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**Datasheet for the decision
of 19 December 2006**

Case Number: T 0414/05 - 3.2.06

Application Number: 97932109.8

Publication Number: 0958082

IPC: B23B 29/02

Language of the proceedings: EN

Title of invention:

Boring bar

Patentee:

Sandvik Aktiebolag

Opponent:

CERATIZIT Austria Gesellschaft m.b.H.

Headword:

-

Relevant legal provisions:

EPC Art. 123(2), 83, 56

Keyword:

"Amendments - added subject-matter (no)"

"Sufficiency of disclosure - (yes)"

"Inventive step - (yes) after amendment"

Decisions cited:

-

Catchword:

-



Case Number: T 0414/05 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 19 December 2006

Appellant: CERATIZIT Austria Gesellschaft m.b.H.
(Opponent) A-6600 Reutte/Tirol (AT)

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Respondent: Sandvik Aktiebolag
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 8 February 2005
rejecting the opposition filed against European
patent No. 0958082 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: P. Alting van Geusau

Members: G. Pricolo
W. Sekretaruk

Summary of Facts and Submissions

I. The appeal is from the decision of the Opposition Division posted on 8 February 2005 rejecting the opposition filed against European patent No. 0 958 082, granted in respect of European patent application No. 97 932 109.8. The Opposition Division came to the conclusion that the grounds of opposition under Article 100(a) to (c) EPC did not prejudice the maintenance of the European patent as granted.

II. On 5 April 2005 the appellant (opponent) lodged an appeal against this decision. The payment of the appeal fee was registered on the same day. The statement setting out the grounds of appeal was received at the EPO on 3 June 2005.

III. In an annex to the summons for oral proceedings pursuant to Article 11(1) Rules of Procedure of the Boards of Appeal the Board expressed the preliminary opinion that the European patent appeared to disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. However, the subject-matter of claim 1 appeared to extend beyond the content of the application as filed.

IV. Oral proceedings took place on 19 December 2006.

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

The respondent (patentee) filed amended documents forming the basis for a main request of maintenance of

the patent in amended form and requested that the decision under appeal be set aside and the European patent maintained on the basis of this main request.

V. Claim 1 of the main request reads as follows:

"1. Boring bar comprising a shaft portion (2) and a bar head (3), characterized in that the shaft portion and the bar head are joined by gluing, the adhesive joint is between 0.05 and 1.5 mm thick and the bar head is manufactured in lighter material than the shaft part, wherein the bar shaft is produced of tool steel or spring steel, the shaft portion (2) in its front end has a conical recess (5) and the bar head at its rear end has a conically protruding part (6), the adhesive joint being provided between said two conical parts."

VI. The documents relevant to the present decision are the following:

D1 :DE-A-2 329 234;

D4 :Technical drawings of Metallwerk Plansee GmbH
dated 26.4.90 and 25.4.90, respectively

D5 :Catalogue Tizit "Werkzeuge zum Drehen",
Plansee GmbH, 09.94

D10 :DE-A-1 552 450

D11 :DE-A-1 403 000

VII. The arguments of the appellant, in as far as they are relevant to this decision, can be summarized as follows:

The disclosure of the patent in suit was not sufficient within the meaning of Article 83 EPC because it did not allow a person skilled in the art to perform the invention over the whole range claimed. The sole example related to a boring bar having a shaft portion and a bar head both made of steel. The patent did not specify what adhesive materials should be used if the shaft portion and the bar head were made of different materials. The patent in suit disclosed that the suitable thickness of the adhesive joint was between 0.05 and 0.8 mm but provided no support for the extremely broad range of 0.05 to 1.5 mm specified in claim 1. Moreover, the skilled person did not know, either from the information in the patent or from general knowledge, what adhesives should be used if the thickness of the joint was greater than 0.8 mm.

There was no disclosure in the application as filed of the specific combination mentioned in claim 1 of a shaft made of tool steel or spring steel with a head made of a lighter material, and therefore the amendments made to claim 1 introduced added subject-matter, contrary to the requirements of Article 123(2) EPC.

