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Datasheet for the decision of 28 April 2008

Case Number: T 1843/07 - 3.2.06

Application Number: 02765301.3

Publication Number: 1425126

IPC: B23C 5/20

Language of the proceedings: EN

Title of invention:
CUTTING INSERT

Applicant:
Iscar Ltd.

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)

Relevant legal provisions (EPC 1973):
EPC Art. 54(1), (2), 56, 84

Keyword:
"Amendments (allowable)"
"Novelty (yes)"
"Inventive steps (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T1843/07 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 28 April 2008

Appellant: (**Applicant:**)
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Decision under appeal:
Decision of the Examining Division of the European Patent Office posted 15 June 2007 refusing European application No. 02765301.3 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. Alting Van Geusau
Members: G. Kadner
W. Sekretaruk

Summary of Facts and Submissions

I. With the decision dated 15 June 2007, the European patent application No. 02765301.3 was refused for lack of inventive step of the subject-matter of the originally filed claim 1, having regard to the combination of

D4 : US-A-3 060 554 and
D6 : DE-A-25 22 735.

II. A notice of appeal against this decision was received by facsimile at the European Patent Office on 24 August 2007. The corresponding fee was paid on the same day. A written statement setting out the grounds of appeal was received on 18 October 2007.

III. In an annex to the summons to oral proceedings the Board of Appeal informed the appellant (applicant) that the subject-matter of claim 1 appeared to lack the necessary features to solve the technical problem underlying the invention as defined in the original description. It also appeared to lack novelty in view of D6.

IV. Oral proceedings were held on 28 April 2008 during which the appellant submitted amended documents.

V. The appellant requested that the decision under appeal be set aside and that a European patent be granted on the basis of the following documents: claims 1-8, description pages 1-10 and drawings fig. 1-10 filed during the oral proceedings.

VI. Claim 1 has the following wording:

"A cutting insert (10) having a substantially square cross section with four rectangular or square side faces comprising:
two end portions (12', 12") and an intermediate portion (14) extending longitudinally therebetween, the cutting insert (10) having an insert axis (A) which traverses the cutting insert in a longitudinal direction between the two end portions;
N side surfaces (20) and N primary cutting edges (22), the N primary cutting edges (22) being formed at the intersection of adjacent side surfaces (20), each one of the N primary cutting edges (22) extending between the two end portions, wherein each primary cutting edge (22) is provided with a chip control element (24);
at least N secondary cutting edges (28', 28") formed on at least one of the two end portions (12', 12"), the at least one of the two end portions extending generally longitudinally from the intermediate portion (14);
at least N cutting corners (30', 30"), each cutting corner being formed between a primary cutting edge (22) and a secondary cutting edge (28', 28"), each secondary cutting edge extending away from an associated cutting corner in a direction generally away from the intermediate portion (14);
wherein the cutting insert (10) has N-fold rotational symmetry about the insert axis (A) and N is equal to four;
each end portion (12', 12") having an end face (16', 16") defining the axially outermost surface of said end portion;
extending from the N side surfaces (20), generally longitudinally away and towards the axis A, to the end

faces (16', 16") at least one end portion (12', 12") is a peripheral end surface (26', 26"); the peripheral end surface (26', 26") having N sub-peripheral end surfaces (26'i, 26"i) being divided into two portions, a leading portion (26'il, 26"il) and a trailing portion (26'it, 26"it), which are provided as two adjoining facets or two parts of one continuous curved surface;
and wherein the secondary cutting edge (28', 28") is formed at the junction between a leading portion (26'il, 26"il) of a sub-peripheral end surface (26'i, 26"i) and an adjacent chip control element (24', 24")."

VII. The arguments of the appellant may be summarised as follows:

In amended claim 1 features have been added to claim 1 as filed which have been taken from the originally filed dependent claims 2, 6, 8, 9, 10, 11 and 14, as well as from the originally filed description page 3, lines 6-8, page 6, lines 10-12, page 7, lines 1-5 and 23-26. The corresponding dependent claims have been deleted, the description has been adapted to the amended claims and the prior-art cutting insert known from D6 acknowledged in the description.

