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**Datasheet for the decision  
of 27 September 2016**

**Case Number:** T 1237/13 - 3.2.08

**Application Number:** 07705087.0

**Publication Number:** 1984135

**IPC:** B23B27/22, B23B27/16, B23D77/02

**Language of the proceedings:** EN

**Title of invention:**  
A CUTTING INSERT

**Patent Proprietor:**  
KENNAMETAL INC.

**Opponent:**  
Sandvik Intellectual Property AB

**Headword:**

**Relevant legal provisions:**  
EPC Art. 123(2), 56  
RPBA Art. 13(1)

**Keyword:**  
Amendments  
Inventive step

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 1237/13 - 3.2.08

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.08**  
**of 27 September 2016**

**Appellant:** Sandvik Intellectual Property AB  
(Opponent) 811 81 Sandviken (SE)

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**Decision under appeal:** **Interlocutory decision of the Opposition**  
**Division of the European Patent Office posted on**  
**9 April 2013 concerning maintenance of the**  
**European Patent No. 1984135 in amended form.**

**Composition of the Board:**

**Chairwoman** P. Acton  
**Members:** M. Alvazzi Delfrate  
D. T. Keeling

## **Summary of Facts and Submissions**

- I. By its decision posted on 9 April 2013 the opposition division found that European patent No. 1 984 135, in amended form according to auxiliary request 1 then on file, and the invention to which it related met the requirements of the EPC.
- II. The appellant (opponent) lodged an appeal against this decision in the prescribed form and within the prescribed time limit.
- III. Oral proceedings before the Board of Appeal were held on 27 September 2016.

The appellant requested that the decision under appeal be set aside and that the patent be revoked. The appellant further requested that the third to fifth Auxiliary requests not be admitted into the proceedings.

The respondent (patent proprietor) requested that the patent be maintained as amended during the opposition proceedings (Main Request) or, in the alternative, that the patent be maintained on the basis of one of the five auxiliary requests filed by letter of 8 November 2013. The respondent further requested that D11 and D12 not be admitted into the proceedings.

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

"1. A cutting blade insert (20) for a machine tool comprising a flat blade formed from a polycrystalline diamond material phase (23) which is a composite of individual diamond crystals sintered together in an inter-connected network and having a front face (21)

formed from the PCD phase with at least one cutting edge (22) thereon, and a rear face formed from a second phase substrate (24), characterised in that the rear face has at least one groove (25) therein formed within the second phase substrate and the front face is a continuous flat surface."

Claim 1 of the **first auxiliary request** differs from claim 1 of the main request in that its characterising portion reads as follows:

"characterised in that the rear face has a plurality of grooves (25) therein formed within the second phase substrate, the front face is a continuous flat surface and each groove is one of a plurality of serrations (25A, 25B) formed in the second phase substrate."

Claim 1 of the **second auxiliary request** differs from claim 1 of the main request in that its characterising portion reads as follows:

"characterised in that the rear face has at least one groove (25) therein formed within the second phase substrate and the front face is a continuous flat surface and wherein the insert is substantially square with four cutting edges and the rear of the blade is provided with two sets of intersecting serrations (25A, 25B)."

V. The following documents played a role in the present decision:

D3: EP-A-1 435 270;

D4: US-A-6 146 060;

D7: US-A-2 435 287;

D11: W. Schedler, "Hartmetall für den Praktiker", (1988), pages 10-13; and

D12: E. Dow Whitney, "Ceramic Cutting Tools - Materials, Development, and Performance", (1994), pages 44-47 and 250-255.

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

*Introduction of D11 and D12 into the proceedings*

D11 and D12 represented the common general knowledge of the person skilled in the art. They had been filed to substantiate that, contrary to the respondent's opinion, the teaching of paragraph [0013] of D3 belonged to the common general knowledge of the person skilled in the art. Thus, they should be introduced into the proceedings.

*Main request - Article 123(2) EPC*

An insert with a "continuous flat surface" as front face was disclosed in the application as originally filed solely in Figures 2 to 4 and in the corresponding passage of the description on page 6, line 23-26. However, said passage and said figures related to a specific embodiment, which exhibited also other features not comprised by claim 1, in particular a groove which extended substantially normal to the cutting edge for the full length of the blade. Because of the flat front face, the groove was necessary in order to supplement the clamping, absorb the machining loads and maintain the insert in position during working. Thus, the omission of this feature was an unallowable intermediate generalisation, contrary to Article 123(2) EPC.

