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D E C I S I O N
of 16 September 1999

Case Number: T 0106/97 - 3.2.3

Application Number: 88904784.1

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Language of the proceedings: EN

Title of invention:
Improved cutting tool

Patentee:
Kennametal Inc

Opponent II:
Sandvik AB

Headword:
-

Relevant legal provisions:
EPC Art. 54(3), 56, 114

Keyword:
"Novelty - prior European applications"
"Inventive step - obvious combination of known features"
"Examination of own motion"

Decisions cited:
T 0271/84

Catchword:
-



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Boards of Appeal

Chambres de recours

Case Number: T 0160/97 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 16 September 1999

Appellant: Sandvik AB
(Opponent II) 81181 Sandviken (SE)

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Respondent: Kennametal Inc.
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 2 December
1996 concerning maintenance of European patent
No. 0 333 776 in amended form.

Composition of the Board:

Chairman: C. T. Wilson
Members: F. Brösamle
J. P. Seitz

Summary of Facts and Submissions

I. With its decision of 2 December 1996 the Opposition Division upheld European patent No. 0 333 776 in amended form.

II. In the light of

(D1) EP-A-0 283 454

(D2) US-A-3 580 708

(D4) US-A-4 543 345 and

(D5) GB-B-954 285

the Opposition Division came to the result that the subject-matter of both sets of amended claims relating respectively to the Contracting States "DE, GB, FR, IT, SE" and to "BE" was novel and based on an inventive step.

III. With telefax of 28 January 1997 the then opponent II - appellant in the following - filed an appeal against the above decision paying the appeal fee on the same day and filing the statement of grounds of appeal on 27 March 1997.

IV. The appellant requested to set aside the impugned decision and to revoke the patent.

V. The patentee - respondent in the following - requested to set aside the impugned decision and to maintain the patent on the basis of sets of claims "A" and "B" for

the Contracting States "DE, GB, FR, IT, SE" and "BE" respectively. Set "A" includes independent claims 1 according to a main request and auxiliary requests I to III whereas set "B" comprises only a single main request based on claims 1 to 16.

VI. Claims 1 of set "A" read as follows:

(a) **main request**

"1. A ceramic composition comprising a polycrystalline alumina matrix having titanium carbide whiskers distributed therein, said composition comprising:

(a) 50 to 90 volume percent high purity alumina comprising at least 99 weight percent alumina;

(b) 10 to 50 volume percent single crystal titanium carbide whiskers; and

(c) a residue of sintering aids comprising an amount up to 3 volume percent."

(b) **auxiliary request I**

"1. A ceramic composition comprising a polycrystalline alumina matrix having titanium carbide whiskers distributed therein, said composition comprising:

(a) 50 to 90 volume percent high purity alumina comprising at least 99 weight percent alumina;

(b) 10 to 50 volume percent single crystal titanium carbide whiskers; and

(c) 0.25 to 1.5 volume percent being residue of sintering aids."

(c) **auxiliary request II**

"1. A ceramic composition comprising a polycrystalline alumina matrix having titanium carbide whiskers distributed therein, said composition comprising:

(a) 10 to 50 volume percent single crystal titanium carbide whiskers; and

(b) 0.25 to 1.5 volume percent being residue of sintering aids; and

(c) the balance being high purity alumina comprising at least 99 weight percent alumina."

(d) **auxiliary request III**

as claim 1 of the main request plus the feature of granted claim 7 that the whiskers are preferably orientated in planes perpendicular to one axis.

VII. Claim 1 of set "B" reads as follows:

"1. A ceramic composition comprising a polycrystalline alumina matrix having titanium carbide whiskers distributed therein, said composition comprising:

(a) 50 to 90 volume percent high purity alumina,

(b) 10 to 50 volume percent single crystal titanium carbide whiskers, and

(c) up to 3 volume percent being the residue of sintering aids."

VIII. Following the board's communication pursuant to Article 11(2) RPBA of 12 January 1999 the appellant with letter of 27 August 1999 filed four pages of a handbook, namely "Alumina", Springer-Verlag Berlin Heidelberg New York Tokyo, 1984, by E. Dörre and H. Hübner as evidence that high-purity alumina ceramics comprise at least 99 weight person alumina when used as cutting tool materials.

