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**D E C I S I O N**  
**of 14 January 1997**

**Case Number:** T 0758/93 - 3.2.2

**Application Number:** 86201720.9

**Publication Number:** 0219162

**IPC:** B23C 5/22

**Language of the proceedings:** EN

**Title of invention:**  
Rotating cutting element

**Patentee:**  
KOMEETSTAAL HOLDING B.V.

**Opponent:**  
Sandvik Aktiebolag

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
"Inventive step (yes)"

**Decisions cited:**  
T 0012/81, T 0332/87, T 0666/89, T 0095/90, T 0305/87

**Catchword:**  
-



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Boards of Appeal

Chambres de recours

Case Number: T 0758/93 - 3.2.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.2  
of 14 January 1997

**Appellant:** Sandvik Aktiebolag  
(Opponent) S-811 81 Sandviken (SE)

**Representative:** -

**Respondent:** KOMETSTAAL HOLDING B.V.  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 16 July 1993  
rejecting the opposition filed against European  
patent No. 0 219 162 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** H. J. Seidenschwarz  
**Members:** P. Alting van Geusau  
J. C. M. De Preter

## Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 219 162 in respect of European patent application No. 86 201 720.9, filed on 3 October 1986, and claiming a priority from the Dutch application No. 8 502 790 filed in the Netherlands on 11 October 1985, was published on 31 January 1990.

II. Notice of opposition was filed on the grounds of Article 100(a) EPC. In respect of an alleged lack of inventive step the opposition was supported *inter alia* by the documents

DE-C-2 354 481 (D1)

US-A-830 779 (D2)

US-A-4 009 742 (D3)

GB-A-21 297 (1913) (D4)

DE-A-2 734 936 (D10, cited in the description of the patent)

(Both documents D1 and D3 were cited after the 9-month period stipulated in Article 99 EPC, but were admitted by the Opposition Division because of their relevance)

III. By a decision which was given at the end of oral proceedings held on 19 April 1993 and issued in writing on 16 July 1993 the Opposition Division rejected the opposition.

The Opposition Division was of the opinion that, starting from the closest prior art as was represented by document D1, neither document D2 nor document D3 could lead the skilled person to adaptation of the known rotating cutting element to include the additional features as were defined in claim 1 of the patent in suit.

Furthermore, also none of the remaining documents cited in the opposition proceedings provided either a better prior art basis from which to substantiate a lack of inventive step, or suggested in an established prior art context a combination of teachings leading in an obvious manner to the features corresponding to the subject-matter of contested claim 1.

- IV. On 21 August 1993 a notice of appeal was lodged against that decision together with payment of the appeal fee.

The statement of grounds of appeal was filed on 9 November 1993 in which the appellant also relied upon document

US-A-4 296 244 (D5).

With letter of 30 June 1994 the appellant further referred to the documents

JP-A-60 22 219 (D15) and  
DE-A-2 549 757 (D16).

- V. In a communication issued in preparation for oral proceedings the Board expressed the provisional opinion that the late cited documents D5, D15 and D16 did not appear to be more relevant than the documents on file and therefore envisaged to disregard them. The closest prior art seemed to be represented by document D1 and considering the issue of inventive step it would appear that the object of the patent as formulated in column 1, lines 59 to 64 of the description of the patent in suit also applied when starting from document D1. Although documents D2 and D3 disclosed certain features for locking of a cutting element by means of a wedge placed at the trailing side of the cutting

element an important issue to be discussed at the oral proceedings was whether the skilled person would be led by this prior art to adapt the rotatable cutter known from D1 in the manner as claimed in claim 1 of the patent in suit.

VI. Oral proceedings were held on 14 January 1997. At the oral proceedings the respondent (patent proprietor) filed a complete amended patent specification and requested that the appeal be dismissed and the patent be maintained in amended form on the basis of these documents.

The appellant requested that the decision under appeal be set aside and that the European patent No. 0 219 162 be revoked.

Claim 1 of the amended patent reads as follows:

"1. Rotatable cutting saw comprising a series of cutting elements (5), fastened detachably around the substantially circular outer periphery of a disc (1) at regular intervals from each other in recesses in the periphery of the disc (1), each by means of a wedge-shaped arrangement (10), each cutting element (5) having a V-shaped profiled leading edge (6) and a profiled trailing edge (7), one of which edges being engaged with a complementarily-shaped one edge of the recess in the disc (1), each wedge-shaped arrangement having a V-shaped profiled leading edge (11) and a V-shaped profiled trailing edge (12), one edge of the wedge-shaped arrangement being engaged with a complementarily-shaped other edge of the recess in the disc and the opposite edge of the wedge-shaped arrangement being engaged with a complementarily-shaped other edge of the cutting element, which each recess having an inner face (8) which serves as a stop surface for radial location of the cutting element (5), wherein