In the description it was stated that a very large amount of materials were possible for the shaft portion and that the joint according to figures 1 to 3 constituted "a" preferred embodiment. However, claim 1 was limited to tool steel or spring steel as the materials for the shaft portion and the joint according

to figures 1 to 3 was the only possible embodiment of an adhesive joint in accordance with the invention. Therefore, the description was inconsistent with the wording of claim 1 and thus threw doubt on the matter for which protection was sought.

The skilled person would regard it as obvious to join the shaft portion and the bar head of the boring bar according to document D1, which represented the closest prior art, by gluing: D1 disclosed that the shaft portion and the bar head could be joined by any sufficiently reliable method, and it was known, in particular by D10, to join tool parts by gluing. The skilled person would obviously consider providing the adhesive joint between a conical recess and a conically protruding part of, respectively, the shaft portion and the bar head, because he would immediately recognize the advantages of this joint configuration, i.e. a greater adhesion area and an easy positioning of the two parts. Furthermore, D4 and D5 disclosed a wedge-shaped brazed joint between the shaft portion and the bar head of a boring bar. Gluing and brazing were similar joining processes and the known wedge-shaped joint was functionally analogous to a conical joint. Finally D11, in the embodiment of Fig. 5, disclosed the provision of two conical brazed joints between the tip and the shaft of a cutting tool. The wording of claim 1 of the patent in suit encompassed two conical joints since it was not limited to one adhesive joint only. Therefore, the skilled person would arrive at the subject-matter of claim 1 without an inventive step.

VIII. In response to these submissions the respondent essentially argued as follows:

The description of the patent in suit explicitly disclosed an adhesive joint having a thickness up to 1.5 mm provided between the sleeve part and the core part of the boring bar according to the embodiment of Fig. 4. This constituted a general disclosure that adhesive joints with a thickness up to 1.5 mm were possible. In any event, the skilled person would have no difficulties in finding a suitable adhesive for joining the different materials in question, in particular by selecting an adhesive from those specifically mentioned in the description, and applying it in a thickness within the claimed range. Accordingly, the invention was sufficiently disclosed.

The application as filed disclosed that a very large amount of materials were possible for the shaft portion and the bar head, in particular tool steel or spring steel. It further disclosed that the bar head could be made of a lighter material. Accordingly, the specific combination of a shaft portion made of tool steel or spring steel and a bar head made of a lighter material was clearly and unambiguously disclosed in the application as filed.

The description was consistent with the wording of claim 1 because the statement that a very large amount of materials was possible for the shaft portion was immediately followed by a statement that the invention was restricted to tool steel or spring steel as the material for the shaft portion. The embodiment of Fig. 3 was not the sole embodiment of the invention,

because there were possible modifications of that specific embodiment that were still encompassed by the scope of claim 1.

The subject-matter of claim 1 involved an inventive step because the available prior art did not disclose or suggest the specific adhesive conical joint configuration in accordance with claim 1, which provided a relatively large bonding area and an excellent vibration damping effect due to the fact that the adhesive joint absorbed torsion stresses. D4 and D5 disclosed brazed joints in which the parts to be joined were provided with a wedge-shaped protrusion and a wedge-shaped recess, respectively. Similar brazed wedge-shaped joints were also shown in the figures of D11, with the exception of Fig. 5, which showed two conical protrusions engaging corresponding conical recesses. Here the brazing material was not provided only between a single pair of corresponding conical parts, as required by claim 1 of the patent in suit, but also between the other pair and between the flat portions on which said conical parts were provided.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments*
 - 2.1 Claim 1 includes, in combination, the features of claims 1, 2 and 5 of the application as filed.

2.2 In addition, claim 1 recites that "the bar head is manufactured in lighter material than the shaft part, wherein the bar shaft is produced of tool steel or spring steel".

