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Datasheet for the decision of 12 March 2015

Case Number: T 0081/14 - 3.2.08

Application Number: 04765856.2

Publication Number: 1689898

IPC: C22C29/08, B23B27/14

Language of the proceedings: EN

Title of invention:
CEMENTED CARBIDE BODY CONTAINING ZIRCONIUM AND NIOBIUM AND METHOD OF MAKING THE SAME

Patent Proprietor:
KENNAMETAL INC.

Opponents:
Sandvik Intellectual Property AB
MITSUBISHI MATERIALS CORPORATION
Otemachi 1-chome Chiyoda-ku

Headword:

Relevant legal provisions:
EPC Art. 100(c), 84, 83

Keyword:
Amendments
Claims - product-by-process claims
Sufficiency of disclosure

Decisions cited:
G 0005/83, G 0002/88, T 0150/82

Catchword:
When considering the definition of a product in terms of its production process the principles developed in the jurisprudence for the "product-by-process claims" are in general to be applied, also in the case of a claim directed to the use of that product (points 3.2 to 3.7).

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Case Number: T 0081/14 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 12 March 2015

Appellant: (Patent Proprietor)	KENNAMETAL INC. 1600 Technology Way Latrobe, PA 15650 (US)
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Respondent: (Opponent 2)	MITSUBISHI MATERIALS CORPORATION Otemachi 1-chome Chiyoda-ku 1-5-1. Ohtemachi Chiyoda-ku Tokyo (JP)
Representative:	Gille Hrabal Postfach 18 04 09 40571 Düsseldorf (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 15 October 2013 revoking European patent No. 1689898 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	T. Kriner
Members:	M. Alvazzi Delfrate
	D. T. Keeling

Summary of Facts and Submissions

I. By its decision posted on 15 October 2013 the opposition division revoked European patent No. 1689898.

II. The opposition division found that the main request then on file (patent as granted) did not meet the requirements of sufficiency of disclosure. In addition to contravening the requirements of Article 83 EPC, the first and second auxiliary request were found to offend against Article 123(2) EPC and Article 84 EPC. The objections under Article 100(a) EPC were not discussed.

III. The appellant (patent proprietor) lodged an appeal against that decision in the prescribed form and within the prescribed time limit.

IV. Oral proceedings before the Board of Appeal were held on 12 March 2015.

V. The appellant requested that the decision under appeal be set aside and that the case be remitted to the Opposition Division for a decision on novelty and inventive step on the basis of the patent as granted or on the basis of the claims of one of auxiliary requests 1 to 5, all filed with the statement of grounds of appeal or that the patent be maintained as granted or on the basis of one of the auxiliary requests.

The respondents (opponents 1 and 2) requested that the appeal be dismissed.

VI. Independent claim 1 of the **main request** (patent as granted) reads as follows:

"A sintered cemented carbide body having increased resistance to plastic deformation, comprising tungsten carbide, a binder phase comprising at least one metal of the iron group or an alloy thereof, and a solid solution phase comprising at least one of the carbides and carbonitrides of a combination of zirconium, niobium, and tungsten, wherein said body has a mass ratio Nb/(Zr+Nb) of at least 0.5, and wherein said solid solution phase is the sole solid solution phase of said body and (i) consists of a carbide or carbonitride of a combination of zirconium, niobium and tungsten or (ii) comprises a carbide or carbonitride of a combination of zirconium, niobium and tungsten, and at least one carbide, nitride or carbonitride of one or more of titanium, hafnium, vanadium, tantalum, chromium, and molybdenum."

Claim 1 of the **auxiliary request 1** differs from claim 1 of the main request by the addition of the following wording:

"wherein the body is prepared by vacuum sintering or sinter-HIP at a temperature of from 1400 to 1560 °C of a green compact formed from a powder mixture comprising tungsten carbide, a binder metal powder comprising at least one metal of the iron group or an alloy thereof, and a powdered solid solution of the carbides or carbonitrides of zirconium and niobium having a mass ratio Nb/(Zr + Nb) of at least 0.5."

