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D E C I S I O N
of 31 March 2006

Case Number: T 0052/04 - 3.2.02

Application Number: 97108226.8

Publication Number: 0808912

IPC: C22C 29/08

Language of the proceedings: EN

Title of invention:

Composite carbide powder used for cemented carbide and method
of producing the same

Patentee:

Tokyo Tungsten Co., Ltd.

Opponents:

H.C. Starck GmbH
Wolfram Bergbau-und Hütten-GmbH Nfg.KG

Headword:

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Relevant legal provisions:

EPC Art. 54

Keyword:

"Novelty - yes"

Decisions cited:

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Catchword:

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Case Number: T 0052/04 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 31 March 2006

Appellant: Tokyo Tungsten Co., Ltd.
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Respondents: H.C. Starck GmbH
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Representative: Peters, Frank M.
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(Opponent) Wolfram Bergbau-und Hütten-GmbH Nfg.KG
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Representative: Wildhack, Helmut
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 13 November 2003
revoking European patent No. 0808912 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: T. K. H. Kriner
Members: R. Ries
E. Dufrasne

Summary of Facts and Submissions

- I. The grant of European patent No. 0 808 912 on the basis of European patent application No. 97108226.8 was mentioned on 30 August 2000.
- II. The granted patent was opposed by the present respondents (opponents OI and OII) on the grounds that its subject matter lacked novelty and did not involve an inventive step (Article 100(a) EPC).
- III. With its decision posted on 13 November 2003, the Opposition Division held that the claimed subject matter of the independent claims 1 and 4 as granted lacked novelty and revoked the patent.

As the only citation of interest, document

D1: US-A-3 480 410

was relied upon. This document was held to disclose explicitly all the processing steps of claim 4, except for the heating rate that was claimed in the patent in suit to be between 3 and 100 °C/min. In the Opposition Division's view, however, the heating of the powder blend referred to in document D1 was automatically performed at a rate falling within the claimed range and thus could not make a patentable difference. The process steps and the starting material in D1 being the same as claimed in the patent, the tungsten carbide (WC) powder obtained through the known process was rated to exhibit the claimed polycrystalline structure satisfying the inequality $Y > 0.61 - 0.33\log(x)$ cited in claim 1. Consequently, the Opposition Division

concluded that the process stipulated in claim 4 and the composite carbide powder set out in claim 1 and produced by this process were not new over the disclosure of document D1.

IV. An appeal against this decision was filed by the patentee (the appellant) on 12 January 2004 and the fee for appeal was paid on the same date. A written statement setting out the grounds of appeal was filed on 15 March 2004 within the time limit given in Article 108 EPC.

V. In order to meet the requests of all parties, oral proceedings before the Board were held on 31 March 2006.

In the letters dated 28 February 2006 and 21 February 2006, respectively, the respondents OI and OII informed the Board that they would not attend the oral proceedings. Pursuant to Rule 71(2) EPC, the appeal proceedings were continued without them.

VI. The following requests were made:

- The appellant (patentee) requested that the decision under appeal be set aside and the patent be maintained as granted (main request) or, in the alternative, on the basis of a first or second auxiliary request.
- The respondents requested that the appeal be dismissed.
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Independent claims 1 and 4 as granted read as follows:

"1. A composite carbide powder comprising, as a main component, tungsten carbide powder, which consists essentially of fine primary crystal particles of tungsten carbide, and a chromium containing powder, wherein said tungsten carbide powder satisfies an inequality given by:

$$Y > 0.61 - 0.33 \log(x)$$

where Y denotes a half-value width of (211) crystal planes in the tungsten carbide (JCPDS-card 25-1047, $d = 0.9020$) measured by X-ray diffraction method where x denotes a grain size measured by a FSSS method, said grain size x being between 1.0 and 7.0 μm ."

"4. A method of producing a composite carbide powder having tungsten carbide as a main element, according to one of claims 1 to 3, the method comprising the steps of:

preparing tungsten powder, which has a mean grain size between 1 and 7 μm ;
mixing the tungsten powder with carbon powder and chromium containing powder into mixture; and
heating the mixture in an atmosphere selected from one of a hydrogen atmosphere, a vacuum atmosphere, and an inert gas atmosphere at a heating rate between 3 and 100°C/min to a temperature between 1200 and 1700°C, where it is held for 10 to 300 minutes, to form fine primary crystal particle carbide as the composite carbide powder, said chromium containing powder being added in the form of a selected one of metal chromium, organic chromium compound and inorganic chromium compound, such as chromium oxide and chromium carbide."

