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**Datasheet for the decision  
of 26 September 2019**

**Case Number:** T 1364/16 - 3.2.08

**Application Number:** 06715627.3

**Publication Number:** 1864731

**IPC:** B23B27/14, B23B51/00, B23C5/16,  
C23C28/00, C23C30/00

**Language of the proceedings:** EN

**Title of invention:**  
EDGE REPLACEMENT CUTTER TIP

**Patent Proprietor:**  
Sumitomo Electric Hardmetal Corp.

**Opponent:**  
Iscar Ltd.

**Headword:**

**Relevant legal provisions:**  
EPC Art. 54, 54(3), 56, 84, 123(2)  
RPBA Art. 13(3)

**Keyword:**

Novelty - main request and auxiliary requests 1 - 3 (no) -  
prior European application - auxiliary request 4 (no)  
Claims - clarity - auxiliary request (yes)  
Amendments - allowable (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 1364/16 - 3.2.08

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.08**  
**of 26 September 2019**

**Appellant:** Iscar Ltd.  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 2 May 2016  
rejecting the opposition filed against European  
patent No. 1864731 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** M. Alvazzi Delfrate  
**Members:** M. Foulger  
P. Schmitz

## **Summary of Facts and Submissions**

- I. With the decision posted on 2 May 2016 the opposition division rejected the opposition against European patent No. 1 864 731.
- II. The division considered that the subject-matter of claim 1 did not extend beyond that of the application as originally filed and that it was new and involved an inventive step.
- III. The opponent filed an appeal against this decision. The appellant (opponent) requested that the decision be set aside and that the patent be revoked.
- IV. The respondent (patent proprietor) requested that the appeal be dismissed, or in the alternative that the patent be maintained in amended form based on auxiliary requests 1 - 4 filed on 7 February 2017 with the reply to the appeal or auxiliary requests 5 - 7 filed with the letter of 26 August 2019.
- V. Oral proceedings took place before the Board on 26 September 2019. During the oral proceedings the opponent withdrew its objection under Article 100(b) EPC.
- VI. The following documents are relevant for this decision:  
  
D1a: US 2003/0104254 A1  
D2: US 5 232 318 A  
D3: JP 63 065 079  
D4: WO 97/04143 A1  
D5: JP2004-050385 A  
D5a: English translation of D5  
D8: Oberg, "Machinery's Handbook", 25th edition, 1997,

pp. 720 - 728, 748, 752.

D11: US 6 007 909 A

D22: US 7 740 909 B2

D23: EP 1 818 124 A1

D29: "Wear Behavior of PVD TiAlN, CVD TiN Coated and Cermet Cutting Tools", Tribology In Industry, Vol. 27, Nos. 3 & 4, 2005

D30: "A new class of high performance PVD coatings for carbide cutting tools", Surface and Coatings Technologies 139 (2001) 25-34

D31: "Coating for stamping and forming tools", Stamping Journal, March 2005

D32: "Application of CVD and PVD technologies to cutting tools, and evaluation of tool failure modes", D.G. Bhat, Il Jornadas de Ingenierca Metalurgica y Ciencia de Los Materiales, Universidad Central de Venezuela, November 1997, p. 18

D33: "The development of the PVD coating TiAlN as a commercial coating for cutting tools", Surface and Coatings Technology, 48 (1991) 175-178

D34: Creighton and Ho, "Introduction to Chemical Vapour Deposition (CVD)", ASM International, 2001, pp. 1 - 10.

VII. a) Main request

Claim 1 (as granted) reads:

"**(A)** An indexable insert (1) having a structure including at least a rake face (2) and a bearing surface (5),

**(B)** comprising a substrate (10) and a coating layer (11) disposed on the substrate (10), wherein the coating layer (11) includes one or more layers; and

**(C)** at least one layer of the one or more layers covers the entire surface of the substrate (10) and

**(D)** satisfies the relationship  $F1 < F2$  and

**(E)**  $F2 < 0$ ,

**(F)** wherein F1 represents the residual stress in the rake face (2) and F2 represents the residual stress in the bearing surface (5)."

