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**D E C I S I O N**  
**of 25 November 2003**

**Case Number:** T 0801/01 - 3.2.6

**Application Number:** 95102817.4

**Publication Number:** 0661124

**IPC:** B23C 3/00

**Language of the proceedings:** EN

**Title of invention:**  
Method of machining composites

**Patentee:**  
SANDVIK AKTIEBOLAG

**Opponent:**  
Novator AB

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 100(c), 76(1)

**Keyword:**  
"Extension of subject-matter - divisional application"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0801/01 - 3.2.6

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.6  
of 25 November 2003

**Appellant:** Novator AB  
(Opponent) Teknikhöjden, Björnasvägen 21  
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**Representative:** Harrison, Michael Charles  
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**Respondent:** SANDVIK AKTIEBOLAG  
(Proprietor of the patent) S-811 81 Sandviken (SE)

**Representative:** Lieke, Winfried, Dr  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 8 June 2001  
rejecting the opposition filed against European  
patent No. 0661124 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** P. Alting van Geusau  
**Members:** G. Pricolo  
M. J. Vogel

## Summary of Facts and Submissions

I. The appeal is from the decision of the Opposition Division posted on 8 June 2001 to reject the opposition against European patent No. 0 661 124 granted pursuant to European patent application No. 95 102 817.4 which was filed as a divisional application of the earlier European patent application No. 93 850 111.1.

Granted claim 1 reads as follows:

"1. Method of machining and shaping a through opening in a fiber reinforced composite material (1) with damagefree edges by a machining operation whereby one rotation symmetrical milling body (3) is brought into engagement with said composite material by partly rotating around its own axis (5), comprising the steps of

A) providing said body in the shape of a drilling endmill with smaller diameter than the finished opening having a body defining a longitudinal axis of rotation, and a plurality of cutting edges disposed uniformly on an outer periphery of said body, extending generally spirally about said axis of rotation,

B) forming a initial hole (2) in the composite by rotating said endmill and bringing said endmill into cutting engagement with said composite material, said axis of rotation oriented substantially perpendicular to a longitudinal direction of reinforcement fibers disposed at a edge of said initial hole, said edge of said initial opening having damages or defects (6) possessing a radial spread; thereafter

C) moving said endmill along said edge of said initial hole while rotating said endmill about said axis of

rotation, with said axis of rotation offset radially from a center axis of said initial hole and with said cutting edges in contact with said edge of said initial hole so as to enlarge said initial hole into a finished opening, the size and/or geometry of the finished opening differing significantly from that of the initial hole; and

D) performing step C to remove a amount of said composite wherein a lower limit of said removed amount is defined by said radial spread of said damages or defects."

II. The Opposition Division held that the claimed subject-matter did not go beyond the content of the earlier application as filed, whereby the requirements of Article 76(1) EPC were fulfilled, and that it was novel and inventive.

III. The appellant (opponent) lodged an appeal, received at the EPO on 12 July 2001, against this decision. The appeal fee was paid simultaneously with the filing of the appeal. The statement setting out the grounds of appeal was received at the EPO on 9 October 2001.

IV. With the communication dated 21 August 2003, annexed to the summons to attend oral proceedings, the Board expressed its provisional opinion that the earlier application as filed disclosed the use of a drilling mill only in connection with a method comprising the step of providing a preformed hole having a diameter larger than that of the milling body and the subsequent step of machining the preformed hole by means of said milling body. A generic drilling endmill was not suitable for carrying out this method, since it would

drill a hole having a diameter not larger than that of the milling body. Since the patent in suit encompassed the use of such a tool, it contained subject-matter going beyond the content of the earlier application as filed. Furthermore, the Board stated that it would appear that the earlier application as filed disclosed the provision of a plurality of cutting edges disposed uniformly on an outer periphery of the endmill's body and extending generally spirally ("spirally" should in fact read "helically") about its axis of rotation only in connection with a peripheral milling tool, and that it was doubtful whether the earlier application also disclosed a drilling endmill having these specific features.

V. Oral proceedings took place on 25 November 2003.

The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patentee) requested that the appeal be dismissed and that the patent be maintained as granted.

VI. In support of its requests the appellant relied essentially on the following submissions.

Claim 1 defined features of a drilling endmill which were not disclosed in the earlier application as filed. In the latter, there was namely no disclosure of a drilling endmill having uniformly disposed cutting edges, nor a drilling endmill with cutting edges extending spirally (i.e. "helically") about the axis of rotation. The only disclosure of a drilling mill that

could be found in the earlier application was a statement referring to a "so-called" drilling mill. However, nothing else in the application specified a form of the drilling mill to be used. In this regard, it was well known that milling tools could be made with e.g. straight edges running parallel to the axis of rotation, and it was well known to have non-uniformly disposed cutting edges. The inclusion of specific features of the drilling endmill which limited the method of claim 1 thus resulted in added subject-matter.

