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**Datasheet for the decision
of 25 June 2014**

Case Number: T 0158/11 - 3.2.06

Application Number: 02736419.9

Publication Number: 1401603

IPC: B23C5/20

Language of the proceedings: EN

Title of invention:
SINTERED CUTTING INSERT HAVING CENTER HOLE FOR CLAMP SCREW

Patent Proprietor:
Sandvik Intellectual Property AB

Opponent:
Iscar Ltd

Relevant legal provisions:
EPC 1973 Art. 54(2), 56
EPC Art. 123(2)
RPBA Art. 13(1)

Keyword:
Amendments - allowable (yes)
Novelty - (yes)
Inventive step - (yes)



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Chambres de recours**

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Case Number: T 0158/11 - 3.2.06

**D E C I S I O N
of Technical Board of Appeal 3.2.06
of 25 June 2014**

Appellant: Iscar Ltd
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
10 November 2010 concerning maintenance of the
European Patent No. 1401603 in amended form.**

Composition of the Board:

Chairman M. Harrison
Members: G. Kadner
W. Sekretaruk

Summary of Facts and Submissions

- I. The mention of grant of European patent No. 1 401 603, with 6 claims, on the basis of European patent application No. 02736419.9 filed on 7 June 2002, and claiming a US priority of 15 June 2001, was published on 20 August 2008.
- II. A notice of opposition was filed against the granted patent requesting revocation of the patent on the grounds of Articles 100(a), 100(b) and 100(c) EPC.
- III. By way of its decision given at the end of oral proceedings on 19 October 2010 and posted on 10 November 2010, the opposition division found that the patent in an amended form according to the proprietor's auxiliary request met the requirements of the EPC.
- IV. Notice of appeal was filed against this decision by the appellant (opponent) on 20 January 2011, and the appeal fee was paid on the same day. With its grounds of appeal filed on 18 March 2011 the appellant pursued its request for revocation of the patent.
- V. In its communication dated 15 April 2014 the Board expressed its preliminary opinion that the amendments to claims 3 and 6 according to the request found allowable by the opposition division possibly resulted in an inadmissible intermediate generalisation. The requirements of Articles 54 and 56 however seemed to be met.
- VI. With letter dated 23 May 2014 the respondent (proprietor) filed six new auxiliary requests.

VII. Oral proceedings were held on 25 June 2014, during which the proprietor filed a new main request.

The following prior art documents were cited by the appellant in its arguments against this request:

E4: US-A-6 196 770

E5: US-A-5 685 670

E6: US-A-5 071 292

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent No. 1401603 be revoked.

The respondent (patent proprietor) requested that the European patent be maintained with the following documents:

claims 1 to 4, filed 25 June 2014;
description page 2, filed 25 June 2014,
description pages 3, 4, as granted;
Figures 1 to 8, as granted.

Independent claims 1 and 3 read (the features arranged in accordance with Rule 43(1) EPC and the added features, with respect to claims 1 and 4 as granted and those found allowable in opposition, being underlined, it being noted that claim 1 and claim 4 in the form found allowable by the opposition division were the same as claim 1 and 4 as granted):

"1. Indexible cutting insert (13) for chip forming machining, comprising a basically parallelogram shaped body formed of sintered powder, the body including:
a top face (16) forming two main cutting edges (24);
a bottom face (17);

two longitudinal side surfaces (18, 19) extending downwardly relative to respective main cutting edges (24);

two end faces (20, 21) spaced apart in a longitudinal direction of the insert, each end face (20, 21) having a bevel provided on a portion (22, 23) of the body protruding in the longitudinal direction from the remainder of the body;

each of the side surfaces (18, 19) having a height increasing towards a respective active cutting corner of the insert such that the active cutting corner is raised with respect to an opposite end of the respective side surface, the side surfaces (18, 19) being generally inclined at an acute angle toward the top face (16) and at an obtuse angle toward the bottom face (17);

and an upper portion of each of the side surfaces comprising a wave-shaped primary clearance surface (30) extending along the entire respective main cutting edge (24) at a downward inclination to form a clearance angle;

a center hole (15) extending completely through the body from the top face (16) to the bottom face (17) and including a cylindrical portion (15a) adapted to receive a threaded shank of a clamp screw (9), the center hole (15) further including an enlarged portion (15b) adjacent the top face (16);

a lower region (40) of each longitudinal side surface (18, 19) defining an abutment surface adapted to engage a flat support surface of an insert site (12) of a holder, the lower region (40) including a recess (42) extending to the bottom surface (17) and extending in the longitudinal direction for a distance (L') longer than a diameter of the cylindrical portion (15a) of the center hole (15),

characterized in that

the recess (42) extends beyond the entire cylindrical

portion (15a) in the longitudinal direction of the insert (13) as the insert is viewed in a direction toward the side surfaces (18, 19) thereby leaving only two planar flat segments (40a) of the side surface for engaging a flat support surface (11b) of the insert site (12) and in that each main cutting edge (24) is convex as the insert (13) is viewed in a direction perpendicular to the top surface (16).