Feature references added in bold by the Board.

b) First auxiliary request

The following feature has been added to claim 1 of the main request:

"wherein the residual stress F1 is -8 GPa or more"

c) Second auxiliary request

The following feature has been added to claim 1 of the main request:

"wherein the residual stress F2 is -2.1 GPa or more"

d) Third auxiliary request

The following feature has been added to claim 1 of the main request:

"wherein the residual stress F1 is -8 GPa or more and the residual stress F2 is -2.1 GPa or more"

e) Fourth auxiliary request

Feature A of claim 1 of the main request is modified as follows:

"A positive indexable insert (1) having a structure including ~~at least~~ a single rake face (2) on an upper

surface and a single bearing surface (5) on a lower surface opposite to the rake face, and" (additions underlined, deletions struck through)

The following feature has also been added:

"wherein a cutting edge (4) is provided at a position where the rake face (2) intersects a flank face (3)"

f) Fifth auxiliary request

The following feature has been added to claim 1 of the third auxiliary request:

"the at least one layer of the one or more layers covering the entire surface includes aluminium oxide."

VIII. The appellant argued essentially the following:

i) Late filed facts, evidence and requests

a) Late filed documents

D22 was filed in order to show that a CVD coating inevitably covered the entire insert.

D23 was submitted at the earliest possible moment in appeal proceedings. It was relevant and was an attempt to overcome the impugned decision.

D29 - D33 showed that TiAlN was typically a PVD coating.

D34 served to illustrate the general knowledge of the person skilled in the art.

Hence, the above documents should be admitted into the proceedings.

b) Novelty attack based on D11

D11 was already in the proceedings. According to the case law of the Boards of Appeal, documents used for an inventive step attack could be used for a novelty attack. D11 was moreover *prima facie* relevant for the question of novelty of the subject-matter of claim 1. This attack should therefore be admitted.

c) Auxiliary requests

The auxiliary requests should not be admitted because they were *prima facie* not allowable. Moreover, they were not convergent.

ii) Main request

Documents D1a, D2 and D5 were novelty destroying for the subject-matter of claim 1.

D1a disclosed:

**(A)** An indexable insert having a structure including at least a rake face and a bearing surface

**(B)** comprising a substrate and a coating layer disposed on the substrate, wherein the coating layer includes one or more layers.

Moreover, example 1 of D1a related to cutting bodies of the type CNMG 120412 which were double sided inserts, i.e. after one side had been used they may be flipped over to use the other side. Thus, any surface treatment was applied to both sides equally. Moreover, the coating was of the CVD type which was known to be



conformal and to coat all exposed surfaces of the insert in the reaction chamber (see D8, p. 748 and D34, p. 3). Therefore feature C was also known from D1a.

Features D, E, F of claim 1 were known from table 1 of D1a. Hence all features of claim 1 were known from D1a.

D2 disclosed an indexable insert wherein the relationship  $F1 < F2$  (feature D) was satisfied. This followed from the application of PVD layer onto a CVD layer, see col. 5, l. 46 - 48.  $F2 < 0$  (feature E) was also disclosed in relation to the CVD layer, see col. 2, l. 56 - 68.

D5 disclosed that  $F2 < 0$  because a PVD coating was one of the options disclosed (see D5a, paragraph [0017]); PVD coatings typically resulting in compressive residual stresses.

Hence, all features of claim 1 were known from D1a, D2 and D5.

iii) Auxiliary requests 1 - 3

The further features of claim 1 of these requests were also known from table 1 of D1a. Thus, claim 1 of these requests also lacked novelty.

iv) Auxiliary request 4

D23, which was prior art according to Article 54(3) EPC, disclosed all features of claim 1. In particular, D23 disclosed:

A positive indexable insert having a structure including at least a single rake face on an upper

surface and a single bearing surface on a lower surface opposite to the rake face, (Example 2 related to cutting insert SEMT13T3AGSN-L which was of such a type, see paragraph [0128]) and comprising a substrate and a coating layer disposed on the substrate, wherein the coating layer included one or more layers (see paragraph [0129]); and at least one layer of the one or more layers covered the entire surface of the substrate (see paragraph [0129]) and satisfied the relationship  $F1 < F2$  (as the rake face was blasted according to treatment method B (see paragraph [0117])) and  $F2 < 0$  (when applied by PVD - see paragraph [0131]), wherein  $F1$  represented the residual stress in the rake face and  $F2$  represented the residual stress in the bearing surface wherein a cutting edge was provided at a position where the rake face intersected a flank face.