IX. In the oral proceedings of 16 September 1999 the parties brought forward the following arguments:

1. Appellant

(a) Set "A"

main request

- the subject-matter of claim 1 is not novel in view of (D1) since from this document - when read by a skilled person - all features thereof are known, even the high purity of the alumina;
- the handbook "Alumina" is not used as an anticipation in the proper sense rather it is used as evidence that in ceramic compositions used as material for cutting tools the alumina is understood to be of high purity, whether specifically mentioned in (D1) or not;
- the sintering aid of claim 1 is an optional

feature and (D1) also covers feature (c) of claim 1;

- the handbook "Alumina" is relevant for assessing the validity of claim 1 and the fact that it was not cited until the appeal proceedings does not infringe the requirements of Article 114 EPC;
- summarizing, the requirements of Article 54(3) and (4) EPC are not fulfilled.

auxiliary requests I and II

- the only difference with respect to the **main request** lies in the feature of the sintering aid, namely being restricted to 0.25 to 1.5 volume percent;
- (D1) discloses sintering aids in form of ZrO_2 and MgO, namely less than 15% by weight according to page 2, line 56, and 4.2% and 0.3% by weight according to Table 1 thereof and the subject-matter of claim 1 is again not novel since ZrO_2 and MgO are both to be seen as sintering aids present in amounts as claimed; again the requirements of Article 54(3) and (4) EPC are not fulfilled.

(b) Set "B"

- nearest prior art is (D2) disclosing high purity alumina as matrix for TiC; their amounts can be within the range of 20:80 and 80:20;
- what is not known from (D2) is that TiC is used in

the form of whiskers;

- from (D4) and (D5) it is, however, known that applying whiskers is a means to enhance the toughness of ceramics so that a skilled person confronted with the problem of poor toughness of polycrystalline TiC according to (D2) would turn to (D4) or (D5) which both deal with this problem and disclose that the substitution of polycrystalline TiC by single crystal whiskers of TiC solves the above problem of poor toughness;
- claim 1 is therefore obvious with respect to the combination of (D2) and (D4) or (D5) and contrary to respondent's findings the enhanced tool life according to Test A of Table 3 of EP-B1-0 333 776 is not surprising, rather the consequence of the use of whiskers as taught in (D4) and (D5) so that claim 1 does not fulfill the requirement of Article 56 EPC.

2. Respondent

- (a) Set "A"

main request

- the high purity of alumina as claimed in claim 1 cannot unambiguously be seen from (D1); a consideration of the handbook "Alumina" does not lead to a different result, since high purity is there defined for the purposes of the handbook rather than constituting general technical knowledge; in the handbook high purity alumina is

no must since it can be replaced by additions of TiC and ZrO₂, (see page 254, last but one paragraph);

- the handbook "Alumina" should not therefore be taken into account in the appeal proceedings;
- feature (c) of claim 1 can moreover not be seen as optional so that (D1) is not a novelty destroying document to claim 1;

auxiliary requests

- in (D1) ZrO₂ is not disclosed as a sintering aid, and even if one makes this assumption its amount is different from that of claim 1 of the auxiliary requests I and II so that (D1) is not novelty destroying with respect to the claimed subject-matter;
- an additional auxiliary request combining claim 1 of the **main request** and granted claim 7 should be allowed as **auxiliary request III**.

(b) Set "B"

- the result of the combination of the features of (D2) and (D4) or (D5) was not predictable and the effects thereof have to be seen as surprising, (see EP-B1-0 333 776 and Table 3, Test A), namely increased tool life;
- with respect to page 6, lines 44 to 47 and 50/51, it has to be set out that not only poor fracture

toughness can lead to failure of the cutting tool;

- summarizing, the subject-matter of claim 1 is seen as being novel and inventive.

Reasons for the Decision

1. The appeal is admissible.
2. (D1) was filed on 16 March 1988 claiming the priority of SE 8701172 of 20 March 1987 and covering inter alia the Contracting States "DE, FR, GB, IT, SE" but not "BE". (D1) is a European patent application therefore to be considered under Article 54(3) and (4) EPC.

The respondent submitted consequently two sets of claims "A" and "B" one set for "DE, FR, GB, IT, SE" and one set for "BE" as Contracting State(s).

Set "A"

3. *Novelty under Article 54(3) and (4) EPC*
Main request
 - 3.1 (D1) relates to a ceramic composition comprising a polycrystalline alumina matrix having titanium carbide (TiC) whiskers distributed therein (see page 2, lines 3 to 6 and line 50). Also known from (D1) is a content of alumina and TiC - whiskers, namely of 5 to 50 volume percent of TiC - whiskers in a matrix of 50 to 95 volume percent of alumina, so that features (a) and (b) of claim 1 including the high purity value of alumina

being 99 weight percent are known from (D1).