3. A milling tool (10) comprising:
the holder comprising a rotary shank (9) forming at least one insert-receiving site (12) having a floor (14), the flat support surface (11a, 11b) of the insert site upstanding from the floor (14), and a threaded hole formed in the floor, the shank defining an axis of rotation extending in a longitudinal direction;
the cutting insert (13) according to claim 1 mounted in the insert site (12); and
a clamp screw (9) extending through the center hole (15) and threadedly mounted in the threaded hole."

VIII. The arguments of the appellant can be summarized as follows:

The newly filed main request should not be admitted into the proceedings because it did not comply with Articles 84 and 123(2) EPC. The term "planar flat" was redundant or contradictory, and thus it was not clear whether the segments 40a were "planar" or "flat". The feature taken from the description (paragraph [0029]) included an inadmissible intermediate generalisation since the disclosure was linked to a process resulting in the convexity of the side surfaces due to the traditional pressing and sintering of an insert having a center hole and indicated by the words "leaving only ..." which had

however been omitted. Moreover, the reference to Fig. 3 "(see Fig.3)" in paragraph [0029] indicated the relationship to the disclosure in that drawing, which disclosed more detail than was included in the claim, particularly the extension of the recess 42 in a longitudinal direction for a distance L' which was obviously much more than only slightly "longer than a diameter of the cylindrical portion 15a of the center hole".

The formulation of claim 1 was not clear and too broad since any cutting insert of the art was covered which had been later machined by any method.

High complexity had arisen as a result of the late amendments such that they should not be admitted under the Rules of Procedure of the Boards of Appeal (RPBA).

In any case, the newly claimed subject-matter did not involve an inventive step. Starting from a cutting insert disclosed in E4, the differing features were those defined in the characterizing portion of claim 1, that the recess extends beyond the entire cylindrical portion in the longitudinal direction of the insert as the insert is viewed in a direction toward the side surfaces thereby leaving only two planar flat segments of the side surface for engaging a flat support surface of the insert site and that each main cutting edge is convex as the insert is viewed in a direction perpendicular to the top surface. These features were directed to differing solutions and did not solve a common problem. The first problem was the stable support of the cutting insert in its pocket by elimination of convexity whereas the second problem was to achieve an exact right angle in shoulder milling.

A solution to the first problem was given by E5 which disclosed a recess within each of the side surfaces having the form as claimed. The skilled person therefore, having regard to Fig. 3b and Fig. 7 and the description (col. 1, lines 45 to 48; col 5, lines 33 to 45; col. 7, lines 20 to 23), would be led in an obvious manner to the configuration of a recess between two planar segments as claimed. Even if the shrinking problem occurring during the pressing and sintering process was not explicitly addressed in E5, this was a bonus effect which was recognized and taken into consideration by the skilled person.

The solution to the second problem, by providing curved cutting edges, was well known in the art and particularly made obvious by E6.

Also, starting from E6 which also showed bevelled portions protruding in the longitudinal direction from the remainder of the body (Fig. 6, Fig. 7), and combining this teaching with that of E5, the subject-matter claimed was made obvious.

IX. The respondent essentially argued as follows:

The amendments made to claim 1 were caused by the objections brought forward by the appellant and by the discussion during the oral proceedings. Any reaction to the new submissions of the appellant at an earlier stage of the proceedings had not been possible. No high complexity had arisen by the few amendments, such that they should be admitted.

The features taken from the description were clearly disclosed in the context of the cutting insert according to claim 1 as granted, and the features relating to a

manufacturing process (which, according to the appellant were not admissible in a product claim) could be obviated since it was already defined in the preamble of claim 1 that the indexible cutting insert comprised "a basically parallelogram shaped body formed of sintered powder" which inherently comprised this type of manufacturing.

To a skilled person it was clear that E4 did not disclose a lower region extending downward from an upper region in the meaning of the patent since this "upper region" was not part of the bearing surface normal to the bottom surface 17 but provided the primary clearance surface 30 which the skilled person would never consider as a bearing surface.

The problem underlying the patent in suit as defined by the appellant was not the objective problem to be solved. The features of the subject-matter claimed allowed, in combination, milling into a surface by bevelled end portions and shoulder milling at an exact right angle by curved cutting edges which required a stable support of the insert in its pocket. In addition, this combined effect also solved the problem of shape deviation of the side surfaces in the extension of the center hole which was inherent to the pressing and sintering process. These problems were neither mentioned in E4 nor in E5, and the cutting insert disclosed in E5 was of a different type which could not be readily combined with E4. Although E5 related not only to a slotting cutter but also to milling cutters of other types, the solution there was directed to the reduction of space occupied by an insert axial support, and the recess or depression disclosed in E5 acted as a main bearing surface. Contrary thereto the invention was directed to the exact support of the cutting insert in a

radial direction, and the recess was excluded from the side face acting as abutment surface such that only two bearing segments were situated beside the recess.

