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D E C I S I O N
of 11 November 2005

Case Number: T 0557/05 - 3.2.06

Application Number: 00113152.3

Publication Number: 1072345

IPC: B23K 51/00

Language of the proceedings: EN

Title of invention:

Milling cutter

Applicant:

KENNAMETAL INC.

Opponent:

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Headword:

-

Relevant legal provisions:

EPC Art. 52(1), 56, 84

Keyword:

"Clarity (main request) - no"

"Inventive step (auxiliary request) - no"

Decisions cited:

-

Catchword:

-

Case Number: T 0557/05 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 11 November 2005

Appellant: KENNAMETAL INC.
1600 Technology Way
Latrobe, PA 15650-0231 (US)

Representative: Bunke, Holger
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Manzingerweg 7
D-81241 München (DE)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 21 December 2004
refusing European application No. 00113152.3
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. Kadner
K. Garnett

Summary of Facts and Submissions

- I. The appeal is from the decision of the Examining Division, posted on 21 December 2004, refusing European patent application No. 00 113 152.3 filed on 29 June 2000.
- II. In the decision under appeal the Examining Division considered that the claims according to the Applicant's main and auxiliary request did not meet the requirements of the EPC, in particular those of Article 52(1) and 56.
- III. The Appellant (Applicant) lodged an appeal, received at the EPO on 19 January 2005, against this decision and simultaneously paid the appeal fee. The statement setting out the grounds of appeal was filed on 20 April 2005.
- IV. In a communication dated 18 August 2005 the Board expressed the preliminary opinion that claim 1 of the main request did not seem to meet the requirement of Article 84 EPC. Furthermore attention was drawn to D5 which in combination with the teachings of D3 appeared to be pertinent when considering inventive step.
- V. Oral proceedings were held on 11 November 2005 in which the following documents again played a role.

(D3) US-A-4 893 968

(D5) EP-A-0 893 185

The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request filed with the letter of 12 January 2004, or alternatively the auxiliary request filed during the oral proceedings.

Claim 1 of the main request reads as follows:

"A rotary multi-tooth end milling cutter including a cutting end with helical cutting teeth and a shank, wherein the tool cross-sectional area of the cutter core increases gradually from the cutting end towards the cutter shank and wherein the tooth width increases gradually from the cutting end towards the cutter shank."

Claim 1 of the auxiliary request has the following wording:

"A rotary multi-tooth end milling cutter including a cutting end with helical cutting teeth and a shank, wherein the total cross-sectional area of the cutter core increases gradually from the cutting end towards the cutter shank, wherein the tooth width, when measured on the outside of the tooth and perpendicular to the direction of the helical extension of the tooth along the cutter shank, increases gradually from the cutting end towards the cutter shank and wherein the outside diameter of the cutting end remains constant along the length of the cutting end."

VI. In support of its requests the Appellant essentially made the following submissions:

Concerning the clarity of claim 1 according to the main request there was no difference in the result whether the distance was measured perpendicular to the rotational axis of the milling cutter or perpendicular to the direction of the cutting edge. In either case the respective dimension of the tooth width would increase gradually from the cutting end towards the cutter shank.

The amendments made to claim 1 of the auxiliary request were sufficiently disclosed in the application as originally filed (description page 6, second paragraph in connection with Figures 4 and 6).

As regards inventive step, the skilled person had no reason to combine the teachings of D3 with those of D5 because D3 related to a milling cutter, which is subjected to lateral bending forces, whereas D5 dealt with a twist drill, which is primarily constructed in order to withstand axial forces. Moreover, D5 did not disclose flutes having a width which decreased from the cutting end of the drill towards its shank portion.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request - clarity and support*

When considering the feature "the tooth width increases gradually from the cutting end towards the cutter shank" it is neither disclosed nor otherwise apparent to the skilled person where exactly the "width" should

be measured. The Appellant submitted that the result would be the same whether the distance was measured perpendicular to the rotational axis or perpendicular to the direction of the longitudinal cutting edge.

However, an "increase of tooth width" is derivable from the drawings only when such width is measured on the outside of the "tooth" and perpendicular to the direction of helical extension of the "tooth" along the cutter shank, whereas other ways of determining an increase of tooth width lack support.

Therefore, since further specification of the position where the tooth width should be measured is missing, claim 1 does not meet the requirement of Article 84 EPC.

3. *Auxiliary request*

3.1 Admissibility of amendments

The amended claim 1 overcomes the above clarity objection and also does not give rise to formal objections.

3.2 Novelty

Novelty of the subject-matter of claim 1 is also not in doubt since the milling cutter known from the closest prior art represented by D3 neither unambiguously shows nor implicitly contains the feature that the tooth width, when measured on the outside of the tooth and perpendicular to the direction of the helical extension of the tooth along the cutter shank, increases

gradually from the cutting end towards the cutter shank.

3.3 Inventive step

3.3.1 D3 discloses a rotary end milling cutter including a cutting end 32 with helical cutting teeth 44 and a shank 28, wherein the total cross-sectional area of the cutter core increases gradually from the cutting end towards the cutter shank and wherein the outside diameter of the cutting end remains constant along the length of the cutting end (Figures 4 to 9; column 3, lines 29 to 50).

3.3.2 The problem underlying the subject-matter of the patent application is to provide an end milling cutter which overcomes the disadvantages of the prior art and which offers improved stiffness while allowing adequate tooth depth for chip clearance (page 3, fourth paragraph). This problem is already solved by the end milling cutter known from D3. The objective remaining problem therefore consists in the provision of an alternative construction of an end milling cutter.

3.3.3 The alternative solution is characterised in that the tooth width, when measured on the outside of the tooth and perpendicular to the direction of the helical extension of the tooth along the cutter shank, increases gradually from the cutting end towards the cutter shank.

3.3.4 The skilled person in the technical field concerned is well-versed in the methods of manufacturing tools like drills and mills. His knowledge also comprises the

various processes for grinding the flutes. When looking for an alternative production method to form the flutes of the mill according to D3, he is taught by D5 a method of grinding the flutes of a drill. Although the shape of the grinding wheel is not explicitly shown in that document, when regarding the outline of the flute end where the grinding wheel sinks into the cylindrical drill material (Figures 2, 3), the skilled person would immediately recognise that the outer contour of the grinding tool must have a toroidal shape. When carrying out the machining steps as described (page 3, lines 8 to 15) and shown in Figure 8, this results in a flute which increases gradually from the shank portion towards the cutting end, and vice versa as regards the tooth width (when measured on the outside of the tooth and perpendicular to the direction of the helical extension of the tooth along the cutter shank), which increases gradually from the cutting end towards the cutter shank.

3.3.5 Thus the skilled person applying the common grinding technique as shown in D5 in the production of an end milling cutter according to D3 arrives at the claimed solution in an obvious manner. Consequently the subject-matter of claim 1 does not involve an inventive step (Article 56 EPC).

Since the requirement of Article 52(1) EPC is not met, the requested patent cannot be granted on the European patent application.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Patin

P. Alting van Geusau