*Main request - Inventive step*

Figures 8A to 8G of D4 disclosed a cutting blade insert (62) for a machine tool comprising a flat blade and having a front face with at least one cutting edge thereon, and a rear face. The rear face had at least one groove therein and the front face was a continuous flat surface. Since it had the same geometry as the insert of claim 1 of the main request, this insert could be regarded as the closest prior art. Starting from the insert of D4 the problem to be solved by the claimed invention thanks to the PCD front face was the provision of a cutting tool with improved performance for working non-ferrous materials. As evidenced by D11 and D12, it was common general knowledge that PCD exhibited very high hardness and abrasion resistance and allowed for higher cutting speed and/or longer tool life when machining non-ferrous materials. This teaching was present also in D3, which further disclosed in Figures 1(A) to 1(C) how a PCD cutting region could be realised. The insert of Figure 1(B), wherein a PCD front face was unitarily sintered with a carbide support, was particularly advantageous. Thus, it was obvious to solve the given problem by providing the insert of D4 with a front face formed of PCD, as required by claim 1.

Similar considerations applied when starting from D7, which also disclosed a cutting insert with the same geometry as the claimed one.

Finally, it was also obvious to arrive at the claimed invention starting from D3. In particular, the prior art insert of Figure 1(B) exhibited a front face of high-pressure sintered material, for which the person

skilled in the art would have chosen PCD, and a carbide rear face. It was obvious to provide it with the grooves shown in Figures 8A to 8G of D4 to improve the fixation of the insert. Additionally, D3 also disclosed, in the discussion of the prior art, the possibility of having circular or quadrangular inserts. A circular insert was also shown in Figure 8. It was also obvious to provide these inserts with said grooves, thus arriving at the claimed invention.

Therefore, the subject-matter of claim 1 of the main request lacked an inventive step.

*Auxiliary request 1*

Claim 1 of auxiliary request 1 did not add any distinguishing feature in respect of D4. Hence, its subject-matter did not involve an inventive step starting from D4.

*Auxiliary request 2*

Claim 1 of auxiliary request 2 did not involve an inventive step either, in particular starting from D4. As explained above, it was obvious to add a PCD front face to the insert of Figures 8A to 8G. Moreover, if a different type of working was contemplated it was also obvious to exchange the circular shape with a square shape with four cutting edges, a shape which was well known in the art.

Starting from D7, it was obvious to add a PCD front for the reasons given above. Moreover, a fourth cutting edge would be added depending on the working to be performed and D4 rendered it obvious to adopt intersecting serrations.



Therefore, the subject-matter of claim 1 of auxiliary request 2 did not involve an inventive step.

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

*Introduction of D11 and D12 into the proceedings*

D11 and D12 were late-filed and there was no reason for the delay in their submission. Moreover, they were not *prima facie* relevant. Hence, they should not be admitted into the proceedings.

*Main request - Article 123(2) EPC*

The application as originally filed disclosed in Figures 2 to 4 and in the description, page 6, line 23-26, an insert with a continuous flat surface as front face. It was true that said disclosure related to a specific embodiment. However, none of the features of that embodiment which were not comprised in claim 1 was functionally or structurally linked with the flat continuous front face. This applied in particular to the orientation perpendicular to the cutting edge of the groove. This feature provided namely a better adjusting of the position of the insert, which was independent of the fact that the front face was flat or not. Thus, claim 1 complied with the requirements of Article 123(2) EPC.

*Main request - Inventive step*

The patent in suit related to inserts with a PCD front face. Hence, the closest prior art could only be represented by an insert with a PCD front face.

Therefore, neither D4 nor D7 could represent said closest prior art and it was not obvious to provide them with a PCD cutting region. Moreover, even if the person skilled in the art were to consider the provision of a PCD cutting region and consulted D3 for that purpose, he would have been confronted with a number of different possibilities, for instance the different geometries of Figures 1(A) to 1(C). Thus, it was not obvious to choose the specific geometry depicted in Figure 1(B), with a front face of hard material and a carbide substrate.

Also starting from the closest prior art D3 it was not obvious to arrive at the claimed invention. D3 taught against clamping and, as a consequence, against the use of a continuous flat surface. In any event, the insert of Figure 1(B), which was the only one with a continuous flat surface and a second phase support, was an indexable insert. The application of the grooves of D4 would have rendered the insert not indexable. Thus, the person skilled in the art would not have taken this measure. As to Figure 8 of D3, it did not depict a finished insert but only an intermediate product, before a hole was performed in the front face.

*Auxiliary request 1*

The insert of claim 1 of auxiliary request 1 was additionally provided with a plurality of serrations, i.e. grooves with a teeth-like configuration.

*Auxiliary request 2*

There was no reason to change the shape of the inserts of D4 or D7 into a square insert with four cutting edges, as required by claim 1 of auxiliary request 2.

