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**Datasheet for the decision  
of 27 August 2010**

**Case Number:** T 0983/07 - 3.3.05

**Application Number:** 03795443.5

**Publication Number:** 1495791

**IPC:** B01D 39/20

**Language of the proceedings:** EN

**Title of invention:**  
Filter

**Applicant:**  
IBIDEN CO., LTD.

**Headword:**  
Honeycomb/IBIDEN

**Relevant legal provisions:**  
EPC Art. 123(2), 52(1)

**Relevant legal provisions (EPC 1973):**  
EPC Art. 84, 54(1)(2), 56

**Keyword:**  
"Added subject-matter - no"  
"Clarity and support by the description: yes"  
"Novelty - yes"  
"Inventive step (yes) - evidence for an improvement in the application"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0983/07 - 3.3.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.05  
of 27 August 2010

**Appellant:**  
(Applicant)

IBIDEN Co., LTD.  
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**Representative:**

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**Decision under appeal:**

**Decision of the Examining Division of the  
European Patent Office posted 22 December 2006  
refusing European application No. 03795443.5  
pursuant to Article 97(1) EPC.**

**Composition of the Board:**

**Chairman:** G. Raths  
**Members:** B. Czech  
S. Hoffmann

## Summary of Facts and Submissions

- I. The appeal is from the decision of the examining division to refuse European patent application No. 03795443.5.
- II. In the course of the substantive examination of the case, the examining division considered the following prior art documents:
- D1: DE 100 37 403 A1
  - D2: US 4 417 908 A
  - D3: US 4 276 071 A
  - D4: FR 2 789 327 A1

The division raised objections concerning the lack of clarity and lack of novelty of the claimed subject-matter and finally refused the application on the ground that the amended claim 1 according to the main request then on file lacked clarity, since it was not unambiguously clear how the length "(a)" was to be measured.

- III. Under cover of its statement of grounds of appeal, the appellant filed four sets of amended claims as new main and auxiliary requests, and argued that the amended claims were clear and that their subject-matter was novel and inventive. It also filed amended description sheets and figures supposed to explain the flow of exhaust gas through the filter.
- IV. In a first communication issued in preparation of the oral proceedings, the board questioned the allowability of some amendments under Article 123(2) EPC and raised several objections as to the clarity of the claims and

- their support by the description. It also questioned the novelty of the claimed subject-matter in view of documents D1 and D4.
- V. Under cover of its reply, the appellant filed two further prior art documents, namely
- D5: US 4 416 6176 A and
- D6: US 4 420 316 A,
- as well as
- D8: a graph,
- and six amended sets of claims as new main and auxiliary requests, arguing that the amendments were based on the description as filed, and that the fresh claims were clear and their subject-matter novel and inventive.
- VI. In a second communication, the board commented on the admissibility of the appellant's requests, on the allowability of the amendments made, still questioned the clarity of the claims according to the new requests, and noted that claim 1 still covered many other configurations than the one disclosed in Figure 6 of the application. The board also referred to a further prior art document cited by the Japanese Patent Office, namely
- D9: EP 1 142 619 A1.
- VII. Under cover of its letter dated 20 August 2010, the appellant filed explanatory drawings, an affidavit from Mr Uchida and four sets of claims as new main and auxiliary requests. The appellant considered that the new claims overcame the pending objections under Articles 123(2) and 84 EPC, and that their subject-matter was novel.

VIII. In a further written submission dated 23 August 2010, the appellant identified and corrected errors in its previous written submission.

IX. Oral proceedings were held on 27 August 2010. In the course of the oral proceedings, the appellant filed an amended new main request comprising amended claims and replacing the requests previously on file, as well as amended figure sheets.

The claims 1 to 5 according to this request read as follows (amendments to the corresponding claims of the application as filed which are not merely editorial highlighted by the board):

*1. A columnar filter having a porous ceramic honeycomb structure in which a number of through holes are placed in parallel with one another in the length direction with wall portion **set to have a thickness without irregularities** interposed therebetween, wherein:*

*said through holes **are of** two types, namely large-capacity through holes having **an octagonal shape and** a relatively larger cross-sectional area in the cross-section perpendicular to the length direction, and*

*small-capacity through holes having **a square shape and** a relatively smaller cross-sectional area in said cross-section;*

***said relatively larger and said relatively smaller cross-sectional areas do not vary, respectively, in said length direction;***

*the respective number of the two types of through holes is substantially set to the same, **and the two types of holes are alternately arranged, and the***

