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D E C I S I O N
of 29 July 2003

Case Number: T 0568/01 - 3.2.7

Application Number: 95106266.0

Publication Number: 0683244

IPC: C23C 16/40

Language of the proceedings: EN

Title of invention:
Coated hard alloy tool

Patentee:
Sumitomo Electric Industries, Ltd.

Opponent:
Widia GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 0568/01 - 3.2.7

D E C I S I O N
of the Technical Board of Appeal 3.2.7
of 29 July 2003

Appellant: Sumitomo Electric Industries, Ltd.
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Osaka 541 (JP)

Representative: Eder, Thomas, Dr.-Ing.
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Respondent: Widia GmbH
(Opponent) Münchener Strasse 90
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Representative: Vomberg, Friedhelm, Dipl.-Phys.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 21 March 2001
revoking European patent No. 0683244 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: A. Burkhard
Members: P. A. O'Reilly
C. Holtz

Summary of Facts and Submissions

I. The appellant (proprietor) filed an appeal against the decision of the Opposition Division to revoke the European Patent No. 0 683 244.

II. Opposition was filed against the patent as a whole and based on Article 100(a) EPC (lack of inventive step).

The Opposition Division held that the subject-matter of claim 1 of the only request did not involve an inventive step.

The most relevant prior art documents for the present decision are:

D2: EP-A-0 127 416

D3: Sumitomo Electric Technical Review No. 21,
Jan. 1982, pages 126-134

D8: EP-B-0 298 729

III. The appellant requested that the decision under appeal be set aside and the patent be maintained on the basis of a request including claim 1 filed on 27 June 2003.

The respondent requested that the appeal be dismissed.

IV. The independent claim of the only request reads as follows:

"1. A coated hard alloy tool having a cutting edge including a ridge (A in Figs. 1A-1C and Fig. 2) and

comprising a substrate made of a hard alloy, and a multi-layer ceramic coating film provided on the surface of said substrate, said coating film including at least one oxide layer and at least one non-oxide layer, characterized in that the top several layers of said coating film are missing partially or completely along said ridge, at least one oxide layer being included in missing layers among said top several layers, whereby said at least one non-oxide layer of said coating film is exposed along said ridge where said top several layers are missing, wherein said layer exposed along said ridge is a layer of TiCN having a mol fraction of C:N of between 5:5 and 7:3."

V. The appellant argued in written and oral submissions essentially as follows:

(i) The subject-matter of claim 1 involves an inventive step. Document D2 was considered to be the closest prior art by the Opposition Division. The document deals with the problems of wear resistance and chipping. The document does not deal with the problem of peeling which is addressed by the patent in suit. The characterising features of claim 1 lead to surprising and advantageous effects, as shown by the comparative tests given in the description of the patent as set out in experiment 6. Document D2 teaches that the more of the film coating that is removed the better is the desired effect. Therefore, the skilled person would remove all the film coating and thus not arrive at a tool in accordance with claim 1. There is no indication in the document to choose TiCN as the non-oxide

layer, nor is there any indication to provide this in the mol fraction of C:N of between 5:5 and 7:3 as set out in claim 1.

VI. The respondent argued in written and oral submissions essentially as follows:

- (i) With respect to claim 1 document D2 is the nearest prior art document. From document D2 the skilled person is taught to remove outer coatings leaving an inner coating exposed. This is particularly the case since in document D2 it is specified that up to 90% or up to 60% percent of the coating may remain so that the skilled person may choose within this range. This inner coating is formed from a material which is equivalent to TiCN as can be seen from documents D3 and D8. The skilled person would hence consider replacing this material with TiCN. The specified range of 5:5 to 7:3 is no more than the skilled person would arrive at by experimentation, particularly since the value of 5:5 lies in the middle of the possible range. The question of peeling is not relevant if the subject-matter of the claim is obvious since then any solution to the problem of peeling is merely a bonus effect. Moreover, on pages 5 to 6 of document D2 not only toughness but also wear resistance is addressed. These would cover also peeling resistance.

Reasons for the Decision

1. *Inventive step*

1.1 Closest prior art

The closest prior art is represented by document D2 which discloses the features of the preamble of claim 1.

In addition, document D2 discloses the feature of claim 1 whereby the top several layers of said coating film are missing partially or completely along said ridge, at least one oxide layer being included in missing layers among said top several layers, whereby said at least one non-oxide layer of said coating film is exposed along said ridge where said top several layers are missing. This may be seen in particular in Examples G and I of Tables 1 and 2 whereby the non-oxide layers form the inner 69% and 80% respectively of the layers. In accordance with Tables 2, the outer layers may be removed on the ridge by the treatment after coating IV to leave a thickness of 50% and 60% respectively of the layers as compared to their thickness away from the ridge. In each of these examples the inner titanium carbide layer is then left exposed with the result that the said feature of claim 1 is also disclosed in this document.

1.2 Problem to be solved

The problem to be solved by the distinguishing feature of claim 1 is to provide an alternative material for the exposed layer along the ridge.

1.3 Solution to the problem

The solution to the problem is that the said layer exposed along said ridge is a layer of TiCN having a mol fraction of C:N of between 5:5 and 7:3.

1.4 The solution to the problem is obvious for the following reasons:

Titanium carbonitride is a well-known alternative to titanium carbide for tools. In document D2 titanium carbonitride is suggested in Example F of Tables 1 and 2 as an intermediate layer. In document D3 titanium carbonitride and titanium carbide are discussed together (cf. Fig. 4). In document D8 titanium carbonitride and titanium carbide are discussed together in the form of alternatives for lower and intermediate layers below an oxide layer (cf. Tables 1). The skilled person would therefore immediately consider titanium carbonitride as an alternative to titanium carbide depending upon the particular circumstances.

When using titanium carbonitride the skilled person would have to decide in which composition it should be used, since titanium carbonitride is well known to have a non-stoichiometric composition. Claim 1 specifies a mol fraction of C:N of between 5:5 and 7:3. The value of 5:5 is merely that value which the skilled person would recognise as the normal composition of titanium carbonitride without any weighting towards the carbide or the nitride. In the description of the patent in suit a comparison was made between a C:N ratio of 8:2

and a C:N ratio of 6:4 (see page 6, lines 31 to 41). The result was that the ratio of 6:4 was superior. However, the Board can see here no support for the presence of a surprising effect in the range 5:5 to 7:3 since there is no evidence provided of a surprising performance throughout this range. Furthermore, the claimed range starts at the middle, i.e. 5:5, of the possible range and includes a broad part of the possible range to one side of the middle. The skilled person could expect a good performance in the middle of the range and in the vicinity thereof. The claimed range is therefore nothing more than an area which the skilled person would normally consider.

The appellant has argued that document D2 deals with the problems of toughness and wear resistance but does not deal with the problem resistance to peeling. However, evidence has not been provided that with respect to the cutting tool disclosed in document D2 there is a better or indeed surprising resistance to peeling. The appellant further argues that with respect to the teaching of document D2 there is no reason for the skilled person to stop with a partial removal of the coating since document D2 teaches that the results become better the more of the coating that is removed. However, in claim 1 of the document it is specifically stated that the coating film is thinned or removed so that complete removal is only an alternative. It is also stated that the effect is remarkable at most 60% and considerable at most 90% (page 6, lines 4 to 9) so that the skilled person is taught to consider stopping at less than complete removal. Moreover, in the Tables 2 stopping at less than complete removal is mentioned for each example and in the Examples G and I

stopping at 50% and 60% are specifically disclosed. The argument of the appellant in this respect cannot therefore be followed.

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

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Spigarelli

A. Burkhart