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Datasheet for the decision of 10 March 2011

Case Number: T 1045/08 - 3.2.07

Application Number: 98204481.0

Publication Number: 0933178

IPC: B28B 1/00

Language of the proceedings: EN

Title of invention:
Reinforced ceramic structures

Patentee:
The Boeing Company

Opponent:
Airbus SAS

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 84, 114(2), 123(2)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Documents filed shortly before oral proceedings: admitted into the proceedings (point 1)"
"Auxiliary requests filed during the oral proceedings: admitted into the proceedings (point 2)"
"Novelty: yes (main request)"
"Inventive step: no (main request, second and third auxiliary requests)"
"Added subject-matter: yes (first auxiliary request)"
"Clarity: yes (second auxiliary request)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1045/08 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 10 March 2011

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 2 April 2008 rejecting the opposition filed against European patent No. 0933178 pursuant to Article 101(2) EPC.

Composition of the Board:

Chairman: E. Dufrasne
Members: P. O'Reilly
H. Hahn

Summary of Facts and Submissions

I. Opposition was filed against European patent No. 0 933 178 as a whole based on Article 100(a) EPC (lack of novelty and lack of inventive step).

The opposition division decided to reject the opposition.

II. The appellant (opponent) filed an appeal against that decision.

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

The respondent (patent proprietor) requested as main request that the appeal be dismissed or, alternatively that the decision under appeal be set aside and the patent be maintained in amended form on the basis of, one of the first to third auxiliary requests filed during the oral proceedings before the Board.

IV. Claim 1 of the **main request** reads as follows:

"A reinforced ceramic structure, comprising:

a body (32; 70; 75; 94; 96) of cast silica/calcium aluminate based ceramic material; and
a plurality of reinforcing rods (50), made of monolithic fused oxides of silicon or aluminum, cast into said ceramic body (32; 70; 75; 94; 96):

characterized in that said rods (50) have a coefficient of thermal expansion substantially equal to the

coefficient of thermal expansion of said cast ceramic body (32; 70; 75; 94; 96) and a flexural strength at least five times greater than that of said ceramic body (32; 70; 75; 94; 96)."

Claim 1 of the **first auxiliary request** reads as follows (amendments when compared to claim 1 of the **main request** are depicted in bold or struck through by the Board):

"A reinforced ceramic ~~structure~~ **die used for superplastic forming or forging a metal part (35; 80; 100)** comprising:

- a body (32; 70; 75; 94; 96) of cast silica/calcium aluminate based ceramic material; and
- a plurality of reinforcing rods (50), made of monolithic fused oxides of silicon or aluminum, cast into said ceramic body (32; 70; 75; 94; 96):

characterized in that

a) said rods (50) have a coefficient of thermal expansion substantially equal to the coefficient of thermal expansion of said cast ceramic body (32; 70; 75; 94; 96); ~~and~~
b) said rods (50) have a flexural strength at least five times greater than that of said ceramic body (32; 70; 75; 94; 96)**; and**
c) said rods (50) have a thickness between 3.2 and 51 mm (1/8" - 2.0")."

Claim 1 of the **second auxiliary request** reads as follows (amendments when compared to claim 1 of the

first auxiliary request are depicted in bold or struck through by the Board):

"A reinforced ceramic die used for ~~superplastic forming or forging a metal part (35; 80; 100)~~ **forging or superplastic forming and diffusion bonding of aluminium and titanium alloys and other materials that can be formed at elevated temperature,** said die comprising:

- a body (32; 70; 75; 94; 96) of cast silica/calcium aluminate based ceramic material; and
- a plurality of reinforcing rods (50)~~, made of monolithic fused oxides of silicon or aluminum,~~ cast into said ceramic body (32; 70; 75; 94; 96);

wherein said reinforcing rods (50) are made of monolithic fused oxides of silicon or aluminium;

characterized in that

a) said **reinforcing** rods (50) have a coefficient of thermal expansion substantially equal to the coefficient of thermal expansion of said cast ceramic body (32; 70; 75; 94; 96);
b) said **reinforcing** rods (50) have a flexural strength at least five times greater than that of said ceramic body (32; 70; 75; 94; 96); ~~and~~
c) ~~said~~ **the reinforcing** rods (50) have a thickness between 3.2 and 51 mm (1/8" - 2.0")."