*distance between the centers of gravity for the adjacently located large-capacity through holes on the cross-section and that for the adjacently located small-capacity through holes on the cross-section are equal;*

*wherein on a section perpendicular to the length direction, angles formed at the points where a wall portion, shared by a large-capacity through hole and an adjacent large-capacity through hole, is caused to intersect a wall portion, shared by a large-capacity through hole and an adjacent small-capacity through hole, are obtuse angles,*

*said large-capacity through holes are sealed at one end of said filter while said small-capacity through holes are sealed at the other end of said filter; and*

*wherein the ratio (a/b) of:*

*the total (a) of lengths of wall portion which is shared by said one large-capacity through hole and the adjacent large capacity through hole in the cross section perpendicular to the length direction, **and through which exhaust gases are not allowed to pass perpendicularly,** to:*

*the total (b) of lengths of wall portion which is shared by said one large-capacity through hole and the adjacent small capacity through hole in the cross section perpendicular to the length direction, **and through which exhaust gases are allowed to pass perpendicularly;***

*is defined as  $\alpha$ , and wherein:*

*the ratio (A/B) of the area (A) of said cross section of said large-capacity through hole to the area (B) of said cross section of said small-capacity through hole is defined as  $\beta$ ;*

characterized in that  $\alpha$  and  $\beta$  satisfy the relationship represented by the following formula (2):

$$\beta = (\alpha + 2^{1/2})^2 - 1 \quad \text{where } 2.0 \leq \beta \leq 2.54 \quad (2).$$

2. The filter according to claim 1, having an isostatic strength of 7 MPa or more.

3. The filter according to claim 1 or 2, having a compression strength of A-axis of 18 MPa or more.

4. An aggregate-type filter comprising a plurality of columnar filters according to any one of claims 1 to 3, combined with each other through sealing material layers (13, 14).

5. An apparatus for purifying the exhaust gas used in a vehicle, said apparatus comprising the columnar filter according to any one of claims 1 to 3 or the aggregate-type filter according to claim 4.

X. As far as they concern said new main request, the arguments of the appellant can be summarised as follows:

The appellant held that the amended claims according to the new main request found a basis in the application as filed and were clear and supported by the description.

Neither D1 and D2, nor any of the other documents cited, disclosed the specific octagonal/square through hole geometry as now claimed and as shown in Figures 6(a) to 6(d), having a constant separating wall thickness and satisfying the relationship  $2.0 \leq \beta \leq 2.54$ .

The technical problem consisted in providing improved filters of the type shown in D1, more particularly filters having an improved "recovery limit value" combined with very good strength properties. The prior art did not address the problem of improving the recovery limit value and did not suggest the provision of filters as claimed.

XI. The appellant requested that the decision under appeal be set aside and that a patent be granted in the following version:

- claims 1 to 5 of the main request filed during the oral proceedings,
  - figure sheets 5/20, 9/20 to 11/20, 17/20 to 20/20 and
  - figure sheets 1/20 to 4/20, 6/20 to 8/20, 12/20 to 16/20 as originally filed;
- and that the case be remitted to the first instance for adaptation of the description.

## **Reasons for the Decision**

1. *Allowability of the amendments (Article 123(2) EPC)*

1.1 Some of the amendments to claim 1 are merely of an editorial nature. These and all other amendments find a basis in the application as filed. In the following, reference is made to the relevant passages of the translation into English (received by the EPO on 1 April 2004) of the application originally filed as a Japanese PCT application.

1.1.1 Present claim 1 is based on a combination of original claims 1, 3, 5 and 7. As far as the amendments relate

to the shape and relative arrangement of the through holes, the amendments restrict the ambit of claim 1 to more specific embodiments, which are presented as preferred in the application as filed (see e.g. page 27, lines 14 to 15; page 29, lines 7 to 12; claim 3 thereof), exemplified in example 1 and schematically shown in figures 6(a) to 6(d).