Therefore, the subject-matter of claim 1 was not new (Article 54(3) EPC) with respect to D23.

v) Auxiliary request 5

a) Clarity

The phrase "-8 GPa or more" was linguistically confusing because it could either mean that the absolute value should be greater than 8 or that the value should be more than -8. Thus the claim was not clear.

b) Added subject-matter (Article 123(2) EPC)

The value -2.1 GPa was only disclosed in Table 2 of the

application as a single point in relation to a specific structure and the specific example 6. This specific teaching had been unallowably generalised.

It was also submitted that F2<0 was not originally disclosed.

c) Novelty

The border value for the residual stress lay within the range disclosed in D23 (see paragraph [0072]). Thus, the subject-matter of claim 1 was not new (Article 54(3) EPC).

Moreover, D1a disclosed an aluminium oxide layer. The subject-matter of claim 1 was therefore not new with regard to this document (Article 54(2) EPC).

IX. The respondent argued essentially the following:

i) Late filed facts, evidence and requests

a) Late filed documents

D22 was correctly not admitted by the opposition division because it was not relevant.

D23 and D34 were late-filed and not relevant.

D29 - D33 might well show that TiAlN was a typical PVD coating but they did not demonstrate that TiAlN must be a PVD coating rather than for example a CVD coating.

Therefore, the above documents should therefore not be admitted into the proceedings.

b) Novelty attack based on D11

This attack was a change to the appellant's case made during the oral proceedings. It should thus be rejected.

c) Auxiliary requests

Auxiliary requests 1 - 4 were filed with the reply to the appeal, i.e. at the earliest possible moment in appeal proceedings. Auxiliary request 5 was based on previous auxiliary request 5 filed with the reply to the appeal and differed merely through the correction of a typographical error. Auxiliary request 1 - 5 should thus be admitted into the proceedings.

ii) Main request

D1a disclosed an insert with a CVD coating but did not indicate that the bearing surface was coated. It could not therefore disclose the subject-matter of claim 1.

D2 did not disclose the combination of features D and E in the same embodiment.

D5 did not disclose feature E wherein  $F2 < 0$  because example 1 related to an insert coated by a CVD method.

iii) Auxiliary requests 1 - 3

The arguments put forward for the main request also applied to these requests.

iv) Auxiliary request 4

D23 did not disclose that the entire surface was coated

(feature C). The document formed its own dictionary and "entire" was consistently used in reference to the flank and rake surfaces (see for instance paragraph [0048]).

v) Auxiliary request 5

a) Added subject-matter

The further feature of claim 1 whereby the at least one layer of the one or more layers covering the entire surface includes aluminium oxide is disclosed in Table II, see insert Nos. 6 and 9, in combination with the other features of claim 1.

b) Clarity

The amendments to the claim were linguistically clear.

c) Novelty

In D23, paragraph [0072], disclosing aluminium oxide, was part of the general part of the description but not related to any specific example. There was no disclosure of F2 but rather only of cutting surface stresses.

D1a did not disclose that the aluminium oxide layer fulfilled the claimed conditions for F1 and F2.

Thus, the subject-matter of claim 1 was new (Articles 54(2) and (3) EPC).

## **Reasons for the Decision**

1. Admittance of late-filed facts, evidence and requests
- 1.1 Admittance of late-filed documents (D23, D34)

D23 was submitted with the statement setting out the grounds of appeal, i.e. at the earliest possible moment in the appeal proceedings. The Board considers that the filing of this document constitutes a reasonable attempt by the losing party to overcome the decision under appeal.

D34 illustrates the common general knowledge of the person skilled in the art. It was also filed in response to arguments put forward by the respondent.

The Board therefore admitted documents D23 and D34 into the proceedings.

Documents D22, D29 - D33 were all late-filed. The Board did not see that the disclosure of these documents would have a bearing on the outcome of the case, i.e. that they were not *prima facie* relevant, and therefore did not admit them into the proceedings.

- 1.2 Admittance of novelty attack based on D11

The document D11 was referred to in the statement setting out the grounds of appeal and was mentioned in proceedings before the opposition division. However, in the written procedure, it was merely used in combination with other documents in an inventive step attack for which D11 did not represent the closest prior art.

During the oral proceedings the appellant wished to argue that D11 was novelty destroying with regard to the subject-matter of claim 1. This was a new line of attack which took the respondent as well as the Board by surprise and which could not be foreseen. Therefore, for reasons of procedural economy, the Board did not admit this line of attack (Article 13(1) RPBA).

