instructions given in the examples, and accordingly would know which process was claimed and how to obtain a monolith-holding element having the claimed restoration surface pressure.

The subject-matter of claim 1 of auxiliary request 1 additionally included the ratio of the thicknesses C/D being in the range of 1.0 to 2.0 times. Hence, the determination of the restoration surface pressure was limited to such conditions.

The subject-matter of claim 1 of auxiliary request 2 included additionally the range for the content of organic binder. Hence, example 10 no longer fell in the scope of claim 1. The remaining nine examples provided ample evidence for the skilled person being capable to carry out the invention.

The subject-matter of claim 1 of auxiliary request 3 combined the amendments of the first and second auxiliary requests. Accordingly, all arguments set out above applied.

The subject-matter of claim 1 of auxiliary request 4 additionally specified the alumina fibre mat as an alumina/silica-based polycrystalline fibre mat. Therefore, the claimed process steps were specific and for such a mat the claimed restoring properties could be obtained as shown by all the examples.

The subject-matter of claim 1 of auxiliary request 5 specified further characteristics of the claimed process in that it additionally limited the second compressed thickness to the specific range of 1/2 to

1/15 of the first uncompressed thickness, the thickness C to being in the range of 3 to 10 mm and the clearance D to being in the range of 2 to 8 mm. Moreover, the specified method for the determination of the restoration surface pressure enabled the skilled person to identify reliably and reproducibly this property of the monolith-holding element. The amendment concerning alteration of the compressed thickness specified with the letter C in the indirect method of paragraph [0060] to the thickness specified with the letter D in the claim represented the correction of an obvious error. All these modifications could have been expected by the respondent, the amendments addressed the objections put forward and, accordingly, the late-filed request should be admitted.

The subject-matter of claim 1 of auxiliary request 6 differed from the subject-matter of claim 1 of auxiliary request 4 in that the mat was further specified with regard to the material used in the examples.

VIII. The respondent argued essentially as follows:

The opposition division was correct in holding the requirements of Article 100(b) EPC not to be met for the main request. The appellant's contrary view represented a misconception of the requirements set out in Article 83 EPC.

With regard to the main request and auxiliary requests 1 to 4, and 6, the restoration surface pressure could be determined by different methods. Paragraph [0060] of the patent in suit specified a

direct method and an indirect method. Further methods such as for example determination involving sensors were possible. No proof had been provided for all these methods obtaining comparable results. Hence, it was not disclosed how the claimed subject-matter could be obtained reliably and reproducibly over its whole scope. The late-filed auxiliary requests 1, 3, 4 and 6 should not be admitted into the proceedings.

Auxiliary request 5 was the only request including a determination method. The subject-matter of its claim 1 was not clear, and not consistent with the description either in the granted patent or in the originally filed application (Articles 84 and 123(2) EPC). The wording of claim 1 included a reference to the indirect determination method with regard to the compressed thickness C whereas the originally filed application and the granted patent in the corresponding part of the description referred to the compressed thickness D. Additionally, it was not clearly disclosed that the results given for the examples were obtained by this method. The wording in paragraph [0061] which was referred to for evidence in this respect did not provide such a specific information. Accordingly, the subject-matter of claim 1 of this late-filed request was not clearly and unambiguously derivable from the patent in suit and the request should not be admitted.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

- 2.1 The decision of the opposition division to reject the main request was based on the lack of additional operating parameters or conditions which are necessary to obtain the claimed restoration surface pressure.
- 2.2 In contrast to the opinion expressed by the appellant, missing essential features in a claim do not necessarily constitute only an Article 84 deficiency, but may very well give rise to an objection under Article 100(b) EPC (Article 83 EPC).
- 2.3 Article 100(b) EPC provides a ground of opposition in a case where the patent does not disclose "the invention" in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. "The invention" for which protection is sought is defined by the claims (Article 84 EPC), and such definition should be in terms of the technical features of the invention (Rule 43 EPC). This means that it is the invention as defined in the claims that has to be scrutinised for sufficiency even if there may be embodiments disclosed in the description that would not give rise to such an objection. Of course, the effect of Article 69 EPC is that the description and drawings can play a role when interpreting the claims but neither this article nor the Protocol on the Interpretation of Article 69 EPC means that the subject-matter claimed should necessarily be narrowly interpreted to conform to the embodiments disclosed in the patent.