Claim 1 of **auxiliary request 2** reads as follows:

"A method of producing a sintered cemented carbide body having increased resistance to plastic deformation, comprising tungsten carbide, a binder phase comprising

at least one metal of the iron group or an alloy thereof, and a solid solution phase comprising at least one of the carbides and carbonitrides of a combination of zirconium, niobium, and tungsten, wherein said body has a mass ratio Nb/(Zr+Nb) of at least 0.5, and wherein said solid solution phase is the sole solid solution phase of said body and (i) consists of a carbide or carbonitride of a combination of zirconium, niobium and tungsten or (ii) comprises a carbide or carbonitride of a combination of zirconium, niobium and tungsten, and at least one carbide, nitride or carbonitride of one or more of titanium, hafnium, vanadium, tantalum, chromium, and molybdenum;
said method comprising the steps of

a) providing a powder mixture comprising tungsten carbide, a binder metal powder comprising at least one metal of the iron group or an alloy thereof, and at least one of the carbides and carbonitrides of both, zirconium and niobium;

b) forming a green compact of said powder mixture;

c) vacuum sintering or sinter-HIP said green compact at a temperature of from 1400 to 1560 °C;
characterized in that in step a) a powdered solid solution of the carbides or carbonitrides of zirconium and niobium having a mass ratio Nb/(Zr + Nb) of at least 0.5 is used to form said powder mixture."

Claim 1 of **auxiliary request 3** differs from claim 1 of auxiliary request 2 in that the claimed method is limited to the production of a body with

"a mass ratio Nb/(Zr+Nb) of 0.6 or more".

Moreover, auxiliary request 3 comprises use claims 8-12, the independent claim 8 of which reads as follows (emphasis added):

"8. Use of the sintered cemented carbide body obtained according to the method of any one of claims 1 to 7 for the production of a cutting tool."

Auxiliary request 4 differs from auxiliary request 3 by the deletion of the use claims.

Auxiliary request 5 is not relevant for the present decision.

VII. The following documents played a role for the present decision:

D23: Annex 1 submitted by the patent proprietor in examination proceedings; and
D24: Annex 2 submitted by the patent proprietor in examination proceedings.

VIII. The arguments of the appellant can be summarised as follows:

Main request and auxiliary requests 1 and 2 - Article 100(c) EPC

It was true that no sintered cemented carbide body with a mass ratio Nb/(Zr+Nb) of at least 0.5, but only one with said ratio greater than 0.5, was *verbatim* disclosed in the application as originally filed. However, the application disclosed a number of examples, which clearly referred to mass ratios and related to the production of sintered cemented carbide bodies with a ratio Nb/(Zr+Nb) of 0.5. Since different

process conditions and compositions were applied in these examples, it was clear that the mass ratio Nb/(Zr +Nb) was not linked to the other features of the examples. Therefore, the examples provided a basis for the extension of the range of the mass ratio Nb/(Zr+Nb) from "greater than 0.5" to "at least 0.5". As to the fact that not all the examples resulted in a single solid solution phase, this was a matter of sufficiency of disclosure and not of added subject-matter. Accordingly, claim 1 of the main request and of auxiliary requests 1 and 2 did not contain subject-matter which extended beyond the content of the application as originally filed.

Auxiliary request 3 - Article 84 EPC

Claim 8 of auxiliary request 3 was not a product claim but a use claim. Therefore, the conditions for allowing a product-by-process claim established by the jurisprudence of the Boards of Appeal, in particular the requirement that the product could not be defined in terms of structural features, did not apply to the definition of the sintered cemented carbide body used in this claim. Said conditions were to be considered only for claims directed to a product and not for claims directed to a use.

As a matter of fact, although the claimed activity did not cover the production of the sintered carbide body, an infringement court would consider that the use of a sintered carbide body which was not actually produced by a method according to one of claims 1 to 7 would not infringe claim 8.