- 1.1.2 The features relating to the thickness of the wall portion interposed between the through holes finds a basis on page 27, lines 2 to 6, in conjunction with the more specific indications on page 40, lines 3 and 4, which relate to example 1 and figures 6(a) to 6(d).
- 1.1.3 The preference for non-tapering through holes is expressed on page 21, lines 29 to 31, and page 30, lines 19 to 21. Moreover, from the statement on page 44, lines 8 to 11, it can be inferred that in example 1, the cross-sections of the through holes do not vary in the length direction of the filter.
- 1.1.4 The amendments relating to the definition of the totals (a) and (b) of lengths of wall portion find a basis on page 10, line 35 to page 11, line 11.
- 1.1.5 Formula (2) now defining the relationship between the parameters  $\alpha$  and  $\beta$  is disclosed on page 31, line 32, in connection with the embodiments shown in figures 6(a) to 6(d). The narrower range for the parameter  $\beta$  finds a basis on page 32, lines 24 to 27, and - in connection with embodiments according to figures 6(a) to 6(d) - on page 50, lines 25 to 26, of the application as filed. The conditions imposed on the parameters  $\alpha$  and  $\beta$  in claim 1 of the application as filed (formula (1)) are

- implicitly fulfilled by the filters according to present claim 1 as amended and need not, therefore, be repeated in the latter.
- 1.2 Present independent claim 5 directed to an "*aggregate filter*" finds a basis on page 17, line 32 to page 18, line 28; page 35, lines 8 to 14; page 36, line 3 to page 37, line 2; in figures 3 and 7; and in claim 8 of the application as filed.
- 1.3 The independent claim 6 directed to an apparatus for purifying exhaust gas used in a vehicle finds its basis on page 37, lines 3 to 5, and in claim 11 of the application as filed.
- 1.4 The board is thus satisfied that all the amendments to the claims find a basis in the application as filed and concludes that the amendments meet the requirement of Article 123(2) EPC.
2. *Clarity of the claims and support by the description*
- 2.1 On the one hand, the amendments restrict the ambit of claim 1 to filters having a specific configuration of the octagonal through holes having a relatively larger cross-sectional area and the square through holes having a relatively smaller cross-sectional area. When viewed in a cross-section perpendicular to the length direction of the filter, the two types of holes are alternately arranged in a pattern which is highly symmetrical. This is inter alia expressed by the added features relating to the wall portion "*thickness without irregularities*" (i.e. all separating walls between the holes being of a same thickness) and by the

fact that the distance between the centres of gravity of two adjacent octagonal holes and two adjacent square holes is the same. Implicitly, when viewing the cross-section, each of the four sides of an octagon faces and runs in parallel to a side of the four neighbouring squares, and each of the other four sides of the octagon faces and runs in parallel to a corresponding side (of the same length) of one of the four neighbouring octagons. By virtue of the totality of the amendments made, claim 1 is now clearly restricted to filters having a cross-sectional hole pattern as shown schematically in figures 6(a) to 6(d). Other hole patterns shown in the figures are no longer covered by claim 1, and this is also clearly indicated in the amended figure sheets filed at the oral proceedings. In this context, the board notes that Figure 9 also relates to a conventional, i.e. prior art, filter, although this is not expressly indicated on the figure sheet (see e.g. page 1, lines 26 to 27; page 4, lines 14 to 15 of the application as filed).

2.2 On the other hand, the board accepts that by virtue of the limitation of the said specific hole pattern (holes of two types with octagonal/square cross-sections, same thickness of all separating wall portions) and the additional incorporation of the features relating to the flow direction ("*perpendicularly*") of the exhaust gases through the wall portions respectively separating the two different types of holes, the skilled person now understands how the parameter values "*(a)*" and "*(b)*" referred to in claim 1 are to be determined.

2.2.1 The value of the parameter "*(b)*" is the length of the wall portion separating ("*shared by*") an octagonal

inlet hole and an adjacent square outlet hole, through which wall portion a gas molecule may flow (in an unclogged filter) on a path perpendicular to the plane defined by the inner surface of the octagonal inlet hole wall. The skilled person will thus measure this length along said inner surface as illustrated schematically by figures 1(A) and 2 filed by the appellant on 20 April 2007 (it is however to be noted that these figures do not appear to relate to embodiments wherein the wall portions all have a same thickness).

2.2.2 Similarly, the skilled person understands that the value of the parameter "(a)" is the length of wall portion separating ("*shared by*") two contiguous octagonal inlet holes, through which wall portion exhaust gas may flow only on a path which is not perpendicular to the plane defined by the wall surface on the inlet hole side. Analogously, the skilled person will also measure this length along the inner surface of the inlet hole wall. However, when determining "(a)", the skilled person has to take into account the length of all wall portions through which gas is not allowed to pass perpendicularly and which are thus not counted when determining "(b)". In accordance with the indications given on page 32, lines 12 to 20, of the application, the skilled person thus understands that all those parts of the inner circumferential length of the inlet hole which are not counted when determining "(b)" are to be considered as belonging to "(a)".