The method of the earlier application required that the milling body had a substantially smaller diameter than that of the preformed hole. Nothing in the earlier application suggested that a tool with e.g. an equal diameter could be used. In fact, the use of a tool with a substantially smaller diameter than the preformed hole was undoubtedly an essential feature of the earlier application. The use of a tool with substantially the same diameter of the preformed hole would not be feasible because it would lead to overheating of the hole and formation of further damages in the composite material.

Since in the earlier application as filed there was no basis to state what form/features the drilling endmill should have, it was impossible to know how such a drilling endmill would be set up for performing the operation of drilling the hole in the composite. Thus, further added subject-matter was found in the specific definition of claim 1 referring to the perpendicular orientation of the endmill when performing the drilling operation. In fact other orientations were possible,

such as drilling with slanted axis, which was used in practice.

VII. The respondent essentially argued as follows.

In order to establish whether subject-matter had been added, it was necessary to compare the subject-matter of claim 1 of the patent in suit with the content of the earlier application as filed as understood by a skilled reader. The earlier application disclosed a method, referred to in claims 1 and 8, in which the milling tool used for milling an already existing hole was substantially smaller in diameter than the hole itself. For the skilled person, it was clear that this was due to the fact that the milling tool needed to be placed into the preformed hole without causing any damage to the upper edges thereof. However, the disclosure of the earlier application was not restricted to such method. In fact, reference was made to a drilling mill, i.e. to a tool capable both of drilling and milling a hole, which tool was automatically inserted in the hole when carrying out the drilling operation. Accordingly, it was immediately apparent for a skilled person that in this special situation it was sufficient if the milling tool just fitted into the preformed hole in order to get started with the milling operation. Thus, the only reasonable and immediately obvious interpretation of the passage of the earlier application referring to the use of a drilling mill would be that the drilling mill was first used as a drill with axial feed to form a hole and thereafter used as a mill by a lateral feed movement to shape the drilled hole to the desired dimensions. The fact that the mill had substantially the same diameter

of the preformed hole did not lead to overheating and further damages in the area surrounding the hole, as suggested by the appellant, in fact the mill immediately started to cut whereby generated heat was effectively transported away.

Although various types of drilling mills were known, it was clear for a skilled person that the drilling mill referred to in the earlier application would also be provided with the features specifically described in connection with a milling cutter. In fact, the only difference between a milling cutter and a drilling mill was that the latter was additionally provided with cutting edges at its top in order to perform a drilling operation. Since according to the disclosure of the earlier application the same milling operation performed with the milling cutter was to be performed with the drilling mill, it was self evident that any of the disclosed milling geometries also applied to a drilling mill.

It was further clear for the skilled person that, since drilling and milling as claimed was achieved using the same tool, the orientation of the tool for drilling could not be different from the orientation of the tool during milling, i.e. perpendicular to the longitudinal direction of the reinforcement fibres.

### **Reasons for the Decision**

1. The appeal is admissible.



2. In accordance with Article 100(c) and 102(1) EPC, the maintenance of a European patent granted on a divisional application is prejudiced if its subject-matter extends beyond the content of the earlier application as filed (Article 76(1) EPC). In the present case, the patent in suit was granted on a divisional application of earlier European patent application No. 93 850 111.1, published under the No. 0 571 352.
  
3. The earlier patent application describes (column 2, line 28 to column 3, line 1 of the application as published; see Figure 1A) and claims (see claim 1) a method of machining and shaping a through opening in a fibre reinforced composite material starting from a preformed hole, which comprises the step of placing a milling body with substantially smaller diameter than that of the preformed hole in the hole and then machining and shaping the desired opening with the milling body. In the description of the earlier application (column 2, lines 39 to 41 of the application as published) it is stated that the preformed hole is shaped first by, for example, drilling. Thus, a method is described and claimed in which the operation of forming the hole and the milling operation are performed as two distinct machining operations.

However, the earlier application as filed also discloses, in the passage on column 3, lines 21 to 24 (of the published application) that the "whole operation" can be performed with only one tool when a "so-called drilling mill" is used. Considering that what is meant with the "whole operation" can only

concern the forming of the hole by drilling and the subsequent shaping thereof by milling, this passage implies the use of a single tool for drilling the hole and shaping it by milling.