Moreover, the insert of D7 had no intersecting serrations. Therefore, the subject-matter of claim 1 involved an inventive step.

## **Reasons for the Decision**

### 1. Introduction of D11 and D12 into the proceedings

D11 and D12 have been filed about one month before the oral proceedings. Therefore, their introduction into the proceedings is at the Board's discretion (Article 13(1) RPBA).

Although D11 and D12 have been filed at a late stage of the procedure, their content could not take the respondent by surprise, because both documents are extracts from textbooks representing the common general knowledge of the person skilled in the art.

Moreover, they were relevant to the issues to be discussed at the oral proceedings because they concerned the contentious point of whether or not the teaching of paragraph [0013] of D3 belongs to the common general knowledge of the person skilled in the art.

Under these circumstances, the Board decided to admit D11 and D12 into the proceedings.

### 2. Main request - Article 123(2) EPC

The feature according to which the front face of the cutting blade insert is a "continuous flat surface" was added to claim 1 during the examination phase.

It is undisputed that the application as originally filed discloses a cutting insert with a continuous flat surface in Figures 2 to 4 and in the corresponding passage of the description on page 6, lines 23-26, which refer to an insert "having a flat front face".

Said passage and said figures relate to a specific embodiment, which exhibits also other features not comprised by claim 1, in particular a groove which extends substantially normal to the cutting edge for the full length of the blade (page 7, lines 8-10). However, the person skilled in the art would have no reason to consider that said missing features and in particular said specific orientation of the groove are functionally or structurally linked to the fact that the front face is a continuous flat face.

It is true that, since the front face is flat, some measure may be necessary to supplement the clamping in order to absorb the machining loads and maintain the insert in position during working. However, a contribution in this sense is already given by the provision of a groove (page 4, line 18-21), i.e. by a feature which is included in claim 1. The orientation perpendicular to the cutting edge of the groove may open the possibility of a better adjustment of the position of the insert but does not provide any particular advantage compared to other orientations as far as the absorption of machining loads is concerned. Therefore, no functional or structural interaction exists between the flat front face and the orientation of the groove perpendicular to the cutting edge.

Accordingly, the amendment in question does not represent an unallowable intermediate generalisation and complies with Article 123(2) EPC.

3. Main request - Inventive step

Inventive step was questioned starting from each of documents D4, D7 and D3.

3.1 Figures 8A to 8G of D4 disclose a cutting blade insert (62) for a machine tool comprising a flat blade and having a front face with at least one cutting edge thereon, and a rear face. The rear face has at least one groove therein and the front face is a continuous flat surface.

The respondent submitted that the cutting insert of D4, which is made of cemented carbide (column 8, lines 25-27), cannot represent the closest prior art for the insert of claim 1, which has a front face formed from PCD.

However, the person skilled in the art would choose the starting point for developing a particular cutting tool either on the basis of the working operation to be performed, which influences primarily the geometry, or on the basis of the material to be worked, which may influence the material(s) of the cutting tool. Both approaches are in principle viable. In the present case the geometry of the tool of D4, Figures 8A to 8G, is in accordance with the claimed one. Moreover, cemented carbides inserts can be used, albeit with a lower performance, to work the same materials which are worked by PCD inserts. Therefore, D4 would have been a realistic starting point for developing the claimed

invention. Hence, it is a suitable closest prior art for the assessment of inventive step.

PCD is extremely hard and has good abrasion resistance when compared with cemented carbide (patent in suit, paragraph [0002]). Hence, starting from D4 the problem to be solved by the claimed invention, by means of a PCD front face, can be considered to be the provision of a cutting tool with improved performance for working non-ferrous materials.

It is common general knowledge that PCD exhibits very high hardness and abrasion resistance, allowing for higher cutting speed and/or longer tool life when machining non-ferrous materials (D12 page 46, first paragraph). A corresponding teaching can be found also in D3, which discusses the advantages of the high-pressure sintered materials PCD and cBN (paragraphs [0002] and [0013]). D3 shows in Figures 1(A) to 1(C) and describes in paragraphs [0003] and [0004] how prior art tools with high-pressure sintered materials can be realised. In the tool of Figure 1(B), the high-pressure sintered material forms the front face and is unitarily sintered with the carbide support forming the rear face. Hence, D3 renders it obvious to solve the problem above by providing the insert of Figures 8A to 8G of D4 with a front face formed of PCD, thus arriving at the subject-matter of claim 1.