### 1.3 Admittance of auxiliary requests

Auxiliary requests 1 - 4 were filed together with the reply to the appeal. Auxiliary request 5, apart from the correction of a typographical error, corresponds to auxiliary request 5 filed with the reply to the appeal. They thus form the basis of the appeal proceedings (Article 12(1)(b) RPBA). The filing of auxiliary requests is a normal reaction of the patent proprietor (respondent) in order to try to overcome the arguments and new documents filed by the appellant.

It is correct that the auxiliary requests are not always convergent. However, the requests are readily comprehensible, few in number; their number being commensurate with the number of different attacks brought forward by the appellant. The Board decided therefore to admit these requests.

## 2. Main request

### 2.1 It is undisputed that D1a discloses:

- (A) An indexable insert having a structure including at least a rake face and a bearing surface,
- (B) comprising a substrate and a coating layer disposed on the substrate, wherein the coating layer includes one or more layers (see paragraph [0026]).

The feature whereby at least one layer of the coating covers the entire surface of the substrate is also known from D1a. Example 1 of D1a relates to cutting bodies of the type CNMG 120412 which are double sided inserts, i.e. after one side has been used they may be flipped over to use the other side. Thus, any surface treatment must be applied to both sides equally. Moreover, the coating is of the CVD type which is conformal and coats all exposed surfaces of the insert in the reaction chamber. The person skilled in the art reading D1a would therefore understand that the entire insert is coated (Feature C).

Paragraph [0024] reads that "[t]he proposed blast treatment encompasses at least the entire cutting range". This clearly includes the rake face and it follows that the residual stress in this face will be less than in areas of the insert which are not subject to the blast treatment. Whether the relationship  $F1 < F2$  is satisfied depends on the bearing surface not being subject to the blast treatment. The Board considers that the skilled person would read the paragraph, which refers to "at least the entire cutting range", as including embodiments whereby areas outside the cutting range, i.e. the bearing surface, are not subject to the blast treatment. Hence, the cutting surface has a residual stress lower than that of the bearing surface, i.e.  $F1 < F2$  (Features D and F).

D1a furthermore discloses in Table 1 that at least the ZrCN layer of the insert has a negative residual stress before blasting. After the blasting treatment, the residual stresses are even more negative. Feature E is therefore also known from D1a.



Hence, all features of claim 1 are known from D1a.

- 2.2 D2 discloses an indexable insert wherein the feature E is disclosed in col. 2, l. 56 - 68 as part of a discussion of known coating technologies. Feature D is then disclosed as part of the invention at col. 5, l. 6 - 48 through the reference to a PVD layer. These passages are not described as belonging to the same embodiment. The Board therefore considers that features D and E are not disclosed by D2 in combination.

Example 1 of D5 is coated using CVD (see D5a, paragraph [0024]) and hence can be expected to have tensile residual stress. PVD as a coating method has been mentioned in D5 (see D5a, paragraph [0017]) but not in combination with the disclosure of example 1 of D5. Hence, D5 does not disclose feature E of claim 1.

Hence, D2 and D5 are not novelty destroying for the subject-matter of claim 1.

3. First, second and third auxiliary requests

The further features added to these requests are also known from D1a, see table 1. The insert not subject to blasting has a ZrCN layer with a residual stress of -1.0 GPa (top line of the table) - this corresponds to F2 in the language of the claim. After blasting the residual stress is, in the second and third lines of the table, more than -8 GPa. This is disclosed as being just the cutting range in paragraph [0024] i.e. corresponding to F1 in the language of the claim.

The subject-matter of claim 1 of these requests is thus not new with regard to D1a.

4. Fourth auxiliary request

D23, which is state of the art under Article 54(3) EPC discloses:

A positive indexable insert having a structure including at least a single rake face on an upper surface and a single bearing surface on a lower surface opposite to the rake face, (Example 2 relates to cutting insert SEMT13T3AGSN-L which is of such a type (see paragraph [0128])) and comprising a substrate and a coating layer disposed on the substrate, wherein the coating layer includes one or more layers (see paragraph [0129]); and at least one layer of the one or more layers covers the entire surface of the substrate (see discussion below) and satisfies the relationship  $F1 < F2$  (as the rake face is blasted according to treatment method B (see paragraph [0117]), the residual stress in the rake face will be lower than other non-blasted areas) and  $F2 < 0$  (for coatings 10 - 12 formed by PVD, see paragraph [0131]), wherein  $F1$  represents the residual stress in the rake face and  $F2$  represents the residual stress in the bearing surface wherein a cutting edge is provided at a position where the rake face intersects a flank face (as is always the case).