both the leading edge(s) and the trailing edge of the cutting element are V-shaped with their respective ridges protruding outwardly away from each other, each cutting element has a single inner face (9) serving as a stop face and the V-shaped profiled edges of each wedge-shaped arrangement define grooves with their troughs facing towards each other, characterised in that, the leading and trailing edges (6, 7) of each cutting element (5) within the recess extend relative to each other at an angle which opens in the radial direction towards the axis of the disc, each wedge-shaped arrangement within the recess is a single wedge (10) and is placed between the trailing edge (7) of the cutting element (5) and the trailing edge (3) of the recess, and each wedge (10) is fastened and tensioned by means of a single screw (15) which fits in a screw-threaded bore in the disc (1), which bore extends from the inner face of the recess into the disc."

VI. The appellant essentially relied on the following submissions:

The closest prior art, as was represented by document D1, disclosed in addition to the precharacterising features of claim 1 the first characterising feature of this claim, i.e. the conical shape of the cutting element. This feature was apparent from Figures 26 to 28 of document D1. Furthermore, in accordance with the teachings of document D1 such conical cutting element configuration was particularly suitable for high speed tools since ejection from the wheel by centrifugal force was avoided.

When using a conically shaped cutting element it was a mere direct consequence that the wedge should have a complementary, narrowing width towards the axis of rotation. These facts and having the problem of

ejection in mind, document D3 presented itself to the skilled person since it also related to a cutting element which widened towards the axis of rotation held in place by a wedge which narrowed towards the same axis for use in a grooving machine and related to the problem of centrifugal safety. In document D3, however, the wedge was fastened by a screw that extended radially inwards towards and into the carrier body so as to prevent the cutting element from being ejected from the wheel by centrifugal force. Adoption of such alternative means of retention in the arrangement in accordance with document D1 would immediately lead the skilled person to the saw defined in claim 1 of the patent. The retention by means of a single wedge and screw was in itself well-known in the art as followed from documents D5, D10 and D15, which were cited only as mere additional proof of this fact.

Furthermore, also when starting from the saw known from document D4, the skilled person would arrive in an obvious manner at the saw arrangement defined in claim 1 of the patent in suit. The circular saw known from document D4 essentially differed from the saw claimed in the patent in suit in that the wedge holding the cutting element in place was not secured at all and therefore the arrangement obviously lacked centrifugal safety. Document D3, however, taught how to ensure such centrifugal safety and therefore the skilled person would be inclined to adopt fastening of the wedge by means of a screw. The remaining differences relating to the V-shaped surfaces and ridges of the cutting elements and the wedges were well known from document D1 and anyhow did not lead to any technical advantage when compared to the arrangement shown in document D4.

VII. The respondent contested the appellant's view and its submissions are summarised as follows:

Document D1 could be seen as the starting point of the present invention and the amended claim 1 was drafted accordingly so as to acknowledge all the known features of the rotatable cutting saw of document D1 in its precharacterising portion. The conical arrangement of the cutting element shown in Figures 26 to 28 related to another independent embodiment of the invention disclosed in document D1 and should therefore be left out of consideration when drafting the precharacterising part of the claim.

The characterising features of claim 1 led to simpler manufacture with greater precision and easy exchange of the cutting elements, while at the same time the rate of retention could be more easily controlled.

None of the cited documents contained a hint to the skilled person for adapting the cutting insert retention in the manner as claimed in the present claim 1. Indeed, document D3 disclosed a wedge held by a number of screws, but here the cutting elements were cutting blades and there was no problem of lateral stability or danger of a change in the rate of retention. Some of the other documents cited such as D2, D5, D10, D15 and D16 disclosed single wedges held by a single screw, however, without V-shaped grooves and ridges or a conical form of cutting element and therefore could not hint the skilled person to find a solution to the problems involved.

In the absence of any such suggestion the subject-matter of claim 1 should be considered to be based on an inventive activity.



## Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The amended claim 1 contains the entirety of the features of the granted claim 1 but is now limited to a rotatable cutting saw as described in the application as filed (page 3, lines 7 to page 4, line 13) and in the patent specification (column 2, line 55 to column 3, line 28). It is now related in its precharacterising portion to the prior art disclosed in document D1, which, when considering all the available documents, is the most relevant prior art document.

Present claim 2 is a repetition of granted claim 2 with the adaptation that a cutting saw is concerned.

No objections under Article 123(2) or (3) EPC were raised by the appellant and also the Board sees no reason to doubt that the present claims 1 and 2 indeed meet these requirements.

2.2 The description was redrafted to take account of the amendments carried out in the claims, some clerical corrections were made and references were inserted to the documents D1 and D3 considered to be more relevant than document US-A-1 699 747, the original starting point.