The fact that the use of a product could define a product feature to be taken into account for

examination of validity was also recognised at the EPO in the case of Swiss-type claims.

In any event, in the present case it was not possible to define the features resulting from the production process of the sintered cemented carbide body in terms of structural features.

Therefore, claim 8 satisfied the requirements of Article 84 EPC.

Auxiliary request 4 - Sufficiency of disclosure

The patent in suit disclosed how to carry out the invention for sample O, which fell within the scope of claim 1. The fact that the invention could be carried out without difficulties was further evidenced by the experimental data of D23. There was no evidence of any problem in carrying out the invention for compositions different from that of sample O. In particular, D24 could not represent such evidence, because it related to the same composition as sample O. Accordingly, the invention of claim 1 was sufficiently disclosed.

Description

An adapted description did not need to be submitted until a version of the claims had been found to be allowable. Nonetheless, it was accepted that the issue of the alleged added subject-matter in paragraphs [0024], [0031] and [0032] of the patent as granted could be already discussed at this stage in the interest of procedural efficiency.

As already established by the opposition division the amendments of these paragraphs did not introduce added

subject-matter but merely deleted some embodiments which were present in the application as originally filed and were no longer claimed. Therefore, these amendments complied with the requirements of Article 123(2) EPC.

IX. The arguments of the respondents can be summarised as follows:

Main request and auxiliary requests 1 and 2 - Article 100(c) EPC

There was no basis in the application as originally filed for a sintered cemented carbide with a sole solid solution phase comprising at least one of the carbides and carbonitrides of a combination of zirconium, niobium, and tungsten and a mass ratio Nb/(Zr+Nb) of 0.5. It was true that some examples mentioned a Nb/(Zr +Nb) ratio of 0.5. However, there was no clear disclosure that this ratio was a mass ratio and not, for instance, an atom ratio. Moreover, several of these examples resulted in materials with two solid solution phases. Finally, the feature concerning the ratio Nb/ (Zr+Nb) could not be isolated from the other features of the examples. Therefore, claim 1 of the main request and of auxiliary requests 1 and 2 extended beyond the content of the application as originally filed.

Auxiliary request 3 - Article 84 EPC

The carbide body used in claim 8 was defined by a product-by-process definition. There were conditions to be satisfied to allow this type of definition. This applied also in the case of a method claim using the product, like present claim 8. In particular, one condition was the requirement that the product could

not be defined in terms of structural features. Said requirement was not satisfied in the present case, because it would have been possible to define the carbide body in terms of compositional, microstructural and mechanical properties. Hence, claim 8 did not meet the requirements of Article 84 EPC.

Auxiliary request 4 - Sufficiency of disclosure

The patent in suit disclosed how to carry out the claimed invention only for a single composition falling within the scope of claim 1, namely sample O. However, claim 1 was not limited to this composition but covered a range of different compositions. It was not trivial to choose the process parameters which, for each of these compositions, led to a single solid solution phase, as stipulated by claim 1. This was evidenced by sample S124-2 of D24, which had a composition covered by the claim and exhibited two solid solution phases. Hence, the information provided by the patent in suit was not sufficient to carry out the claimed invention over the whole breadth of compositions covered by claim 1. Accordingly, the requirements of Article 83 EPC were not complied with.

Description

It was accepted that an adapted description was not necessary until a version of the claims was found to be allowable. However, in the interest of an efficient procedure paragraphs [0024], [0031] and [0032] of the patent as granted could be considered already at this stage.

These paragraphs had been amended to extend the range of Nb/(Zr + Nb) to comprise 0.5. Moreover, the effect

of this range was now taught to be the obtention of one single solid solution phase, whereas in the application as granted it was merely the obtention of one or more single solution phases Hence, these amendments provided the reader of the patent with a teaching which was not comprised in the application as originally filed, contrary to the requirements of Article 123(2) EPC.