The subject-matter of claim 1 is novel over the cutting insert of figure 1 from D6, since this prior-art insert does not have a substantially square cross section, but comprises a central portion with four radially extending prismoid side portions. It also does not disclose at least the feature "the peripheral end surface (26', 26") having N sub-peripheral end surfaces (26'i, 26"i) being divided into two portions, a leading portion (26'il, 26"il) and a trailing portion (26'it,

26"it), which are provided as two adjoining facets or two parts of one continuous curved surface".

The amended claim 1 also meets the requirement of inventive step, since the combination of D4 with D6 does not lead in an obvious manner to the claimed subject-matter. The closest prior art cutting insert is disclosed in figure 15 of D4, which has a substantially square cross section, four-fold rotational symmetry, four primary cutting edges and adjacent chip control elements. The insert does not comprise secondary cutting edges and corresponding cutting corners. D6 discloses a cutting insert with secondary cutting edges but with a complex star-shaped, and not square, cross-section. The skilled person would not receive any indication from D6 to specifically divide the sub-peripheral end faces into a leading and a trailing portion, provided as two adjoining facets or two parts of one continuous curved surface according to claim 1.

Reasons for the Decision

1. The appeal is admissible.

2. Admissibility of late filed request

According to Article 13(1) of the Rules of Procedure of the Boards of Appeal any amendment to a party's case after it has filed its grounds of appeal may be admitted and considered at the Board's discretion. The discretion has to be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.

Although the new request was filed during the oral proceedings before the Board of Appeal, i.e. at the latest possible stage, it takes account of the deficiencies pointed out by the Board and is clearly allowable (see below). Neither its complexity nor the need for procedural economy leads to a different conclusion.

3. *Amendments*

3.1 The Board is satisfied that the amendments of to the claims, which are based on the passages of the originally filed documents indicated by the appellant (point VII, first paragraph), and the amendments to the description, meet the requirement of Article 123(2) EPC.

3.2 The claims are clear, consistent and are supported by the description, so that the requirements of Article 84 EPC 1973 are also met.

4. *Novelty*

4.1 The subject-matter of claim 1 is distinguished over the cutting insert disclosed in figure 1 of D6 by the following features:

a) the cutting insert having a substantially square cross-section with four rectangular or square side faces, and

b) the insert's N sub-peripheral end surfaces being divided into two portions, a leading portion and a

trailing portion, which are provided as two adjoining facets or two parts of one continuous curved surface.

The cutting insert of D6 (figure 1) has a central body portion with four radially extending prismoid side portions, resulting in a polygonal, star- or cross-like cross-section. Furthermore, the sub-peripheral end surfaces provided on the side portions of the known insert are formed with facets which are radially arranged with respect to one another; the radial direction is perpendicular to the rotating insert's cutting direction. However, the skilled person in the field of cutting tools would understand that, in relation to the expressions "leading edge" and "trailing edge" which are used in claim 1, the cutting direction is the reference direction.

The subject-matter of claim 1 is therefore novel over the inserts of D6.

4.2 The cutting inserts shown in D4 do not comprise secondary cutting edges and cutting corners.

The subject-matter of claim 1 is thus also novel over the inserts of D4.

4.3 Since also none of the other available prior art documents anticipates the combination of the features of claim 1, the subject-matter of claim 1 is new in the sense of Articles 54(1) and (2) EPC 1973.

5. *Inventive step*

5.1 The problem indicated in the application underlying the impugned decision is to provide a cutting insert with improved strength, wherein each main or primary cutting edge is provided with a secondary cutting edge for making a finishing cut, at each end thereof, such as to give rise to eight cutting corners (page 2, lines 19-27, page 3, lines 6-11).