No objections under the EPC arise against these amendments either.

3. *Novelty*

Novelty was not contested and follows from the fact that none of the available documents discloses a rotatable cutting saw in which the cutting inserts are held in place by means of a single wedge which is fastened and tensioned by means of a single screw which fits in a screw-threaded bore in the disc.

4. *Inventive step*

- 4.1 The Board and the parties agree that document D1 describes the closest prior art. The present claim 1 is related in its precharacterising part to the rotatable cutting saw disclosed in document D1 and in particular to the embodiment described in relation to the cutting element of Figure 25, which is the only cutting element having a V-shaped profiled leading (16f) and trailing (=27) edges.

The cutting element shown in Figure 25 is one of the alternatives disclosed for use in a saw unit in accordance with Figures 4 and 5, which incorporates a split wedge having V-shaped profiled leading and trailing edges.

- 4.2 The appellant was of the opinion that in addition to the precharacterising features of claim 1, document D1 also disclosed its first characterising feature because in Figures 26 to 28 the leading and trailing edges of each cutting element within the recess extend relative to each other at an angle which opens in the radial direction towards the axis of the disc.

However, it is to be noted that the cutting element according to Figures 26 to 28 does not have a V-shaped leading edge as known from Figure 25 such that tapering of the cutting element and at the same time providing the cutting element with V-shaped trailing and leading edges is not disclosed as a combination of features in D1.

In support of its argument that also the combination of V-shaped leading and trailing edges and a tapered form of the cutting element formed part of the disclosure of document D1, the appellant submitted that the case law of the Board's of Appeal in the decisions T 12/81 (OJ 1982, 296), T 332/87, T 666/89 (OJ 1993, 495) and T 95/90 gave rise to such a conclusion.

The Board cannot find a basis for support of such an allegation in any of these decisions, rather it is established in accordance with the case law of the Board's of appeal that, as concerns novelty, it is not permissible to combine separate items belonging to different embodiments described in one and the same document merely because they were disclosed in that document, unless of course such combination had been specifically suggested therein (see for example T 305/87, OJ 1991, 429, reasons point 5.3).

Since there is clearly no specific disclosure of combining the features of the cutting elements of Figures 25 and 26 to 28 of document D1, any combination of these two teachings disclosed independently becomes therefore a matter of obviousness rather than of novelty.

4.3 The subject-matter of claim 1 is therefore distinguished from that disclosed in document D1 in that:

- (a) the leading and trailing edges of each cutting element within the recess extend relative to each other at an angle which opens in the radial direction towards the axis of the disc,
- (b) each wedge-shaped arrangement within the recess is a single wedge and is placed between the trailing edge of the cutting element and the trailing edge of the recess, and
- (c) each wedge is fastened and tensioned by means of a screw which fits in a screw-threaded bore in the disc, which bore extends from the inner face of the recess into the disc.

4.4 Starting from the rotatable cutting saw as known from document D1 the object of the invention can be seen in the provision of a rotatable cutting saw which permits simple manufacturing with great precision and with a fastening of the cutting elements which permits rapid and easy replacement without any danger of change in the rate of retention of each cutting element (see column 1, lines 59 to 64 of the patent specification and page 2, lines 10 to 13 of the amended description.)

These objects are achieved by the combination of characterising features together with the features of the precharacterising part of claim 1. As follows from the feature that both the leading edge(s) and the trailing edge of the cutting element are V-shaped with their respective ridges protruding outwardly away from each other, the V-shaped grooves which can be manufactured with less precision are on the wedge. They take up tolerances but, due to the fact that the wedges are tensioned by means of a screw, all wedges and accordingly all cutting elements can be tensioned with the same measurable moment (see also the patent specification column 2, lines 15 to 26). With a wedge

tightened by a radial tensioning force as compared to the tightening by means of an excenter such as is shown in document D1, the clamping force can be relatively small due to the widening angle opening inwardly between the leading and trailing ridges of the cutting element so that friction components do not interfere with the exact tensioning of the wedge and therefore permits closer control of the clamping pressure on the cutting elements.

- 4.5 Considering document D1 the Board notes that the conical form of a cutting element is preferred for improving centrifugal safety (see column 8, lines 22 to 32) and therefore the skilled person was led by document D1 to use a conical form of cutting insert also in the embodiment of Figure 25, if centrifugal safety prevailed.

However, the use of different wedge- or fastening means is neither suggested in document D1 nor is it obvious when considering this prior art document. Because of the different effects achieved it cannot be said that the tightening by means of a screw is an immediate alternative of the known tightening by means of an excenter. Whereas correct tightening by a screw can be easily checked by the torque applied to the screw in an excenter arrangement the tensioning force will be dependent on the position of the reaction points of the excenter which changes with the angle of rotation.