Similar arguments applied with respect to the combination of E6 with E4, whereby the skilled person would also not combine the teaching of one document with the other. Although the cutting insert disclosed in E6 comprised a convex cutting edge, it did not have bevelled portions at its longitudinal ends and was therefore not suitable for milling into the surface of a workpiece. Therefore the subject-matter of claims 1 and 3 involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.
2. *Admittance of the new request (Article 13(1) RPBA)*

Although the appellant argued that the amendments made in claim 1 gave rise to a lack of clarity and led to contravention of Article 123(2) EPC, which also resulted in complex considerations such that the request should not be admitted into the proceedings, the Board exercised its discretion under Article 13(1) RPBA to admit the request into proceedings. As explained below, no problem of clarity arises by the introduced amendments, nor does the Board find a contravention of Article 123(2) EPC to have been caused. Also, it should be borne in mind that these amendments had been made as a result of objections made by the appellant regarding a portion of the curved clearance surface 31 of the cutting insert in D4 as being suitable, albeit not explicitly disclosed as such, as part of an abutment

surface (when considering novelty of a claim of an earlier request during oral proceedings). Those objections had not been made identifiably with the grounds of appeal, but only at a later stage (with letter of 17 April 2012) and thus also represented a change of the appellant's case under Article 13(1) RPBA. As a result of the discussions at oral proceedings before the Board, the appellant's change of case was admitted and considered, leaving the respondent in a position where an amendment to the claims was required in order to overcome that objection.

- 2.1 The Board cannot recognise a lack of clarity in the expression "planar flat segments" in the context of the claim, since the words "planar" and "flat" do not have an identical meaning, nor are these contradictory as asserted by the appellant. A "flat" surface is not necessarily a "planar" surface in all contexts, such that "planar" is a more specific expression for defining the shape of the segments 40a.
- 2.2 The insertion of the text "thereby leaving only two planar flat segments (40a) of the side surface for engaging a flat support surface (11b) of the insert site (12)" has been taken from the description (paragraph [0029]) of the original application. The disclosure there reads:

"The relative positioning between the cylindrical portion 15a of the center hole and each recess 42 is such that when the insert is viewed in a direction toward either of the side surfaces (see Fig.3), the respective recess 42 extends beyond the entire cylindrical portion in the longitudinal direction of the insert. As a result, the convexity that results from the traditional pressing and sintering of an insert having a center hole (as

described earlier) is completely eliminated, leaving only two planar (flat) segments 40a of the side surface. That is, there remains no convex segment on the abutment surface 40 of either side surface 18, 19. Accordingly, a stable support of the insert at its pocket is ensured, as the flat segments 40a engage a flat support surface 11b."

2.3 In the first part of the preamble of claim 1 the cutting insert is defined as comprising a basically parallelogram shaped body formed of sintered powder. This already implies "pressing" to a skilled person. From this particular definition therefore, the skilled person implicitly understands that the body is formed to its final shape (as is also normal in the art) by pressing and sintering, whereby no machining is necessary after the body has been formed by this method. In paragraph [0029] from which the text of the amendment is taken, the same process is indicated. Including this method of production if possible in some manner into the claim would at best lead to a form of redundancy in particular when considering that the claim is to an indexable insert and not a method for its production; therefore only the other feature in relation to which it is disclosed needs to be taken into the claim.

2.4 Furthermore, the appellant objected to the expression "leaving (only two planar flat segments)" which was a process feature. As mentioned above, the skilled person is well aware that the cutting insert together with the planar flat segments is produced by pressing and sintering whereby the two segments are left as part of the longitudinal side surface with the recess between them. The "leaving" of two segments is defined in the claim in relation to the recess 42, whereby "leaving" in the context of the recess defines simply that the formed

body has only two flat planar segments which are on either side of the recess of the respective longitudinal side surface.

2.5 As a result the Board concludes that the amendments made to claims 1 and 3 comply with the requirements of Articles 84 EPC 1973 and 123(2) EPC. Since an additional restricting feature has been inserted, the requirement of Article 123(3) is also met; the appellant also did not argue that any contravention of Article 123(3) had occurred

3. *Novelty (Article 54(2) EPC 1973)*

3.1 Novelty of the subject-matter according to the amended claims of the main request was not contested. The Board also holds that none of the documents relied on discloses the combination of all features of claims 1 and 3.

3.2 Taking E4 as the closest prior art for the consideration of inventive step, E4 does not disclose a cutting insert having the characterizing features of claim 1, which by inclusion of this claim in claim 3 applies likewise to claim 3.