Reasons for the Decision

1. The appeal is admissible.

2. Main request and auxiliary requests 1 and 2 - Article 100(c) EPC

2.1 Claim 1 of the main request is directed to a sintered cemented carbide body comprising tungsten carbide, a binder phase and a solid solution phase which is the sole solid solution phase in the body and comprises at least one of the carbides and carbonitrides of a combination of zirconium, niobium, and tungsten. The body has a mass ratio Nb/(Zr+Nb) of at least 0.5.

2.2 By contrast, claim 1 as originally filed relates to a body with one or more solid solution phases and does not recite the amount of Nb/(Zr+Nb). Paragraphs [0026] and [0030] and claim 16 of the application as filed disclose as a preferred feature of the invention a mass ratio of Nb/(Zr+Nb) of greater than 0.5.

2.3 The appellant indicated, as basis for extending the range of the mass ratio Nb/(Zr+Nb) to include 0.5, the

examples (samples A, C to F, H to J, L and N) of the application which involve the use of a (Zr,Nb)C 50/50 powder.

2.4 According to the respondents there was no clear disclosure that in the examples this ratio is a mass ratio. However, claims 16 and 17 as originally filed explicitly refer to a mass ratio Nb/(Zr+Nb). Moreover, the contents of the different constituents given in the examples are all expressed in weight%. Therefore, the Board is satisfied that a person skilled in the art would understand that the Nb/(Zr+Nb) ratio referred to throughout the application and in particular in the examples is a mass ratio.

2.5 Nevertheless, it remains to be established whether the skilled person could recognise without any doubt from the application as filed that this feature is not closely related to the other characteristics of the examples and applies directly and unambiguously to the more general context of claim 1.

2.5.1 While it is true that in the examples different process conditions and compositions are applied, only one example with a Nb/(Zr+Nb) ratio of 0.5 (sample C) is disclosed to result in a sole solid solution phase. For the other examples the application either discloses a structure with two solid solution phases (samples D and F) or provides no information as to the presence and number of the solid solution phases (samples A, H to J and L).

2.5.2 Contrary to the appellant's view this point is relevant for determining the allowability of the amendments, because it affects the information provided to the person skilled in the art in respect of which

conditions were necessary to obtain a single solid phase as required by claim 1. This information does not directly and unambiguously disclose that the Nb/(Zr+Nb) ratio of 0.5 is not linked to the other features of the examples, in particular the composition, when a body with a sole solid solution phase is to be obtained. On the contrary, the fact that some examples result in a two-phase structure makes clear that a close relationship between this ratio and the further features relating to the composition of the body exists.

2.6 Since these further features were not included in claim 1 of the main request, this claim contains subject-matter which extends beyond the content of the application as originally filed.

2.7 The same objection applies to the auxiliary requests 1 and 2. Accordingly, none of the main request and the auxiliary requests 1 and 2 is allowable.

3. Auxiliary request 3 - Article 84 EPC

3.1 The feature that the use of claim 8 concerns a product "obtained according to the method of any one of claims 1 to 7" was not present in the claims as granted but is the result of a post-grant amendment. Hence, the objection under Article 84 EPC raised against this feature has to be considered.

3.2 Article 84 EPC provides that the claims shall define the matter for which protection is sought and that they shall be clear and concise and be supported by the description. The requirement laid down in this article that the claims have to be clear reflects the demand for legal certainty, which is of paramount importance

in any system where the rights of the public are affected by the grant of a monopoly.

3.3 Present claim 8 is directed to the use of the sintered cemented carbide body obtained according to the method of any one of claims 1 to 7 for the production of a cutting tool. Hence, the claim comprises process and product features and is notionally equivalent to a claim directed to a process for the production of a cutting tool using the sintered cemented carbide body (see G2/88, point 5.1 of the Reasons, OJ 1990, 93). Accordingly, as acknowledged by the appellant itself, the steps of the method for the production of the sintered cemented carbide body do not form part of the claimed activity. Indeed, had the appellant intended to include these steps in the claimed method it could have drafted the claim in different terms, for instance by directing it to a process for the production of a cutting tool using a sintered cemented carbide body and comprising the production of said sintered cemented carbide body according to the method of any one of claims 1 to 7.