2.2.3 In view of the symmetry of the filters as now claimed, the value of the ratio " $\alpha$ " of "(a)" to "(b)" is the same irrespective of whether the wording relating to

the definition of "(a)" and "(b)" (mix of singular and plural in e.g. "*the total of lengths of wall portion which is shared by said one large capacity through hole and the adjacent large capacity through hole*") is to be understood as referring to the ratio of the sums (around the entire circumference of one octagonal inlet hole) of the lengths of the two types of separating walls (i.e. four octagon/octagon separating walls and four octagon/square separating walls) or to the ratio of the length of one octagon/octagon separating wall to the length of one octagon/square separating wall.

- 2.2.4 The board also considered the contents of the affidavit from Mr Uchida and notes that the alleged imprecisions of certain passages of the translated application as filed have no bearing on the assessment of the case. More particularly, the board holds that in the context of the translated application as filed, taken as a whole, the skilled person would not understand said passages of the application in a manner differing from the one set out in the affidavit.
- 2.3 Claim 1 now relates to a preferred embodiment of the type disclosed in ample detail in the description (see inter alia example 1 and Figures 6(a) to 6(d)) and is thus sufficiently supported by the latter.
- 2.4 The board is also satisfied that claims 2 to 5 are clear and supported by the description.
- 2.5 Claims 1 to 6 thus meet the requirements of Article 84 EPC.

3. *Novelty*

3.1 Document D1 (see claim 1) discloses particle filters for purifying exhaust gases of combustion engines, comprising a plurality of inlet through holes sealed at one end of the filter, and of outlet through holes sealed at the other end of the filter. The parallel inlet and outlet holes extend in the length direction of the filter and are separated by wall portions. The inlet holes have a relatively larger cross-sectional area and the outlet holes have a relatively smaller cross-sectional area.

3.1.1 According to a preferred embodiment (see claims 4 to 8), the filter is made from extruded ceramic material and hence has a columnar honeycomb structure. The inlet and outlet holes are alternately arranged and may have octagonal and square cross-sections, respectively, which cross-sections are constant along the entire length of the filter element. According to claims 2 and 3 of D1, the ratio (designated as  $\beta$  in the application in suit) of the cross-sectional area of the inlet hole to the one of the outlet hole is preferably in the range of from 3 to 4 : 1, and/or the ratio of the circumference of the inlet holes to the one of the outlet holes is about 1.5 to 2 : 1.

3.1.2 The board notes that the entire document D1 is silent about whether or not the thickness of the porous wall portions separating adjacent octagonal and square holes is the same as the one between adjacent octagonal holes throughout the filter structure.

3.1.3 Moreover, the claims of D1 taken alone are silent about the relative spatial configuration of the octagonal and square holes.

Concerning the embodiment shown in the drawings of D1, it is stated in D1 (column 2, lines 46 to 51) that the ratio (designated as  $\beta$  in the application in suit) of the cross-sectional area of the octagonal inlet holes to the one of the square holes is in the range of from 3 to 4 : 1 and that the ratio of their circumferences is from about 1.5 to 2 : 1.

On the one hand, the range of 3 to 4 which is expressly indicated is outside the range for  $\beta$  specified in present claim 1 ("2 to 2.54").

On the other hand, even accepting that, despite its merely schematical nature, Figure 2 of D1 showed a hole pattern wherein the four side lengths of an octagon were equal to the side length of a square, the board concurs with the appellant that a circumferential ratio between 1.5 and 2 would implicitly correspond to a value for  $\beta$  of between about 2.6 and 4.8, i.e. in a range outside the range specified in present claim 1.

Moreover, it is noted that the range of  $\beta$  values derivable when considering Figure 3 of D1 in this manner differs substantially from the range of  $\beta$  values expressly specified in the corresponding description passage. This raises doubts as to the range of  $\beta$  values actually disclosed in connection with the said figure.

3.1.4 The board thus concludes that D1 neither explicitly nor implicitly discloses directly and unambiguously a filter with all the features of present claim 1.

3.2 Document D4 (see abstract; claims 1, 5 and 7; figures 1, 5 and 6) also discloses particle filters for purifying exhaust gases of combustion engines, comprising a plurality of inlet through holes sealed at one end of the filter, and of outlet through holes sealed at the other end of the filter. The parallel inlet and outlet holes extend in the length direction of the filter and are separated by wall portions. The inlet holes have a relatively larger octagonal cross-sectional area and the outlet holes have a relatively smaller square cross-sectional area.