These features are clearly and unambiguously derivable from the description of the application as filed: On page 3, lines 23 to 25, of the application as filed, it is stated that: "*a very large amount of materials are possible both for the shaft portion and the bar head, as long as they fulfil the requirements relating to strength and function. E.g., both may be produced of tool steel or spring steel*". Accordingly, the application as filed specifically discloses tool steel or spring steel as possible materials for both the shaft portion and the bar head. The following sentence of the description (page 3, lines 26 to 28) recites: "*further, in order to reduce the weight and increase the natural frequency, the bar head may also be made of a lighter material, such as aluminum or magnesium, or an alloy based on one or both of these two metals*". The next sentence (page 3, lines 28, 29), which recites that: "*with the same purposes, the shaft portion may also be made of a lighter material*", makes clear that in the previous sentence it is intended to refer to the situation in which the shaft portion is not made of a "lighter material", but of one of the specifically disclosed heavier materials tool steel or spring steel. Accordingly, said previous sentence directly implies that the material for the bar head may be selected from amongst the materials lighter than tool steel or spring steel.

Therefore, the amendments made to claim 1 meet the requirements of Article 123(2) EPC.

- 2.3 Claim 1 includes all the features of claim 1 as granted and is further restricted by the inclusion of the feature taken from the description according to which *"the bar shaft is produced of tool steel or spring steel"* and of the features of granted claim 2 according to which *"the shaft portion (2) in its front end has a conical recess (5) and the bar head at its rear end has a conically protruding part (6), the adhesive joint being provided between said two conical parts"*.

Therefore, the amendments made to claim 1 do not extend the protection conferred (Article 123(3) EPC).

- 2.4 Dependent claims 2 and 3 recite the additional features of granted dependent claims 3 and 4.

Claims 4 and 5, which are directed to a process for the production of the claimed boring bar and to use of the claimed boring bar, respectively, formally correspond to the process and the use of granted claims 5 and 7. Claims 4 and 5 do not introduce any additional subject-matter.

- 2.5 Accordingly, claims 2 to 5 do not give rise to objections under Article 123(2) and (3) EPC.

- 2.6 The description is amended to be in conformity with the new claims, and to acknowledge the prior art according to D1, D10 and D11.

The appellant submitted that the statement in the description (para. [0015]) according to which "*Generally, very large amount of materials are possible both for the shaft portion and the bar head*" was confusing since claim 1 was restricted to a shaft portion made of tool steel or spring steel. In the Board's judgment, this statement is not confusing because it is immediately followed by a statement ("*According to the present invention, the shaft portion is produced of tool steel or spring steel*") which reflects the restriction of claim 1. In this context, the former statement in the description is to be regarded as a remark of general character made to emphasize a specificity of the invention expressed in the latter statement.

The appellant further objected to the statement in para. [0018] according to which the conical adhesive joint according to Figures 1 to 3 constitutes "a" preferred embodiment. The Board accepts the respondent's view that the invention as defined in claim 1 cannot be seen as being restricted to the specific embodiment of these figures, in particular as regards the features of the joint which are shown in these Figures but for which no specific limitation is defined in claim 1 (e.g. whether the cone is truncated as in Figure 3 or not).

Therefore, the amendments made to the description are formally allowable (Article 123(2),(3), and 84 EPC).

3. *Sufficiency of disclosure*

3.1 In the communication pursuant to Article 11(1) RPBA annexed to the summons to oral proceedings, the Board

explained in detail why in its preliminary opinion the European patent discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. During the oral proceedings the appellant did not comment on this view and simply relied on its written submissions in the grounds of appeal. The Board therefore does not see any reason to deviate from its provisional opinion, which is given in further detail below.

- 3.2 The skilled person would have no difficulties in finding an appropriate adhesive for joining the different materials of the shaft part and the bar head, because he has at its disposal the various examples of adhesive types given in the patent in suit (see para. [0019]) and his common general knowledge. This information, possibly together with a reasonable amount of trial and error, would guide the skilled person towards the selection of an appropriate adhesive. Furthermore, the appellant has not submitted any evidence that the adhesive types mentioned in the patent in suit are not suitable for joining tool steel or spring steel with the lighter materials that are suitable for a boring bar.