Therefore, the reference in claim 8 to the steps of the method for the production of the sintered cemented carbide body does not define process features but solely the features of the product (the sintered body) used in the claimed method. As a consequence, the issue at stake when considering this reference in the context of Article 84 EPC is the assessment of the clarity of product features.

3.4 To ensure legal certainty the definition of a product is normally done by means of the structural features of the product, i.e. by features which can be verified on the product. A definition in terms of the process of

manufacture, in the following a "product-by-process definition", in lieu of a definition in terms of structural features is reserved for cases wherein the latter definition is not possible. This principle is well established in the case law for a claim which is directed to a product, in the following a "product-by-process claim" (see for instance T150/82, point 10 of the Reasons, OJ 1984, 309).

It is true that present claim 8 is not directed to a product but to a process. However, there is no reason to make the principles underlying the assessment of the clarity of product features dependent on the fact that said product features appear in a claim directed to a product or in a claim directed to a method.

3.5 The appellant disagreed with this position and submitted that in case of infringement the features pertaining to the method of production of the sintered carbide would be fully taken into account by the court, so that the use of a sintered body which is merely obtainable by the method of any one of claims 1 to 7 but not actually obtained by this method would not infringe claim 8.

However, the Boards of Appeal are concerned only with validity and not with infringement, which is a matter reserved for the courts of the different contracting states, which may interpret the same claim in different ways. Accordingly, the Board is not in the position of considering the (possibly different) interpretations given to a "product-by process definition" in national infringement proceedings. This applies all the more in a case like the present one, wherein no specific decision of a national court has been submitted for consideration to the Board.

Moreover, although it is in general desirable that the interpretation of the meaning of the claims given by a court in infringement proceedings and that given by a board of appeal or a court when considering the validity of a claim are consistent with each other, situations exist wherein this is not achieved. Indeed an example of such a situation concerns "product-by-process claims". In the decision of the UK High Court of Justice, Chancery Division, Patents Court of 21 November 2014, in *Hospira v. Genentech* ([2014] EWHC 3857, points 143 to 147) Mr Justice Birss considered that, as far as infringement is concerned, a product "obtained by" a process means a product which has actually been obtained by that process. However, he did not adopt the same interpretation for the issue of validity but took instead the view that a new process which produces a product identical to an old product cannot confer novelty on that product, an interpretation corresponding to the established case law of the Boards of Appeal for a "product-by-process claim" (Case Law of the Boards of Appeal of the European Patent Office, 7h edition 2013, II.A.7.). Hence, the issue raised by the appellant is not specific to the use of "product-by-process definitions" in use claims but concerns also "product-by-process claims". Therefore, it cannot support the appellant's view that the requirements to allow a "product-by-process definition" are to be considered only for claims directed to a product and not for claims directed to a use.

Finally, the issue to be considered in the present case is not the interpretation of the claim for assessing novelty and inventive step, but rather whether the

definition of the product chosen by the appellant is clear or not.

In view of these considerations, the allegedly different way in which claim 8 would be interpreted in infringement proceedings fails to dissuade the Board from applying the principles developed for "product-by-process" claims when considering the definition of the sintered body used in claim 8.

3.6 The same applies in respect to the reference to Swiss type claims made by the appellant. The so-called Swiss-type claims are claims directed to the use of a substance or composition for the manufacture of a medicament for a specified therapeutic application. According to decision G5/83 (OJ 1985, 64) they were to be allowed even in a case in which the process of manufacture as such does not differ from known processes using the same active ingredient, provided that the therapeutic application is new and inventive. The application of this special approach, which derived the novelty from the intended therapeutic use of the medicament, was restricted to claims to the use of substances or compositions intended for use in a method referred to in Article 52(4) EPC 1973 (corresponding to present Article 53(c) EPC), a so-called "medical use" (G5/83, last paragraph of point 21 of the Reasons). Accordingly, this approach finds no place in the consideration of a "product-by-process definition", i.e. a definition which does not involve the intended use of a product, let alone an intended "medical use", but rather concerns its process of production.