- 4.6 Document D3, considered to be pertinent by the appellant in respect of the wedge and wedge tightening, essentially relates to wood working mechanism and in particular to improvement of the operational accuracy of a rotatable cutter unit in the form of a grooving or planing tool by ensuring that the protrusion of the blade from the carrier body remains unchanged after that the cutting element has been resharpened. It is

true that reference is made to centrifugal safety (column 1, lines 60 to 64) and the use of a conical cutting blade but such measures are already suggested in document D1 and therefore the skilled person would not see any need to consider document D3 further.

As was also set out by the Opposition Division in the decision under appeal, the resharpenable blades disclosed in document D3 have a considerable lateral length, whereas the cutting elements of the saw in accordance with the patent in suit are by contrast relatively narrow in extent and consequently measures are involved so as to ensure lateral stability. Such problems of lateral stability do not occur in the wood working mechanism disclosed in document D3. Although in the description of document D3 reference is made to a mere grooving machine which, as was submitted by the appellant, could have a single narrow blade, the reference to cutting blades in document D3 and the absence of any lateral retention such as ridges and grooves, excludes that the skilled person would consider the suitability of this known construction, or parts of it, for improvement of the cutting element tensioning means known from document D1.

- 4.7 Document D2 discloses the use of a single wedge, with a groove on its leading side and a ridge on its trailing side, for tightening the cutting elements of a circular saw. The wedge is tightened by means of a nut that can be screwed on a stud that is fixed to the wedge. This prior art arrangement does clearly not allow easy replacement of the cutting element and tightening of the wedge within narrow tolerances, mainly because the nut is accessible through a narrow hole only.

Thus document D2 does also not provide a teaching so as to lead the skilled person to modify the prior art disclosed in document D1 in such a manner to arrive at the subject-matter of claim 1 without resorting to an inventive step.

- 4.8 Document D4, which the appellant used in its alternative line of argument as the starting point for the assessment of inventive step, does not show V-grooves and ridges in the positions as defined in claim 1. The appellant was of the opinion that these features were of no importance and could be left out of consideration when considering whether the subject-matter of claim 1 was based on an inventive activity.

However, as clearly follows from the functioning of the claimed cutting element fastening arrangement the selection of the position of the V-grooves and ridges is not a feature which is independent of the rest of the features of claim 1. Rather its combination with the other features of claim 1 is essential for the proper functioning of the fastening arrangement. Usually the cutting elements of the type shown in document D1 are made of very hard, and thus brittle, material whereas the wedge and disc are made of tool steel. In such an arrangement the provision of ridges on the cutting elements avoids that the clamping force leads to breakage or splitting of the cutting elements to be feared in case the clamping force is applied to a V-grooved leading or trailing edge of the cutting elements.

Furthermore the wedges shown in document D4 are too narrow to give the skilled person any incentive for using a screw in the manner as claimed in the patent in suit because there is no place left. Indeed there is, in the Board's opinion, also no objectively derivable reason why the skilled person should seek improvement

of this arrangement (dating from 1913) by applying teachings from document D3 (dating from 1977) relating to a wood-working mechanism for planing, grooving or multiple slotting of work pieces where the main object is the sharpening of the blades without changing the effective height of the leading face of the blades and even tensioning of cutting elements or lateral stability of the fastening arrangement is not at all addressed.

- 4.9 The further documents relied upon by the appellant including the late cited documents D5, D10 and D15 were used merely as support of the fact that cutting elements that are fixed by means of wedges tensioned by means of a screw were in itself well known in the machine tool art.

However, as follows from the above analysis, the combination of features of claim 1 involves more than a simple application of a screw tensioned wedge for mounting of a cutting element to a rotatable disc and therefore these documents cannot be considered particularly relevant.

- 4.10 The Board sees no need to consider in detail the remaining documents introduced into the proceedings but not any longer relied upon by the appellant. The prior art disclosed by these documents does not come nearer to the subject-matter claimed than the prior art according to the documents discussed in this decision and they do also not suggest in the context of the claimed rotatable saw any combination of features leading without inventive step to the cutting saw arrangement of claim 1.



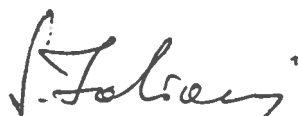
4.11 The Board therefore comes to the conclusion that the subject-matter of claim 1 of the respondent's request cannot be derived in an obvious manner from the cited prior art and accordingly involves an inventive step (Article 56 EPC). This claim, together with dependent claim 2, the amended description and drawing as filed during the oral proceedings therefore form a suitable basis for maintenance of the patent in amended form.

### Order

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with the claims, the description and drawing as submitted during the oral proceedings held on 14 January 1997.

The Registrar:



S. Fabiani

The Chairman:



H. Seidenschwarz