VII. The appellant essentially argued as follows:

In the claimed process fine tungsten carbide (WC) primary crystal particles were created by diffusing Cr into coarse W particles before the WC particles were formed. The chromium diffusion process was strongly influenced (i) by the mean grain size of the tungsten powder and (ii) by the heating rate when the mixture was heated up to a temperature between 1200 and 1700°C. It was evident from the comparative examples 1 to 4 given at the end of Table 1 of the Japanese priority document JP 8-125537 of 21 May 1996 that heating rates outside the claimed range could also be applied. Specifically, heating rates of 1°C/min (example 3) or 150°C/min (example 1) were tried but failed to promote the Cr-diffusion and thus did not produce the fine grained composite tungsten carbide powder satisfying the inequality stipulated in claim 1. Given that document D1 was totally silent on the heating rate, the subject matter of claim 4 was novel vis-à-vis the disclosure of this document and so was the composite carbide powder defined in claim 1.

VIII. In their written submissions in reply to the grounds of appeal, the respondents relied upon document D1 and concurred with the reasoning given by the Opposition Division in the impugned decision. It was admitted that document D1 failed to disclose a heating rate at all. Notwithstanding that the respondents argued that heating rates within the claimed range were "typical" for the conventionally used batch furnaces or continuous tunnel furnaces, the more since rates below 3°C/min were uneconomical and those higher than

100°C/min were difficult to achieve. The specific heating rate claimed in the opposed patent therefore did not make a technical difference to the process known from document D1. The subject matter of process claim 4 and product claim 1 therefore lacked novelty.

Reasons for the Decision

1. The appeal is admissible.
2. *Novelty, main request*
 - 2.1 Like the opposed patent, document D1 discloses a process for producing a sintered WC-Cr₃C₂-Co composite comprising the steps of
 - mixing tungsten powder having a mean grain size between 0.2 and 6 µm, preferably 1.0 to 1.3 µm (cf. D1, column 2, lines 46 to 53) with carbon powder and a Cr-containing powder (e.g. in the form of Cr-oxide or Cr-salts; cf. D1, column 2, lines 62 to column 3, line 2, column 3, lines 19 to 30) and
 - heating the mixture in a hydrogen or vacuum atmosphere to a temperature between 1450 to 1600°C for about 30 minutes (cf. D1, column 3, line 38 to 44; column 4, lines 45 to 66, example 1).

The Board concurs with the position of the parties and that given by the Opposition Division that - except for the heating rate of 3 to 100°C/min up to the firing temperature - document D1 anticipates all the processing steps set out in claim 4. Apart from being

very broad, the respondents hold the view that the claimed range for the heating rate is "typical" for the batch or continuous tunnel furnaces and conclude that the heating rates claimed in the patent at issue must be "automatically" fulfilled when carrying out the process disclosed in document D1.

It, therefore, has to be examined whether it is directly and unambiguously derivable from the disclosure of document D1 to work within the claimed range of 3°C/min to 100°C/min when heating the powder mixture according to the known process. The disclosure of D1 is to be determined by what knowledge and understanding can and may be expected of the average skilled person in the field of composite carbide powder production.

It can be learned from the comparative examples 1 to 4 given in Table 1 of the Japanese priority document JP 8-125537 of 21 May 1996 that heating rates of 150°C/min (example 1) and of 1°C/min (example 3) have also been performed. Contrary to the position of the respondents, the comparative examples 1 and 3 thus show that heating rates outside the claimed range could be actually chosen, but fail to bring about the fine chromium containing WC grain structure aimed at by the claimed process. As has been previously noted, a heating rate is not even remotely mentioned in document D1, and no information whatsoever is given anywhere in this document that the heating rate should be controlled at all, let alone to produce a fine Cr-containing WC grain structure. Following the technical instructions given in D1, the person skilled in the art thus could only derive from this specification that the heating rate

does not represent a critical parameter but could be selected freely. Consequently, it is not directly and unambiguously derivable from D1 to work within the range for the heating rate claimed in the patent when putting into practice the process of document D1. The theoretical possibility of operating within the claimed range is legally not sufficient to deprive the claimed range of novelty, in particular if the skilled person had no technical motive at all to adhere to this range.

The respondents have repeatedly contended that the claimed heating rates are "typical" for the batch and continuous tunnel furnace which are used in the known process. Although this issue was addressed in the summons to attend oral proceedings, the respondents did not submit any evidence in support of this contention in the appeal proceedings.

It is thus concluded that the process set out in claim 4 is novel vis-à-vis the disclosure of document D1.

- 2.2 The novelty of the product defined in claim 1 has not been explicitly challenged by the respondents in their response to the grounds of appeal. Specifically, no evidence has been produced showing that the composite carbide powder obtained by the process known from D1 satisfies the inequality of $Y > 0.61 - 0.33 \log(x)$ featuring in claim 1 of the patent at issue. The Board therefore does not see any reason to put in doubt the novelty of the subject matter of claim 1.

Furthermore, since the method of claim 4 as granted is novel over the method disclosed in document D1, it cannot be concluded that the use of the known method inevitably results in the product defined in claim 1.

3. *Remittal*

Since the decision of the Opposition Division was exclusively based on the ground of lack of novelty vis-à-vis the disclosure of document D1, now removed, the Board finds it appropriate to remit the case to the first instance for further prosecution on the basis of the claims as granted (main request).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution.

The Registrar:

The Chairman:

V. Commare

T. K. H. Kriner