This can be illustrated by considering a case where features disclosed in the description are essential to an embodiment described there but which features are absent in the claims. Such claims may well relate to a different invention from the one described in the description. This is not a case of a contradiction between the description and the claims (and thus a clarity/Article 84 problem), which in the case of granted claims must be resolved by construction of the patent as a whole, but of the claims simply defining a different, often broader, invention from the one described in the description. Sufficiency has therefore to be examined in relation to the combination of features claimed rather than taking into account features of embodiments that are not specified in the claim.

In this respect T 818/03, cited by the appellant, does not lead to a different conclusion because it dealt with a different situation, namely one where only lack of clarity of an amended claim was at issue.

- 2.4 For the subject-matter of present claim 1 there is also a particular reason for looking carefully into whether the invention can be carried out over the whole range claimed. This is that the restoration surface pressure values of examples 1 to 9 fall inside the claimed range, whereas the restoration surface pressure value of example 10 does not, even though all the claimed process steps (i) to (iii) were carried out for this example as well. Thus the restoration surface pressure of example 10 is 0.1 kg/cm^2 whereas the claimed ranged is 0.05 to 3 MPa (0.5 to 30 kg/cm^2). The skilled person would have to investigate why this was the case. None

- of the claimed process steps concerns any conditions which relate to the restoration surface pressure and therefore the conundrum cannot be resolved by reference to any of the process steps.
- 2.5 Additional operating parameters or conditions which need to be known in order to arrive at the claimed subject-matter concern, on the one hand, the determination method for the restoration surface pressure and, on the other, what is meant by the (imprecise) requirement that the restoration pressure of the monolith-holding element should fall within the specified range when it is kept under a "*compressed condition such that its thickness corresponds to the clearance between the outer surface of the monolith and the inner surface of the metal casing*".
- 2.6 Concerning the determination method, the appellant's view that the skilled person would gain enough information from the description and the examples of the opposed patent about how to measure the restoration surface pressure is not correct.
- 2.6.1 When reading the description to see if it identifies any process step indicating how to obtain and determine the desired restoration surface pressure, the skilled person would inevitably take into consideration the instructions in paragraph [0060]. This paragraph refers to two methods, one "direct" and the other "indirect", for determining the restoration surface pressure. The subsequent paragraph additionally specifies that the indirect method is preferred because of its simplicity.

2.6.2 However, nowhere in the description is one of these determination methods linked to the examples or the steps defined in the claimed process. The fact that different methods exist for determining the restoration surface pressure of a mat was not in dispute. Given that:

- (a) the description refers to two different methods,
- (b) the claim neither specifies which method to apply nor excludes other possible methods (for example a method using pressure sensors), and
- (c) it is not suggested that the different methods produce identical results,

it follows that the skilled person cannot be sure whether he is working within or outside of the claimed range, thus whether he is carrying out the invention or not.

2.6.3 Also the Figures do not portray any determination method. Figure 1 is an exploded perspective view of a catalytic converter and hence not related to the claimed process itself. Figure 2 is a perspective view showing the manner in which a monolith-holding element is wound around a monolith. Hence, it shows a process step subsequent to the claimed process steps. Figure 3 provides schematic sketches showing the various thicknesses of an alumina mat during the different steps of production of the monolith-holding element. Accordingly, none of these Figures is related to the question on how to obtain a specific restoration surface pressure.

2.6.4 Moreover, the examples in the description refer to specific metal casings, monoliths and test set-ups and rely on a limited clearance range D of from 3 mm to

7 mm and a resultant range for the restoration surface pressure after burning of from 0.6 to 9.8 kg/cm². No examples exceeding these ranges are disclosed. Hence, with regard to obtaining and determining the complete range which is claimed for the restoration surface pressure, no sufficient information is present in the specification.