- 3.2 It is true that (D1) does not literally disclose the high purity value of claim 1 but (D1) has to be read with the eyes of a skilled person who is aware of the handbook cited by the appellant, namely "Alumina", in particular pages 1 and 254, wherefrom it is general technical knowledge that alumina used for cutting tools is high-purity alumina consisting of at least 99% alumina. This knowledge has to be considered when interpreting the term "aluminium oxide" in (D1) without, however, carrying out an assessment thereof in form of a mosaic contrary to respondent's findings.
- 3.3 From (D1) it is also known to make use of sintering aids since ZrO_2 and MgO , (see page 2, lines 26 to 28 and Table 1) have to be seen as sintering aids present in amounts of for instance 0.3% by weight and falling therefore under the range of claim 1, namely up to 3 volume percent.
- 3.4 Under these circumstances it is beyond doubt that a skilled person makes use of alumina with a purity of at least 99 weight percent and that the definition used in the handbook "Alumina" constitutes general technical knowledge. Even if in this handbook some alumina can be replaced by TiC and ZrO_2 (see page 254, last but one paragraph) it discloses the use of pure alumina.
- 3.5 Since "Alumina" is a highly relevant handbook representing general technical knowledge it cannot be disconsidered by the board as "late filed", contrary to respondent's request (Article 114(1) EPC), (see particularly T 271/84, OJ 1987, 405).

- 3.6 Summarizing the above considerations the subject-matter of claim 1 is not novel with respect to (D1) (Article 54(3) and (4) EPC).

Auxiliary requests

- 3.7 In claims 1 according to the **auxiliary requests I and II** only the content of the sintering aids is restricted with respect to the main request to 0.25 to 1.5 volume percent.
- 3.8 Since (D1) is based on less than 15% by weight ZrO₂ in a matrix of 50:50 alumina and whiskers, the content of the ceramic cutting material is up to 7.5% by weight, i.e. 0 to 7.5%, so that the range of claims 1 of the **auxiliary request I and II** is also known from (D1) (see page 2, lines 49 to 56 and Table 1 thereof, 4.2%).
- 3.9 Even if ZrO₂ is not literally identified as a sintering aid it is known to a skilled person that ZrO₂ and MgO are inhibiting grain growth and act thereby as sintering aids.

Apart therefrom identical technical features must lead to identical technical effects irrespective of how they are defined.

- 3.10 Under these circumstances claims 1 of the **auxiliary requests I and II** do not define novel subject-matter within the meaning of Article 54(3) and (4) EPC so that no request within set "A" of the claims is allowable.
- 3.11 Respondent's **auxiliary request III** was submitted for

the first time during the oral proceedings before the board and **after** the deliberation about set "A" and the announcement of the board's findings about set "A". It was therefore rejected by the board as inadmissible and has not to be dealt with in respect of substantive matters.

Set "B"

4. With respect to claim 1 the following is observed:
 - 4.1 Starting point for claim 1 is (D2) which document discloses a ceramic composition of alumina with polycrystalline TiC particles in a proportion of 20 to 80%:80 to 20%, (see for instance claim 1). The alumina matrix has a purity of more than 99% and is therefore of "high purity" as in claim 1, (see column 2, lines 6/7). From (D2) a sintering aid in the form of MgO is known covering a range up to 3 volume percent as in claim 1, (see column 2, lines 10 to 13).
 - 4.2 Claim 1 differs from the disclosure of (D2) in respect of the single crystal whiskers of the TiC which solve the problem of poor fracture toughness of polycrystalline TiC.
 - 4.3 From (D4) and (D5) it is, however, well known in the art of ceramic compositions to make use of whiskers to increase the toughness of ceramic compositions (see (D4) and column 1, lines 12 to 17, and column 2, lines 26 to 29) irrespective of the material of the single crystal whiskers.
 - 4.4 Since in (D4), (see column 1, lines 12 to 17) the same

problem is acknowledged as in EP-B1-0 333 776, (see page 2, lines 46 to 52), a skilled person in cases of poor fracture toughness and limited tool life would turn to (D4) from the technical field of ceramic compositions to overcome the above disadvantages and would replace polycrystalline TiC by monocrystalline TiC i.e., by single crystal whiskers thereof without exercising an inventive endeavour within the meaning of Articles 56 and 100(a) EPC.

- 4.5 Relying on (D5), for instance on page 1, lines 8 to 23 and lines 45 to 50, leads to the same result, namely that the replacement of polycrystalline TiC by monocrystalline (whiskers) TiC is obvious under the above circumstances so that claim 1 of set "B" is also not valid since its subject-matter lacks inventive step (Articles 56 and 100(a) EPC).
- 4.6 Under the above circumstances any advantageous effects such as longer tool life (see EP-B1-0 333 776, Table 3, Test A) have to be seen as bonus and predictable effects since enhanced fracture toughness according to the incorporation of single crystal whiskers is general technical knowledge and the direct consequence for longer tool life even if other parameters may have an influence on the tool life.
5. Summarizing, no allowable request from the respondent is on file so that the impugned decision cannot be upheld. Rather the patent in all its requested amended versions has to be revoked.

Order

For these reasons it is decided that:

1. The impugned decision is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

N. Maslin

C. T. Wilson