3.3 The cutting insert according to E6, although showing one of the characterizing features, namely that of convex cutting edges, has no bevelled portions at its longitudinal ends and does not disclose the other characterizing feature concerning a recess extending beyond the entire cylindrical portion leaving only two planar flat segments of a side surface.

3.4 The cutting insert disclosed in E5, although showing the feature that a recess extends beyond the entire

cylindrical portion leaving only two planar flat segments of a side surface for engaging a flat support surface of the insert site (also notably for a different purpose), does not have a longitudinal shape nor bevelled portions at its longitudinal ends nor convex cutting edges.

4. *Inventive step (Article 56 EPC 1973)*

4.1 The appellant had two lines of attack on inventive step starting from E4 or E6 as the closest prior art. The Board concludes that a combination of E5 with either of these documents does not allow a skilled person to arrive at the invention defined in claim 1 without using inventive skill for the following reasons:

4.2 The patent in suit describes in paragraph [0005] the problem arising from the well-known manufacturing process by pressing and sintering a basically parallelogram shaped cutting insert resulting in slightly convex shaped side surfaces, and the problem of a stable abutment with the support surface of the insert-receiving holder. In respect of the closest prior art being taken as E4, the objective problem can be seen in the provision of a cutting insert for use in a milling tool which helps to ensure the stable abutment within the support surface of an insert side of a holder and allowing a square-edged to be more precisely obtained

Although the convex cutting edges are not known from E4, the Board does not see these advantages as linked with the same objective problem of ensuring a stable abutment, but to a separate partial problem, the solution to which *per se* is obvious as the provision of

convex cutting edges precisely for this purpose is well known (see e.g. E6)

4.3 However, addressing the further difference starting from E4 (or E6), the Board agrees that the skilled person would always try to provide a stable abutment of the cutting insert in the insert-receiving pocket of a tool holder. The side surfaces for abutment with the corresponding surface for support in the radial direction in E4 and E6 are flat and without a recess as defined in the claim. Therefore, if a problem with deviation of the side surface of the insert from an exact plane arises, the pocket has to be formed corresponding to possible convexity in order to assure a correct seat of the insert. In E4 or E6 themselves, no means or measures are disclosed or hinted at in respect of a particular solution to the problem of convexity of the side surfaces. Neither E4 nor E6 therefore gives any indication towards the problem to be solved.

4.4 E5 at first sight discloses a cutting insert of the general type as claimed. However, when compared with the cutting insert as disclosed in E4 and E6, there are certain fundamental differences in respect of the form of the insert and also how it is to be aligned and held within the holder.

4.5 E5 discloses a generally quadratically formed cutting insert, in which, contrary to the problem with elongated cutting inserts, the problem of highly compressed powder in the region of the side surfaces does not arise to the same extent as in the cutting insert of E4 or E6. Due to the quadratic form during the pressing process, the powder is better distributed in all radial directions than when forming an elongated cutting insert. The problems of seating due to a convex-shaped side surface

is neither mentioned in E5 nor is there any indication for the skilled person that a problem in respect of seating of the insert was to be addressed. On the contrary, the recess or "depression 14" acts in E5 primarily as a bearing surface in order to solve the problem of providing insert receiving pockets formed in the tool holder offering improved support of the inserts in radial and axial directions (see also col. 1, lines 42 to 44). Accuracy of positioning in axial and radial direction is achieved by mutually perpendicular side walls, as in the prior art (see also col. 1, lines 48 to 50), and the problem is solved by pocket side surfaces co-acting with protrusions 36 (see e.g. Fig. 3b) which are notably designed to be in mating contact with the depressions 14 of the insert.

- 4.6 Thus, although the manufacturing process of the cutting insert disclosed in E5 is also a powder technology process (col. 4, lines 39 to 43), the skilled person dealing with the problem of shrinkage of elongated cutting inserts (as in E4 or E6) during the sintering process leading to convex mating surfaces, would not derive any indication from E5 towards the solution of the specific problem arising particularly in the cutting inserts of different shape and for different purposes compared to E4 or E6. Moreover, since the depression 14 on one side of a tool insert in E5 is intended as a seat against one of the supporting protrusions 36 of the tool holder which has to support the insert with optimal accuracy, no indication can be derived from this document to provide an improved seating of the insert by eliminating the drawback of a slightly convex side surface using a planar seat surface by providing only two bearing planar flat segments with a recess in-between, because the provision of a depression between planar surfaces in E5 serves a different purpose. The

subject-matter claimed is therefore found to be based on 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 European patent with the following documents:

claims 1 to 4, filed 25 June 2014;
description page 2, filed 25 June 2014,
description pages 3, 4, as granted;
Figures 1 to 8 as granted.

The Registrar:

The Chairman:



M. H. A. Patin

M. Harrison

Decision electronically authenticated