- 2.7 Additionally, there is also no process step claimed or disclosed about how to combine the bulk density and the compression ratio to obtain the desired surface pressure. Hence, the reference in claim 1 to keeping the monolith under a "compressed condition such that its thickness corresponds to the clearance between the outer surface of the monolith and the inner surface of the metal casing" does not make any link to the claimed process steps and it concerns an independent subsequent step of mounting the processed monolith-holding element within a metal casing of undetermined size. Hence, the subject-matter of claim 1 concerns further undefined process steps and accordingly is not defined in such a way that it can be reproduced reliably over the whole ambit of the claim. Accordingly, the requirements of Article 100(b) EPC are not met for these reasons either.

3. *Auxiliary request 1*

- 3.1 The subject-matter of this amended claim 1 additionally includes the identification of the different thicknesses by the letters A to D and specifies the ratio of the thicknesses C/D as being in the range of 1.0 to 2.0 times.

3.2 The terminology concerning the different thicknesses is illustrated in Figure 3 and disclosed in paragraphs [0038] to [0041] of the patent in suit and concerns the process for the production of the monolith-holding element (paragraph [0034]). Accordingly, the specification of the different thicknesses via the letters A to D is clear and was originally disclosed. Accordingly, the requirements of Article 84 EPC and 123(2) EPC are met as far as these features are concerned.

3.2.1 The further amendment concerning the ratio of the thicknesses C/D is disclosed in paragraph [0067], which reads:

"The thickness (C) of the holder 3 according to the present invention may be determined depending upon the clearance (D) of the catalytic converter. In general, in the case where the clearance (D) is from 2 to 8 mm, preferably from 3 to 6 mm, it is suitable that the thickness (C) of the corresponding holder is in the range of 3 to 10 mm. The thickness of the holder 3 is 1.0 to 2.0 times, preferably 1.0 to 1.6 times the clearance (D)."

Consistently, examples 1 to 11 disclose a ratio C/D in the range of between 1.0 (example 6) and 1.8 (example 5) and are based upon a clearance D in the range of between 3.0 and 7.0 mm and upon a thickness C in the range of between 3.5 and 7.0 mm.

3.2.2 Hence, only in combination with a specific range for the thickness (C) and for the clearance (D) is a ratio of the thicknesses C/D in the range of 1.0 to 2.0 disclosed. Since claim 1 is not limited to such a disclosed combination and in the absence of any other

information that would allow a broader definition in the claim, it includes added subject-matter. Accordingly, the subject-matter of claim 1 does not meet the requirements of Article 123(2) EPC.

3.3 The first auxiliary request was filed during the oral proceedings, and replaced the first auxiliary request filed in response to the summons to oral proceedings. According to Article 13(1) of the Rules of Procedure of the Boards of Appeal (RPBA), it lies within the discretion of the Board to admit such late-filed requests in the proceedings. To be admitted such a request should be clearly allowable, which is not the case here. Hence, this request was not admitted into the proceedings.

4. *Auxiliary request 2*

4.1 The subject-matter of claim 1 includes the subject-matter of claim 2 as originally filed (which is identical to claim 2 as granted). The added feature concerns the content of the organic binder, which is specified to be in the range of from 10 to 30 parts by weight based on 100 parts by weight of the alumina fibre mat. Accordingly, the requirements of Article 84 and 123(2) EPC are met.

4.2 This feature was added in order to overcome the objections concerning sufficiency raised with respect to claim 1 of the main request. Example 10 no longer represents an inventive example as its content of organic binder lies below the claimed range.

4.3 While this amendment overcomes the problem relating to example 10 it does not overcome the board's conclusions with respect to the lack of sufficiency concerning the ambiguity of the determination method or of the missing link between the bulk density and the compression ratio needed to obtain the desired surface pressure. Hence, consistent with the finding as set out above for the main request, there is no clear and complete disclosure in claim 1 which enables a skilled person to carry out the claimed invention over the whole scope of the claim and the requirements of Article 100(b) EPC are not met.