Claim 1 of the **third auxiliary request** reads as follows (amendments when compared to claim 1 of the **second auxiliary request** are depicted in bold or struck through by the Board):

"A reinforced ceramic die used for forging or superplastic forming and diffusion bonding of aluminium and titanium alloys and other materials that can be formed at elevated temperature, said die comprising:

- a body (32; 70; 75; 94; 96) of cast silica/calcium aluminate based ceramic material; and
- a plurality of reinforcing rods (50) cast into said ceramic body (32; 70; 75; 94; 96);

wherein said reinforcing rods (50) are made of monolithic fused oxides of silicon or aluminium;

characterized in that

a) said reinforcing rods (50) have a coefficient of thermal expansion substantially equal to the coefficient of thermal expansion of said cast ceramic body (32; 70; 75; 94; 96);
b) said reinforcing rods (50) have a flexural strength at least five times greater than that of said ceramic body (32; 70; 75; 94; 96);
c) the reinforcing rods (50) have a thickness between 3.2 and 51 mm (1/8" - 2.0") **and**
d) the rods (50) have centers that are spaced apart from each other by 2 - 10 times the diameter of said rods."

V. The documents cited in the present decision are the following:

D4: US-A-5 467 626

D6: "Matériaux Réfractaires et Céramiques Techniques", in I. Eléments de Céramurgie et de Technologie, Giovanni Aliprandi et al., Editions Septima, pages 85 - 106, 297 - 337 and 389 - 408

D7: "Introduction to Ceramics", Second Edition,Kingery, Bowen & Uhlmann, John Wiley & Sons, pages 583 - 645 and 768 - 815

D8: Quartz - Chemical Composition, extract from website www.momentivequartz.com

D9: "More about Glass, Ceramics and Carbon - Mechanical and Physical Properties", Document 8477KAC, McMaster-Carr Supply Company, 2008

D10: "Ceradyne Thermo-Sil® Castable 220 Fused Silica", MatWeb Material Property Data, extract from website www.matweb.com

D11: GB-A-936 129

D12: US-A-3 607 325

D13: US-A-4 905 750.

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

(i) D11 to D13 should be admitted into the proceedings.

With letter dated 28 January 2011 the respondent filed auxiliary requests. It was necessary to carry out an extra search to look for the subject-matter of the claims of these requests. During the course of this search D11 to D13 were found. These documents are relevant and should therefore be introduced into the proceedings. D11 is particularly relevant for the auxiliary requests 2 to 4 of those requests since it discloses the use of fused silica rods as reinforcement for a ceramic die (see page 2, lines 17 to 24) for use

in forming metals (see page 1, lines 9 to 11). D12 is relevant as it takes away the novelty even of claim 1 of the main request. D13 is relevant as it shows reinforcement with quartz tubing (see column 3, lines 42 to 44). Even though quartz was mentioned in claim 1 as granted it was specified as an alternative to silica so that a search could at the time of filing the opposition be stopped once silica was found.

(ii) The third auxiliary request filed during the oral proceedings should not be admitted into the proceedings since it is late filed and does not change the situation in respect of D12.

(iii) The subject-matter of claim 1 of the main request is not novel over D12.

D12 discloses all the features of claim 1. In particular the rodlike reinforcing particles disclosed in D12 are rods in the sense of the claim. As admitted by the respondent they have a size between 0.67 and 0.74 millimetres which is of the same order as those mentioned in the patent in suit (see claim 2). Also claim 1 does not give any size limitations so that these particles must be considered to be rods. D7 gives information regarding the coefficients of thermal expansion and the flexural strength of the materials mentioned in D12. From this information it can be deduced that the rods have a coefficient of thermal expansion substantially equal to the coefficient of thermal expansion of said cast ceramic body and have a flexural strength at least five times greater than that of said ceramic body.