5.2 D4, which had been selected by the examining division as closest prior art to the subject-matter of claim 1 underlying the impugned decision, is directed to cutting tool mountings, more particularly to mounting devices for cutting tools, such as for use in a lathe. It deals in particular with problems resulting from the differences in thermal expansion of tool holders and cutting inserts, which lead to reduced clamping forces during normal operation due to the increased temperatures which arise (cf. D4, column 1, lines 9-18, col. 2, l. 4-16). The problem identified in the application underlying the impugned decision is neither addressed in, nor immediately apparent to the skilled person from, D4. Figure 15 in combination with figure 7 discloses a milling head comprising longitudinal, indexable cutting inserts which have a substantially square cross-section with four rectangular side faces. The inserts are provided with four primary cutting edges and adjacent chip control elements. Secondary cutting edges and corresponding cutting corners are not disclosed in any of the embodiments of D4.

5.3 The object of D6 is to provide a cutting insert which does not rotate out of the tool holder's seat by the

cutting forces acting on it, while at the same time providing for an increased number of cutting edges on the insert (cf. D6, page 2, last paragraph). The cutting insert of figure 1 of D6 has more features in common with the subject-matter of claim 1 than any other cutting insert disclosed in the available prior art. Although it does not have a square cross-section, it has a four-fold rotational symmetry, four primary and at least four secondary cutting edges as well as four cutting corners between them on radially extending side portions, the latter being provided with peripheral end surfaces and four sub-peripheral end surfaces at their end portions.

5.4 It follows from the above that the cutting insert of D6 represents the closest prior art to the subject-matter of claim 1.

5.5 The distinguishing features of claim 1 over the insert of D6 are identified in point 4.1 above and have the following technical effects: feature (a) increases the strength of the cutting insert; feature (b) enables the formation of secondary cutting edges and cutting corners associated with each of the primary cutting edges, thereby enabling an increased number of cutting edges and corners. The latter effect is already obtained by the cutting insert known from D6.

5.6 The distinguishing features consequently solve the objective technical problem, which is to provide for a cutting insert with four primary cutting edges having increased strength, and an alternative geometry which allows for four secondary cutting edges and cutting corners on the insert's end portions.

5.7 The skilled person would not get any indication from D6 that he should modify the insert's cross-section or the geometry of the sub-peripheral end faces according to the features of claim 1.

It even goes against the teaching of D6 to provide the cutting insert with a square cross-section, since this would eliminate one of the principal advantages achieved by the prismoid side portions: the side surfaces which delimit the prismoid side portions provide for additional support when the insert is mounted in the tool holder, reducing in this way the tendency of the inserts to rotate out of the seats under the action of the cutting forces. Since this was one of the main objectives of D6, the skilled person would not contemplate modifying the cross-section of the insert.

In order to increase the strength of the cutting insert the skilled person would select appropriate materials before starting to substantially modify the geometry of the cutting insert.

D6 also does not contain any indication that would point the skilled person in the direction of forming the sub-peripheral end surfaces with leading and trailing portions according to the distinguishing feature (b).

The combination of features according to claim 1 is thus not obvious in view of D6 alone.

5.8 Although D4 discloses cutting inserts with a square cross-section, the skilled person would not get any indication from this document that he should apply this shape to the known insert of D6. Notwithstanding the reasons already given (point 5.7), the problem dealt with in D4 is of a different nature (different thermal expansion coefficients of tool holder and inserts) and no particular attention to the insert's shape is given in this prior art. The inserts do not comprise secondary cutting edges and cutting corners, so that the necessary modification according to claim 1 of the sub-peripheral end surfaces of the known inlet of D6 cannot be derived from D4 either.

Therefore, the combination of D6 and D4 also does not result in an obvious manner in the subject-matter of claim 1.

5.9 Since the remaining available prior art does not contain any indication which would point the skilled person in the direction of modifying the cutting inserts of D6 according to claim 1, its subject-matter involves an inventive step (Article 56 EPC 1973).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted back to the examining division with the order to grant a European patent on the basis of the following documents:

claims 1-8,
description pages 1-10,
drawings fig. 1 to 10

filed 28 April 2008.

The Registrar The Chairman

D. Meyfarth P. Alting Van Geusau