The respondent argued that the configurations shown in Figures 1(A) and 1(C) of D3 would be equally taken into consideration by the person skilled in the art to solve the problem posed. However, the configurations of Figures 1(A) and 1(C) consist of a tip of high-pressure material brazed on the carbide substrate (Figure 1(A)), which may come loose under repeated stresses (paragraph

[0006]), or an insert completely made of high-pressure sintered material (Figure 1(C), on whose rear face the grooves of the geometry of D4 may be difficult, if not altogether impossible, to realise. Therefore, these geometries are less obvious than the geometry of Figure 1(B) as solutions to the given problem. Moreover, even accepting the respondent's argument that the configurations of Figures 1(A) and 1(C) were equally viable would not change the finding that the choice of the geometry of Figure 1(B) was an obvious one, but it would merely result in several obvious solutions, each lacking any inventive merit.

Therefore, the subject-matter of claim 1 does not involve an inventive step starting from D4.

3.2 D7 discloses a cutting blade insert (13) for a machine tool comprising a flat blade and having a front face with at least one cutting edge thereon, and a rear face, wherein the rear face has at least one groove therein and the front face is a continuous flat surface (see for instance Figure 1). Hence, in respect of the features of claim 1 the disclosure of D7 is similar to that of D3 and the same considerations made in view of D3 apply *mutatis mutandis*. Thus, the subject-matter of claim 1 does not involve an inventive step when starting from D7 either.

3.3 By contrast, the Board is not convinced that the subject-matter of claim 1 lacks an inventive step also when starting from D3.

As explained above, D3 shows in Figure 1(B) a prior art insert with a high-pressure sintered material flat front face and a carbide rear face. The insert of Figure 1(B) is equilateral triangular in shape.

Applying the grooves shown in Figures 8A to 8G of D4, which extend in two directions perpendicular to each other, to said triangular insert would result in an insert that is not indexable, because to be indexable an equilateral triangular insert would need grooves extending at 120° to each other. However, D3 relates to indexable inserts (see paragraph [0001] and paragraph [0004] for what specifically concerns the insert of Figure 1(B)). Therefore, applying the grooves of D4 to the insert of Figure 1(B) of D3 would go against the teaching of D3. Thus, it was not obvious to modify the insert of Figure 1(B) in the sense of claim 1.

It is true that D3 discloses also, in the discussion of the prior art, the possibility of having circular or quadrangular inserts (paragraph [0004]). However, D3 either discloses that they are realised integrally in the high-pressure sintered material (round insert of Figure 1(C)) or does not describe at all how they are to be realised. Firstly, the insert of Figure 8, does not comprise a PCD but a cBN layer. Moreover, this drawing does not show a finished insert, but rather an intermediate product into which a hole as shown in Figure 9 is to be formed, resulting in an insert with no continuous flat front surface. The other inserts disclosed in D3 are all further remote from the claimed invention than the insert of Figure 1(B) and it was not obvious to modify them in the sense of the claimed invention. Thus, an inventive step is also present starting from these inserts.

4. Auxiliary request 1

In the insert of D4 a plurality of grooves is formed in the rear face and each groove is one of a plurality of serrations, since the grooves have a teeth-like



configuration (see in particular Figures 8F and 8G). Hence, claim 1 of auxiliary request 1 does not add any further distinguishing feature in respect of D4. Thus, for the reasons already explained above, the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step starting from D4.

5. Auxiliary request 2

5.1 Starting from D4

Claim 1 of auxiliary request 2 relates to an insert which is substantially square with four cutting edges. As a consequence, the insert is indexable. The insert of Figures 8A to 8G of D4 is also indexable but with a different, namely circular, shape.

As explained above the shape of a particular insert is chosen on the basis of the particular working operation to be performed. Given that requirement the person skilled in the art, without a previous knowledge of the invention, would have no reason to transform the circular shape in a substantially square shape. Rather, if a working operation requiring an indexable square insert is involved, he would directly start from a prior art concerning such an insert. Therefore, it is not obvious to arrive at the insert of claim 1 of auxiliary request 2 starting from D4, Figure 8A to 8G.

5.2 Starting from D7

D7 is an even more remote starting point because its substantially square insert does not have four cutting edges, is not indexable in view of the working operation involving three cutting edges and does not

have intersecting serrations. Hence, it is also not obvious to arrive at the insert of claim 1 starting from D7.

- 5.3 Therefore, the subject-matter of claim 1 of the second auxiliary request 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 following documents:
  - Claims 1 to 10 according to the Second Auxiliary Request filed by letter of 8 November 2013;
  - Description, columns 1 to 5, as filed during oral proceedings on 27 September 2016;
  - Figures 1 to 6 as granted.

The Registrar:

The Chairwoman:



C. Moser

P. Acton

Decision electronically authenticated