(iv) The subject-matter of claim 1 of the main request does not involve an inventive step.

Taking D12 as the closest prior art, in column 2, lines 15 to 19 of this document reference is made to the coefficient of thermal expansion which shows that it was a known relevant parameter. It is well known that thermal stresses should be avoided to improve durability. It is also well known that thermal stresses can be avoided by ensuring that the materials have coefficients of thermal expansion that do not differ too much. Therefore the skilled person would provide this feature.

The feature whereby the flexural strength of the reinforcing rods is at least five times greater than that of the ceramic material provides no technical effect and hence no contribution to the inventive step. As reinforcing rods they should be substantially stronger than the material that they are reinforcing and the value of at least five times greater is arbitrary.

(v) Some of the amendments made to claim 1 of the first auxiliary request do not comply with Article 123(2) EPC.

The claim has been limited to a "reinforced ceramic die used for superplastic forming or forging a metal part". There is no basis in the application as originally filed for this amendment. The opening paragraph of the application as originally filed does not refer to superplastic forming or forging of metal parts in general, but rather to such treatment to be applied to

specific metals and other materials at elevated temperatures. Also claim 10 as originally filed cannot provide a basis since that is a method claim which does not disclose features of an apparatus.

(vi) The amendment made to claim 1 of the second auxiliary request is not clear.

The claim refers to "other materials that can be formed at elevated temperatures". This definition is vague and the other materials are not specified.

(vii) The subject-matter of claim 1 of the second auxiliary request does not involve an inventive step.

Claim 1 of this request is now directed to a die for superplastic forming of amongst other things materials that can be formed at elevated temperatures. The skilled person would recognise that the die known from D12 could be suitably employed for this purpose since he would recognise that the reinforcing particles present in this die would make it suitable, at the very least by a suitable choice of materials.

The extra feature of the range of sizes for the rods is obvious to the skilled person. Only the thickness is specified without indicating their length or shape. Also, the size of the die is not given. Without this information no effect can be considered to arise and indeed no effect of the specified range is disclosed in the patent. Moreover, at least the lower end of the stated range is close to the values that can be derived from D12.

(viii) The subject-matter of claim 1 of the third auxiliary request does not involve an inventive step.

The specified spacings can be those between non-adjacent rods so that the rodlike particles disclosed in D12 would certainly fulfil this criterion. In any case no technical effect is achieved by this feature since there no ordered arrangement for the rods is specified which could lead to an effect.

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

(i) No objection is made to the admission of D6 to D10 into the proceedings. However, D11 to D13 should not be admitted since they are late filed and not relevant.

Although claim 1 of each of the auxiliary requests 2 to 4 filed with letter dated 28 January 2011 are limited to quartz rods this feature was already contained in claim 1 as granted as an alternative to silica so that it is not a new feature which would justify the admission of new documents D12 and D13 which mention this feature. Also, the "rodlike" particles disclosed in D12 do not constitute rods as specified in claim 1 of all the requests so that also this disclosure of D12 does not make it relevant. In D11 the base material is neither silica nor calcium aluminate so that also this document is not relevant.

(ii) The auxiliary requests filed during the oral proceedings should be admitted into the proceedings.

The auxiliary requests filed during the oral proceedings are to meet objections raised against the auxiliary requests filed before the oral proceedings and to meet grounds based on D12.

(iii) The subject-matter of claim 1 of the main request is novel.