5. *Auxiliary request 3*

5.1 The subject-matter of claim 1 includes, in addition to the amendments already made to the subject-matter of claim 1 of auxiliary request 1, the subject-matter of claim 2 as originally filed (which is identical to claim 2 as granted). Hence, the subject-matter of claim 1 is a combination of the subject-matter of claim 1 of auxiliary requests 1 and 2.

5.2 Accordingly, the conclusion set out above for the first and second auxiliary requests apply and the request was not admitted into the proceedings.

6. *Auxiliary request 4*

6.1 The subject-matter of claim 1 of auxiliary request 4 specifies, in addition to the above discussed amendments that the alumina fibre mat which is impregnated in the first step of the process is an alumina/silica based polycrystalline fibre mat.

6.2 Accordingly, all the conclusions in respect of lack of sufficiency set out above for the previous requests still apply. The specification of the material of the alumina fibre mat is of no relevance with regard to the determination method or the combination of bulk density and compression ratio. Accordingly, the skilled person obtains no further information in this respect. Accordingly, the requirements of Article 83 EPC are not met for the reasons discussed above.

6.3 Hence, claim 1 of this request is not clearly allowable and the request was not admitted into the proceedings.

7. *Auxiliary request 5*

7.1 The subject-matter of claim 1 of the fifth auxiliary request specifies further characteristics of the claimed process in that additionally to the above discussed amendments it limits the second compressed thickness in step (ii) to the specific range of 1/2 to 1/15 of the first uncompressed thickness, the thickness C to being in the range of 3 to 10 mm and the clearance D to being in the range of 2 to 8 mm. Moreover, the method for the determination of the restoration surface pressure is specified as being the indirect method which is disclosed in paragraph [0060]. The text of this paragraph is further amended by referring to the thickness C instead of to the thickness D.

7.2 This latter amendment cannot, however, be seen clearly and unambiguously as a correction of an obvious error. Both thicknesses C and D can be identical but do not have to be identical. This is consistent with the large

overlap of the ranges specified in the claim (3 to 10 mm for thickness C and 2 to 8 mm for clearance D).

7.3 Moreover, although the now-claimed indirect method is specified as a preferred method, the description does not indicate that it is this method which has been applied when determining the restoration surface pressure of the examples. Accordingly, it is not unambiguously and clearly derivable from the original disclosure that the data specified for the examples are consistent with the now claimed restoration surface pressure.

7.4 No disclosure is present which links the second compressed thickness in step (ii) to the specific range of $1/2$ to $1/15$ of the first uncompressed thickness with a specific range of the thicknesses C and D, its ratio in the monolith-holding element or with the indirect method for the determination of the restoration surface pressure. Hence, the subject-matter of claim 1 cannot be derived directly and unambiguously from the application as filed (Article 123(2) EPC).

7.5 Additionally, this auxiliary request 5 was filed during the oral proceedings and no reason was indicated why such amendments could not have been filed earlier. For the above reasons claim 1 of auxiliary request 5 is also not clearly allowable and the request was not admitted into the proceedings.

8. *Auxiliary request 6*

8.1 The subject-matter of claim 1 of auxiliary request 6 specifies, additionally to the amendments already

present in the subject-matter of claim 1 of auxiliary request 4, that in the first step of the process the alumina fibre mat is an alumina/silica based polycrystalline fibre mat and the alumina fibres constituting the mat are specified as being mullite fibres containing 72% by weight of alumina.

8.2 All the conclusions set out above for auxiliary request 4 apply. The further specification of the material of the alumina fibre mat is of no relevance with regard to the determination method or the combination of bulk density and compression ratio. Claim 1 is thus not clearly allowable and the request was not admitted into the proceedings.

9. Consequently the appellant-proprietor's main request and auxiliary request 2 do not satisfy the requirements of Articles 100(b)/83 EPC and the auxiliary requests 1, and 3 to 6, are not admissible.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

C. Eickhoff

P. Alting van Geusau