3.2.1 The specific embodiments described in examples 5 and 6 of D1 have a highly symmetrical hole pattern wherein the thickness of the wall portions separating two adjacent octagonal holes or two adjacent octagonal and square holes is expressly stated to be the same (see D4, page 8, lines 14 to 15:  $e_1 = e_2 = 0.356$  mm), although this feature is not shown in Figure 5 illustrating inter alia these two specific embodiments. Based on additional indications given in these two examples concerning the geometry of the hole pattern (regular octagon, the side lengths of the octagon and square are all the same), the value for the parameter  $\beta$  can be computed to be about 4.8, i.e. a value outside the range of present claim 1.

3.2.2 In the other examples of D4 with octagonal/square holes, namely examples 4 (see Figure 5 and page 8, lines 1 to 13) and 7 (see Figure 6 and page 8, lines 18 to 29),

the thickness of the walls separating two adjacent octagonal cells ( $e_1 = 0.432$  mm) differs significantly from the thickness of the walls separating an octagonal and the adjacent square cells ( $e_2 = 0.356$  mm), in contrast to what is required by present claim 1, namely a same wall thickness between all holes ("*thickness without irregularities*").

- 3.3 Document D3 (see figures 5m and 5p) inter alia discloses ceramic exhaust gas filters with through holes which could arguably be considered as having octagonal and square cross-sectional areas, with curved walls separating the inlet and outlet holes. However, the figures are of a schematical nature only and no specific information can be inferred therefrom as to the values of  $\alpha$  and  $\beta$  (in the sense of present claim 1) to be considered. Moreover, embodiments of this type are no longer covered by present claim 1 (see amended figure sheets 10/20 and 11/20, especially figures 11(a), 11(c), 12(c) and 12(d)).
- 3.4 None of the other documents cited in the examination and/or appeal procedure and/or in the International Search Report or the Supplementary European Search Report discloses filters having through holes of octagonal and square shapes, let alone in the very specific geometric configuration defined in present claim 1.
- 3.5 The subject-matter of claim 1, and consequently of claims 2 and 3 dependent thereon, is thus novel. Independent claims 5 and 6 relate, respectively, to an aggregate filter and an apparatus for purifying exhaust gases which comprise one or more filters according to

claim 1. Consequently, their subject-matter is also novel.

Claims 1 to 5 thus meet the requirement of Article 52(1) in conjunction with Article 54(1) and (2) EPC.

4. *Inventive step*

4.1 For the board, document D4, which is acknowledged as prior art in the description of the application in suit, represents the most reasonable starting point for the assessment of inventive step, since it discloses filters with a highly symmetrical through hole configuration (octagonal/square cross-sectional areas as defined in present claim 1; same thickness between all through holes) and, like the application in suit, aims at providing exhaust gas filters permitting a longer period of particle filtration before requiring a regeneration of the filter.

4.2 According to the application in suit, the aim of the invention is to provide ceramic honeycomb filters overcoming the various deficiencies of the different previously known filters, i.e. filters which are improved in terms of their properties such as maintenance of a low pressure loss, high particle collection capacity, long operating period before recovery, high resistance to cracking and high isostatic and compressive strength when used as exhaust gas filters (see page 8, line 16, to page 9, line 17).

4.3 Starting from example 5 or 6 of D4 as the closest prior art, the technical problem can be seen in providing an improved ceramic honeycomb filter.

- 4.4 As a solution to this technical problem the application in suit proposes a filter according to claim 1 which is characterised by a specific geometric configuration of the inlet and outlet through holes, and more particularly by ratios  $\alpha$  and  $\beta$  satisfying the relationship  $\beta = (\alpha + 2^{1/2})^2 - 1$ , where  $2.0 \leq \beta \leq 2.54$ .
- 4.5 The data reported in the application in suit convincingly show that the technical problem stated under point 4.3 is indeed solved by filters having a through hole configuration according to the present amended claim 1:
- 4.5.1 When comparing the properties, reported in Table 1 of the application, of the filters of examples 7 to 13 falling within the ambit of present claim 1 (prepared as described in example 1; hole configuration as shown schematically in figures 6(a) to 6(d); "Aperture ratio  $\beta$ " as indicated in Table 1) to the properties of the other filters, the following can be noted:
- 4.5.2 The filters of examples 7 to 13 combine the highest isostatic strength values (9.0 to 9.4 MPa) and the highest "recovery limit values" (9.1 to 9.5 g/L) of all filters tested, with the lowest or second lowest initial pressure loss values (1.5 or 1.6 kPa), the lowest or second lowest pressure losses (11.1 or 11.2 kPa) upon a particle collection of 8 g/L, and the second highest compression strength values (27.8 to 28.8 MPa) reported.
- 4.5.3 Compared to other filters of the type shown in figures 6(a) to (d) with a  $\beta$  value of less than 2, i.e. examples 1 to 6, the filters according to present

claim 1 are improved by virtue of their significantly higher recovery limit value (expressing the resistance to cracking) and their significantly smaller pressure loss increase, and can thus be operated for a longer period before a recovery process becomes necessary.