D12 does not disclose any rods as specified in claim 1. The rodlike particles mentioned in D12 are particles not rods since they have a size between 0.67 and 0.74 millimetres, even if they are stated to be rodlike. D7 cannot be used to interpret D12 since the materials mentioned therein are not necessarily the same as those mentioned in a general manner in D12. Therefore, the features of the coefficient of thermal expansion of the rods being substantially equal to the coefficient of thermal expansion of the cast ceramic body and the rods having a flexural strength at least five times greater than that of ceramic body are also not disclosed in D12.

(iv) The subject-matter of claim 1 of the main request involves an inventive step.

Considering the arguments of the appellant starting from D12 there is no disclosure of the feature that the rods have a coefficient of thermal expansion substantially equal to the coefficient of thermal expansion of said cast ceramic body. The reference in D12 in column 2, lines 15 to 19 to a low coefficient of thermal expansion for the particles gives no information regarding a comparison with the base material. It merely indicates that it is low. Also there is no reference to the flexural strength.

(v) The amendments made to claim 1 of the first auxiliary request comply with Article 123(2) EPC.

A basis for the amendment to the first part of the claim can be found in the first paragraph of the description of the application as originally filed as well as in claim 10 as originally filed. The other feature is taken from claim 2 of the application as originally filed.

(vi) The amendment made to the introductory part of claim 1 of the second auxiliary request is clear and does not contain added subject-matter.

A basis for the amendment can be found in the first paragraph of the application as originally filed.

Also, the materials other than titanium and aluminium are envisaged in so far as they can be formed at elevated temperatures. Therefore they are clearly defined.

(vii) The subject-matter of claim 1 of the second auxiliary request involves an inventive step.

The rods according to this request are clearly rods and not rodlike particles as disclosed in D12 since the size of the rodlike particles is clearly smaller than the range of sizes for rods as specified in the claim. In the composition known from D12 the rodlike particles are distributed homogeneously whereas according to the invention they are distributed in a certain way.

(viii) The subject-matter of claim 1 of the third auxiliary request involves an inventive step.

The spacing between the rods is clearly the spacing between adjacent rods. In D12 no structure is disclosed for the rodlike particles and hence there is no certain spacing therebetween.

Reasons for the Decision

1. *Admissibility of late filed documents*

1.1 With its grounds of appeal the appellant filed D6 to D10. These documents relate essentially to the background art in the form of textbooks and information about the properties of materials. At the oral proceedings before the Board the respondent indicated that it did not object to their admission into the proceedings.

The Board also had no objection and therefore admitted the documents into the proceedings.

1.2 D11 to D13 were filed with the submission of the appellant dated 28 February 2011, i.e. 10 days before the oral proceedings before the Board. The appellant argued that the filing of these documents was a response to the auxiliary requests 1 to 4 filed by the respondent with letter dated 28 January 2011. The appellant further argued that they were relevant and hence should be admitted into the proceedings.

The respondent argued that the documents were not relevant and hence should not be admitted into the proceedings.

1.3 The Board considered that the documents were a response to the newly filed auxiliary requests 1 to 4 of the respondent, since the documents at least arguably disclosed features contained in the independent claims of those requests. Where a party files new requests in appeal proceedings the other party must have the possibility of responding to these including the filing of new prior art documents, particularly when, as in the present case, some of the amendments to the claims of the requests are based on features taken from the description of the patent. In this situation the concept of "late filed" must be considered relatively since the documents could not have been filed earlier because the party could not know the content of the future requests of the other party.

1.4 The Board hence also admitted D11 to D13 into the proceedings.

2. *Admissibility of requests filed during the oral proceedings*

2.1 The final forms of the auxiliary requests of the respondent were all filed during the oral proceedings before the Board. Some amendments made to the claims of these requests were made in part to deal with objections to the form of the claims filed as the auxiliary requests with letter dated 28 January 2011 in particular in relationship to clarity and added subject-matter. The amendments made to the second and

third auxiliary requests included the addition of features taken from claims 2 and 3 respectively of the patent as granted. The respondent argued that these amendments were intended to distinguish the respective claims further from the disclosure of D12.