This passage is the only disclosure in the earlier application as filed relating to the use of a single tool for drilling the hole and shaping it by milling. It is true that dependent claim 8 of the earlier application, referred to by the respondent, defines that the milling body both shapes the preformed hole and finishes the opening; however, as already stated by the Board in the communication annexed to the summons to oral proceedings, the expression "shaping the preformed hole" does not unambiguously refer to the step of providing the hole itself. In fact, the term "shaping" is also used in the earlier application to refer to the machining of the preformed hole (see column 1, lines 15 to 18 of the published application). Furthermore, the "shaping" referred to in claim 8 could simply be a rough milling, which in accordance with the definition of claim 8 is followed by a finishing milling of the hole.

The above-mentioned "whole operation", consisting in the forming of the hole by drilling and the subsequent shaping thereof by milling, is specifically described throughout the earlier application as an operation which comprises the step of milling a preformed hole by means of a milling body with substantially smaller diameter than that of the preformed hole (see claim 1; see column 2, lines 31 to 53 of the earlier application as published). However, if a cylindrical drilling mill is used, then the milling body and the preformed hole

will have substantially the same diameter, whereby the requirement that the diameter of the milling body is substantially smaller than that of the preformed hole is not met. In the Board's view, for the skilled reader this requirement implies that a free space between the milling body and the hole exists which is substantially larger than the space remaining between a drilling tool and the hole that it has just drilled (see for instance the disclosure in Figures 1A and 1B of the earlier application).

In view of the above analysis, the disclosure of the earlier application is such that the skilled reader is confronted with the following question when trying to put into practice the teaching of the above-mentioned passage referring to the use of a drilling mill:

- either the "whole operation" is interpreted in a manner corresponding to that specifically disclosed in the earlier application as comprising the step of placing a milling body having a substantially smaller diameter than that of the preformed hole in said hole, but then a particular drilling mill having e.g. a tapered or stepwise configuration providing a larger drilling diameter and a thinner milling body diameter is to be used;
- or the "whole operation" is interpreted in a manner different from that specifically disclosed in the earlier application as comprising the step of drilling and subsequently milling the hole with a cylindrical drilling mill, whereby the formed hole and the milling body have substantially the same diameter. However, there is no basis in the

earlier application for deciding which of these two alternative interpretations is the correct one, and therefore which of the two alternative methods is the one effectively disclosed in the earlier application.

Claim 1 of the patent in suit clearly corresponds to the second alternative method since it defines that the initial hole is formed by rotating and bringing an endmill into cutting engagement with the composite material (step B) and then the initial hole is enlarged by moving the same endmill along the edge thereof (step C). Moreover, the second alternative method corresponds to the meaning of claim 1 as intended by the respondent. However, the second alternative method can only be arrived at by introducing the technical information about the correct interpretation of the expression "the whole operation", which technical information, as already stated above, cannot be objectively derived from the earlier application as filed. Therefore, the subject-matter of claim 1 of the patent in suit can only be arrived at by introducing subject-matter, namely the above-mentioned technical information, which extends beyond the content of the earlier application as filed.

4. Furthermore, if the "whole operation" is interpreted as comprising the step of drilling and subsequently milling the hole with a cylindrical drilling mill, whereby the formed hole and the milling body have substantially the same diameter (as intended by the respondent), this implies that the "whole operation" is interpreted in a manner which is different from that specifically disclosed in connection with the use of a

milling cutter (which is a tool intended only for milling) in the earlier application as filed, and which comprises the step of placing a milling body having a substantially smaller diameter than that of the preformed hole in said hole. In fact, when using a drilling mill, the tool is placed in a hole which has essentially the same diameter of the tool. Thus, the cutting conditions at least at the beginning of the milling operation are different in the two cases. Therefore, since the "whole operation" carried out with a milling cutter and the "whole operation" carried out with a drilling mill are substantially different operations, there is no basis for the skilled person to conclude directly and unambiguously that the milling geometry specifically disclosed in the earlier application in connection with a milling cutter also applies to a drilling mill. Consequently it is left open to the skilled person whether to select a drilling mill having a milling portion with a geometry identical to the geometry of the milling cutter disclosed in the earlier application, or rather select a drilling mill having a different geometry.

Therefore, claim 1 of the patent in suit defines specific features of a drilling mill which are not disclosed in combination with the drilling mill mentioned in the description only. Furthermore, these specific features cannot be regarded as an obvious clarification for describing a generic drilling mill because known drilling mills can have different arrangements as regards the distribution of cutting edges on the outer periphery of the body and the direction of the cutting edges in respect of the axis of rotation.

Thus also for this reason, the amendment of the originally filed claim 1 introduces subject-matter which extends beyond the earlier application as filed.

5. Since the subject-matter of the patent in suit granted pursuant to a divisional extends beyond the content of the earlier application as filed (Article 100(c) and 76(1) EPC), the patent cannot be maintained (Article 102(1) EPC).

## **Order**

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

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

E. Görgmaier

P. Alting van Geusau