4.5.4 Compared to other filters of the type shown in figures 6(a) to (d) with a  $\beta$  value of more than 2.54, i.e. examples 15 to 24 and comparative examples 1 and 2, the filters according to present claim 1 are improved by virtue of their significantly lower initial pressure drop, and significantly higher recovery limit values and isostatic and compression strength values.

4.5.5 Summarising, compared to the various previously known filters, including the ones of the closest prior art, the filters according to present claim 1 are indeed improved since they have the highest recovery limit values (see also document D8) in combination with a very good balance of the other relevant properties.

4.6 Hence, it remains to be assessed whether the claimed solution to the stated technical problem was obvious in the light of the prior art.

4.6.1 Document D4 itself is focused on the concept of providing filters wherein the total volume of the inlet through holes is larger than the total volume of the outlet through holes in order to achieve a long operating time of the filter (page 2, lines 18 to 25; claim 1). The alternative with the through hole geometry described in examples 5 and 6 of D4 is presented as one out of several possibilities for implementing this concept.

However, the impact of the ratio of the two through hole cross-sectional areas on other properties of the filter than the said volume ratio is neither investigated nor even addressed. Examples 5 and 6 of D4 implicitly teach a value for  $\beta$  of about 4.8. Figure 6 of D4 belonging to example 7 appears to teach a much lower value for the ratio  $\beta$ . As pointed out by the appellant, assuming that the sides of the square hole and the contiguous side of the octagonal hole are of a same length  $b$  (which is not stated in the text), a value of  $\beta$  of about 1.6 could be computed. Figure 6 of D4, although of schematical nature, appears however to show that the face of the square is longer than "b", and that an even lower value of  $\beta$  would thus have to be assumed.

Under these circumstances, the skilled person trying to improve the filters as described in examples 5 or 6 of D4 is not induced to modify the latter by changing the through hole geometry such as to achieve a  $\beta$  value within the range of claim 1.

4.6.2 D1 is focused on providing a larger filtering surface to thereby achieve a slower increase in pressure drop and a longer period of use by foreseeing inlet holes having a relatively larger cross-sectional area than the outlet holes (sections [0006] and [0008]; claim 1).

4.6.3 However, in connection with an octagonal/square through hole geometry, D1 expressly recommends a  $\beta$  value of 3 to 4 : 1. Implicitly, other values (from about 2.6 to 4.8) outside the range of present claim 1 appear to be suggested as well in connection with such a through

hole geometry 8 (see above point 3.1.3, last two paragraphs).

Since the skilled person could not derive from D1 that a highly symmetrical octagonal/square through hole geometry described in examples 5 and 6 could be improved by modifying the latter such as to obtain a  $\beta$  value within the range of claim 1, even a combination of the teachings of D4 and D1 cannot lead the skilled to the subject-matter of claim 1 in an obvious manner.

4.7 None of the other documents cited in the examination and/or appeal procedure and/or in the International Search Report or the Supplementary European Search Report discloses filters having through holes of octagonal and square shapes, let alone in the very specific geometric configuration defined in present claim 1. Nor do these documents contain some other relevant information which could induce the skilled person to modify the filters of examples 5 or 6 of D4 such that their  $\beta$  value would fall into the range of present claim 1.

4.8 The subject-matter of claim 1, and consequently of claims 2 and 3 dependent thereon, is thus based on an inventive step. Independent claims 5 and 6 relate, respectively, to an aggregate filter and an apparatus for purifying exhaust gases which comprise one or more filters according to claim 1. Consequently, their subject-matter is also based on an inventive step.

Claims 1 to 5 thus meet the requirement of Article 52(1) in conjunction with Article 56 EPC.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the claims according to the main request filed during the oral proceedings and figure sheets 5/20, 9/20 to 11/20, 17/20 to 20/20 also filed during the oral proceedings and figure sheets 1/20 to 4/20, 6/20 to 8/20 and 12/20 to 16/20 as originally filed, and a description to be adapted.

The Registrar

The Chairman

G. Röhn

G. Rath