2.2 The Board notes that the admission of D12 into the proceedings means that the respondent must also be allowed to defend itself against the disclosure of this document, in particular by filing new requests. The admissibility of such requests during oral proceedings will depend in particular upon whether they are directed to defending against the recently filed document and/or new objections and are not ones which could have been filed earlier in view of the documents then in the proceedings. In filing a relevant document shortly before oral proceedings a party must accept that the other party may file appropriate new requests also during the oral proceedings, which may raise issues not previously addressed in the proceedings. This may not apply to requests which could reasonably have been filed before the new document was filed.

2.3 The Board considered that in the present case the auxiliary requests filed in the oral proceedings responded to objections to the earlier filed requests in particular in view of the newly introduced documents so that it admitted them into the proceedings.

Main request

3. *Novelty*

3.1 The appellant argued that the disclosure of D12 took away the novelty of the subject-matter of claim 1 of this request. In this respect the appellant considered that the information regarding coefficients of thermal expansion and flexural strength disclosed in D7 could be applied to the materials disclosed in D12 in order to derive their relative coefficients of thermal expansion and flexural strengths.

3.2 The respondent argued that the rodlike particles disclosed in D12 are not rods in the sense of claim 1 and do not have a coefficient of thermal expansion substantially equal to the coefficient of thermal expansion of said cast ceramic body or a flexural strength at least five times greater than that of said ceramic body. In support of this argument the appellant referred to the properties of the materials of the ceramic body and of the particles as mentioned in D12 which are set out in D7 (see pages 595 and 791).

With respect to the feature of the reinforcing rods claim 1 of the patent in suit places no dimensional or functional limitations on these apart from having some form of reinforcement function. The rodlike particles disclosed in D12 also perform a reinforcing function (see column 8, lines 13 to 18). The respondent also argued that particles cannot be rods. However, the size of the particles disclosed in D12 (see column 8, lines 24 to 29) is apparently 0.65 to 0.74 millimetres (according to the calculations of the respondent). According to claim 2 of the patent in suit the rods may have a thickness of from 3.2 to 51 millimetres. The minimum preferred size is thus about four times greater

than the size of the prior art rodlike particles and thus of the same order of magnitude.

The argument of the respondent thus cannot be accepted and the Board considers that the prior art rodlike particles constitute rods in the sense of claim 1.

3.3 The Board notes that D12 indicates the aluminous cements used in the ceramic composition in a general form (see column 3, lines 60 to 73) and that the rodlike particles are formed from fused silica (see column 4, lines 29 to 31 and 55 to 60). The coefficient of thermal expansion of a material will normally depend upon its particular composition and how it was made, i.e. its structural properties.

The respondent argued that the information contained in D7 could not be applied to D12.

In the view of the Board D12 does not supply sufficient information in this respect to enable conclusions to be drawn when attempting to apply to it the information contained in D7. It is therefore not possible to unambiguously derive values for the coefficients of thermal expansions of the materials as described in D12. In the absence of this information it is not possible to calculate whether the feature of claim 1 according to which the coefficient of thermal expansion of the rods is substantially equal to the coefficient of thermal expansion of the cast ceramic body was disclosed in D12.

The Board therefore considers that this feature of claim 1 is not disclosed in D12.

3.4 The same considerations apply to deriving values for the flexural strengths by reference to D7, whereby the lack of information in D12 regarding the exact form and size of the rodlike particles makes it even more difficult to derive values for their flexural strength.

The Board therefore considers that also this feature of claim 1 is not disclosed in D12.

3.5 Therefore, the subject-matter of claim 1 of this request is novel in the sense of Article 54 EPC.

4. *Inventive step*

4.1 The appellant argued lack of inventive step starting from several different documents. For the purposes of the present decision it is only necessary to consider the argumentation starting from D12 as the closest prior art document. As explained above with respect to novelty the subject-matter of claim 1 is distinguished over the disclosure of D12 by the features that the rods a) have a coefficient of thermal expansion substantially equal to the coefficient of thermal expansion of the cast ceramic body and b) have a flexural strength at least five times greater than that of the ceramic body.