D23 discloses literally that coatings 10 - 12 covered the "entire" surface of the substrate, see paragraph [0130]. The argument that this only meant the rake and flank surfaces is unpersuasive. Firstly, in plain language the term is unambiguous and does not allow any other interpretation. Secondly, even if the person skilled in the art had considered the document to be its own dictionary, they would not have come to a

different conclusion because the document merely says, see for instance paragraph [0048], that the entire surface includes the flank and the rake surfaces but makes no specific statement regarding the other surfaces. Thus, the Board must conclude that the term "entire" is meant to encompass all surfaces of the insert. The bearing surface of the insert is thus also coated.

Therefore, the subject-matter of claim 1 is not new (Article 54(3) EPC) with respect to D23.

5. Fifth auxiliary request

5.1 Clarity - Article 84 EPC

The language of the claim is clear and unambiguous. The concept of "more" is well known to the person skilled in the art who does have a basic knowledge of mathematics. Given the presence of the negative sign, the person skilled in the art would understand that the expressions "-1 GPa or more" and "-8.1 GPa or more" do not refer to the absolute value (modulus) of  $F_1$  and  $F_2$ . The modification does not introduce any unclarity into the claim and is thus not objectionable on this basis.

5.2 Added subject-matter - Article 123(2) EPC

Claim 1 as granted is based on claim 1 as originally filed together with the feature that  $F_2 < 0$  which is disclosed in the final sentence of paragraph [0027] which states that  $F_2$  may be compressive residual stress.

The features added in auxiliary request 5 are based on the following parts of the original application:

The value of F2 of -2.1 GPa is disclosed in Table II (see indexable insert No. 6).

The value of F2 is not an isolated value because there is at least one other value (indexable insert No. 9) which is more than -2.1 GPa in combination with the claimed features. The application as originally filed thus provides a generalised teaching of a range of values for F2 in combination with the other features of claim 1.

The penultimate sentence of paragraph [0026] of the application teaches that "the residual stress F1 is adjusted so as not to be less than -8 GPa." The reason is then explained in the final sentence of this paragraph as being because otherwise "the layer itself may self-destruct". Hence, the application teaches that in the insert of the invention F1 should not be less than -8 GPa.

The coating layer being aluminium oxide is disclosed in claims 3 and 4 of the application.

Inserts 6 and 9 of table 5 exhibit these features in combination. Hence, the amendments do not introduce subject-matter which goes beyond that of the application as originally filed.

### 5.3 Novelty

5.3.1 The claim specifies that "at least one layer of the one or more layers" satisfies the relationships for F1 and F2. Later in the claim it is specified that the at least one layer includes aluminium oxide. Hence, according to the claim, the aluminium oxide layer must

fulfill the requirements for F1 and F2.

D23 discloses an aluminium oxide layer in paragraph [0072]. This paragraph also discloses that F1 is  $-8$  GPa or more. There is however no disclosure of the claimed condition for F2 for this aluminium oxide layer. Thus, the feature that the aluminium oxide layer in combination with the given conditions for F1 and F2 is not disclosed.

The subject-matter of claim 1 is thus new (Article 54(3) EPC) with respect to D23.

- 5.3.2 D1 does not disclose the feature that the aluminium oxide layer fulfills the claimed requirements for F2. From table 1 the residual stress value of the untreated aluminium oxide layer is  $+0.4$  GPa whereas claim 1 requires that  $F2 < 0$ .

The subject-matter of claim 1 is thus also new (Article 54(2) EPC) with respect to D1a.

#### 5.4 Inventive step

After the discussion on novelty in the oral proceedings, the appellant did not submit that the subject-matter of claim 1 of auxiliary request 5 lacked an inventive step. The Board sees no reason why it would have been obvious for the person skilled in the art to have arrived at the claimed insert; there being no hint in the prior art (cf. paragraph 2.2 above) that would have incited person skilled in the art to modify the insert known from D1a such that they would arrive at the subject-matter of claim 1.

Hence, the Board considers that the subject-matter of

claim 1 involves an inventive step.

## 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 with the order to maintain the patent on the basis of the set of claims of auxiliary request 5 filed with letter of 26 August 2019 and a description to be adapted.

The Registrar:

The Chairman:



C. Moser

M. Alvazzi Delfrate

Decision electronically authenticated