3.7 Therefore, the Board is satisfied that when considering the definition of a product in terms of its production process the principles developed in the jurisprudence

for the "product-by-process claims" are in general to be applied, also in the case of a claim directed to the use of that product.

3.8 Applying said principles to present claim 8 the Board sees to reason why it would not have been possible to define the sintered body in terms of structural features, namely composition, microstructure and mechanical properties, i.e. the features which characterise the product in the examples of the patent in suit.

The appellant failed to convince the Board to the contrary, because it did not indicate concretely in which respect it would not be possible to define in terms of structural features a carbide body obtained by the method of claims 1 to 7.

3.9 Accordingly, the use of a product-by-process definition in claim 8 of auxiliary request 3 results in a lack clarity.

4. Auxiliary request 4 - Sufficiency of disclosure

It is undisputed that the patent in suit discloses how to carry out an embodiment (sample O) falling within the scope of claim 1.

The respondents submitted that this information was not sufficient to carry out the claimed invention over the whole breadth of compositions covered by claim 1. To support their view they referred to sample S124-2 of D24. It is true that this sample exhibits two solid solution phases, contrary to what is requested by claim 1. However, sample S124-2 relates to a composition with a ratio Nb/(Zr+Nb) of 0.6, which is the same of

sample O of the patent, in other words a composition for which the patent provides enough information to carry out the invention.

Therefore, the respondents failed to provide evidence in support of their view that a person skilled in the art reading the patent and using his common general knowledge would be unable to carry out the invention over the whole breadth of compositions covered by claim 1. In the absence of this evidence it is concluded that the requirements of Article 83 EPC are complied with.

5. Description

The Board accepts that in the present case an adapted description does not need to be submitted until a version of the claims has been found to be allowable. However, in the interest of an efficient procedure, since paragraphs [0024], [0031] and [0032] of the patent as granted (the main request presently on file) have been objected under Article 100(c) EPC, the Board considers it appropriate to deal also with this point.

According to paragraph [0026] as originally filed if the cemented carbide body has a mass ratio Nb/(Zr + Nb) of greater than about 0.5 the formation of a single homogeneous solid solution phase or the formation of two or more coexisting solid solution phases within the sintered cemented carbide body is remarkably increased.

This passage has been amended: according to paragraph [0024] as granted if the cemented carbide body has a mass ratio Nb/(Zr + Nb) of at least 0.5 the formation

of a single homogeneous solid solution phase within the sintered cemented carbide body is remarkably increased.

Therefore, the range of the mass ratio of Nb/(Zr + Nb) has been extended to comprise 0.5. Moreover, the effect of this range is now taught to be the obtention of one single solid solution phase, whereas in the application as granted said effect was merely the obtention of single solution phases in whatever number. Hence, this amendment is not merely a deletion of an embodiment but provides the reader of the patent with a teaching which was not comprised in the application as originally filed.

Therefore, the amendments extend beyond the content of the application as filed.

A similar consideration applies in respect of paragraphs [0031] and [0032] of the patent as granted (see paragraphs [0033] and [0034] as originally filed).

6. Remittal

In its decision the Opposition Division did not decide upon the objections based on Article 100(a) EPC. Hence, the Board considers it appropriate to remit the case to the Opposition Division for further prosecution in order to give the parties the possibility to have these issues considered by the Opposition Division.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division for further prosecution on the basis of Auxiliary Request 4 filed with the statement of grounds of appeal on 24 February 2014.

The Registrar: The Chairman:

V. Commare T. Kriner

Decision electronically authenticated