4.2 The problem to be solved by feature a) is to avoid thermal stress in the ceramic structure so as to improve durability. No particular special effect is disclosed in the patent resulting from the provision of this feature (see column 8, lines 11 to 21).

It is common knowledge that in many situations when structures are formed from more than one material and may be subject to temperature variations then account must be taken of the thermal compatibility of the materials, i.e. their coefficients of thermal expansion, in order to avoid stresses arising. This may include choosing the materials such that these coefficients are substantially the same and thus do not produce a thermally induced stress due to differing rates of expansion upon heating. In the patent in suit it is explained that such stresses occur when a ceramic structure is reinforced with steel (see column 3, lines 2 to 6 of the patent in suit). This was therefore also a known problem in the technical area of the patent in suit. A close match of the coefficients of thermal expansion is indicated (see column 8, lines 11 to 14), without any mention of any effect beyond that which would be expected.

The provision of this feature in the die known from D12 is therefore obvious to the skilled person.

4.3 The problem to be solved by feature b) is apparently to increase the modulus of rupture of the structure (see column 3, lines 48 to 52). This is a known problem in the technical area of superplastic forming dies (see column 2, lines 6 to 9).

The provision of reinforcing material to solve the problem was known (see column 2, lines 10 to 15).

Feature b) is intended to solve the problem by specifying a particular minimum value for the flexural

strength of the reinforcing rods compared to the ceramic material.

It is not indicated in the patent in suit that any special effect is achieved by the minimum value of at least five times. The Board considers that it lies in the nature of a reinforcing member that its strength is superior to the strength of the material that it is reinforcing. In the absence of any special effect having been disclosed it must be considered that the ratio of five is an arbitrary selection and that the skilled person would ensure that the strength of the reinforcing members is considerably more than that of the ceramic material.

The provision of also this feature in the die known from D12 is therefore obvious to the skilled person.

4.4 No synergistic effect has been proven for the simultaneous provision of features a) and b).

4.5 Therefore, the subject-matter of claim 1 of the main request does not involve an inventive step in the sense of Article 56 EPC.

First auxiliary request

5. *Added subject-matter - Article 123(2) EPC*

5.1 Claim 1 of this request has been limited to a die for superplastic forming or forging a metal part. Also, the features of dependent claim 2 of the patent as granted have been added.

5.2 As a basis for the first amendment the respondent referred to the first paragraph of the description as well as claim 10, both of the application as originally filed.

The first paragraph of the application as originally filed cannot, however, provide a basis since that paragraph did not refer to metals in general but rather to particular metals, namely aluminium and titanium alloys.

Also, claim 10 cannot provide a basis since that claim was directed to a process and not to a die as in the claim under consideration.

5.3 Claim 2 of the patent as granted was present in the application as originally filed also as claim 2, so that this provides a basis for the second amendment.

5.4 Therefore, some of the amendments made to claim 1 of the first auxiliary request do not comply with Article 123(2) EPC.

Second auxiliary request

6. *Added subject-matter and clarity*

6.1 Claim 1 of this request has been limited to "a reinforced ceramic die used for forging or superplastic forming and diffusion bonding of aluminium and titanium alloys and other materials that can be formed at elevated temperature".

6.2 The respondent gave the first paragraph of the description of the application as originally filed as a basis for this amendment. The appellant accepted that this provided a basis. Also the Board agrees.

6.3 Compared to claim 1 of the patent as granted this claim further specifies a range for the thickness of the rods. This feature was present in claim 1 of the first auxiliary request and as indicated above (see point 5.3) it has a basis in claim 2 as originally filed.

6.4 The appellant argued that the references to "other materials" and "elevated temperature" were vague and unclear. The Board does not agree. The reference to "other materials that can be formed at elevated temperature" may be broad but is not unclear. An elevated temperature is one which requires the temperature to be raised, i.e. elevated, which means raised above room temperature and this qualifies the expression "other materials". The claim therefore includes all materials which, when their temperature is raised above room temperature, can be superplastic formed.

6.5 The Board is therefore satisfied that the claim as amended complies with Articles 84 and 123(2) EPC.

7. *Inventive step*

7.1 The subject-matter of claim 1 of this request is distinguished over that of the main request essentially in that the ceramic structure is limited to being a die for superplastic forming or forging of metal parts and

in that a range for the thickness of the reinforcing rods is specified.

7.2 D12 is concerned with dies, though not explicitly with superplastic metal forming dies. Such dies are subjected to pressure so that the metal parts therein are deformed to reach the desired shape, cf. D4. The appellant argued that the skilled person considering the teaching of D12 would recognise that the presence of reinforcing structures in the die would mean that it could also be used for a superplastic forming die. The appellant further argued that even if as disclosed it was not necessarily immediately suitable for this purpose it could nevertheless be so used with a suitable choice of materials and shape.

The Board agrees with the appellant. According to the description of the patent (see paragraph [0008]) the use of reinforcing fibres has been investigated in this technical area. This would mean that the skilled person would recognise that D12 might, depending upon its material, be suitable for this purpose or at least would be suitable after selection of appropriate material for the ceramic structure.

The Board concludes that the provision of this feature cannot be considered to require any inventive step from the skilled person.

7.3 Concerning the range for the thickness of the reinforcing rods the description of the patent merely states one value within this range (see column 5, lines 40 to 44) without any indication of any special significance. As pointed out by the appellant an

indication of the thickness of the rods without any indication of their lengths or the size of the die means that it is not possible to derive any effects from the provision of the feature.

The Board concludes that the provision of this feature cannot be considered to require any inventive step from the skilled person.

7.4 No synergistic effect has been proven for the simultaneous provision of the above mentioned features.

7.5 Therefore, the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

Third auxiliary request

8. *Inventive step*

8.1 Claim 1 of this request contains the extra feature that the rods have centers that are spaced apart from each other by 2 - 10 times the diameter of said rods.

The appellant argued that the provision of this feature does not produce any special effect. It pointed out that only the distance between the centers is given without any particular order being specified, e.g. being parallel. The appellant further argued that the spacings did not have to be between adjacent rods so that the criteria would virtually always be fulfilled in particular in the ceramic structure disclosed in D12.

The respondent disagreed with the appellant regarding the spacing arguing that the spaced apart centers must refer to adjacent rods and pointing out that in D12 there was no order in the arrangement of the rods.

8.2 The Board agrees with the respondent that the expression "spaced apart from each other" implies that it must be the distance to adjacent rods that is implied.

With regard to any possible effects the Board notes that in the description of the patent an arrangement of two or more orthogonally arranged rows of rods is described with the rods in a row spaced apart from each other by about 1 - 5 times the diameter of said rods and the rows spaced from each other by about ½ - 3 times the diameter of said rods (see column 5, lines 40 to 47). No special effect is disclosed as resulting from this arrangement.

The Board notes that the definition in the claim gives no indication of any structure in the arrangement of rods, e.g. arranged in rows, so that any arguments based on structure cannot be considered.

The Board agrees with the respondent that D12 does not disclose any structure for the rodlike particles disclosed therein. However, as noted above the claim does not specify any structure so also the arrangement disclosed in D12 comes within the scope of this aspect of the claim.

D12, whilst disclosing the rodlike particles being contained in the ceramic structure, does not indicate

any specific spacing for these. Nevertheless, the Board considers that the absence of any effect resulting from the specified range of spacing means that it cannot contribute towards an inventive step in the subject-matter of the claim.

8.3 Therefore, the subject-matter of claim 1 of the third auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

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:

G. Nachtigall E. Dufrasne