Nor has the appellant submitted any evidence in support of its allegation that an adhesive thickness close or equal to the upper end value of the range defined in claim 1, namely 1.5 mm, is not suitable for forming a joint between the shaft portion and the bar head. In particular, the appellant did not demonstrate that no joint can be formed when the adhesive types disclosed in the patent in suit are applied in such thickness. Although the Board can accept that in most known

applications the adhesive thickness is below 1.5 mm, this is not *per se* a sufficient ground to conclude that a thickness of 1.5 mm is not technically meaningful. Therefore the appellant's objection that the invention cannot be carried out for adhesive thicknesses greater than 0.8 mm must fail.

4. *Novelty*

None of the available pieces of prior art discloses a boring bar comprising all the features of claim 1. Novelty, in fact, was not in dispute in these proceedings.

5. *Inventive step*

5.1 The main problem underlying the patent in suit (see para. [0007]) is to provide a boring bar with a reduced tendency for vibrations.

5.2 The Board concurs with the view shared by the parties that the closest state of the art is to be found in document D1, since this document concerns the same problem (see page 4, 2nd full paragraph of D1) of the patent in suit. Using the wording of claim 1 of the patent in suit, D1 undisputedly discloses a boring bar (see Figures 1 and 2) comprising a shaft portion (4, 7) and a bar head (5, 9), wherein the bar head is manufactured in lighter material than the shaft part (see page 7, last paragraph: steel and aluminium alloy) and the bar shaft is produced of steel.

The subject-matter of claim 1 differs from this known boring bar in that

i) the shaft portion and the bar head are joined by gluing,
ii) the adhesive joint is between 0.05 and 1.5 mm thick, iii) the steel of the bar shaft is either tool steel or spring steel,
iv) the shaft portion in its front end has a conical recess and the bar head at its rear end has a conically protruding part, the adhesive joint being provided between said two conical parts.

5.3 The distinguishing features effectively solve the problem of reducing the tendency to vibration of the boring bar. Firstly, because of the inherent damping properties of the adhesive material (features i and ii), and secondly, because of the adhesive joint being provided between two conical parts (feature iv). As regards this latter aspect, it is noted that the claim recites that the adhesive *joint* is provided between the two conical parts and therefore, contrary to the appellant's view, the claim can only be read as requiring a joint in which adhesive is provided exclusively between said two conical parts (otherwise the adhesive *joint* would only be *partly* provided between said two conical parts). By means of this configuration vibrations of the boring bar generated by the cutting procedure leading to torsion stresses in the joint can be effectively dampened by the layer of adhesive at the interface of the head and the shaft portion of the boring bar.

5.4 Although the Board might agree with the appellant that D1 (see page 8, lines 20-23) directly prompts the skilled person to seek an alternative manner of joining the head to the shaft portion and that the prior art

(see e.g. D10) gives the indication that gluing is a joining process which might be used for that purpose, there is no indication in the prior art that would suggest to the skilled person the provision of the specific adhesive joint configuration in accordance with claim 1 of the patent in suit, according to which the joint is provided between two conical parts.

The appellant referred to the joint configurations shown by D4 and D5 (see page 35). These documents show brazed joints between corresponding wedge-shaped parts (rear end of the bar head and front end the shaft portion) of a boring bar. Even assuming that the skilled person would consider using this configuration when providing an adhesive joint in the boring bar of D1, there is no apparent reason to modify the wedge-shaped configuration disclosed by D4 and D5 to a conical configuration (which, in contrast to a wedge-shaped configuration, is symmetrical about an axis of revolution).

The appellant further referred to D11, which analogously to D4 and D5 shows brazed joints between wedge-shaped parts (see e.g. Fig. 2 of D11) of a tool for turning operations (see claim 1 of D11). This document additionally discloses (see Fig. 5) a brazed joint configuration in which two conical protrusions extending from a flat surface (51d) of the tool shaft (51) are inserted into corresponding conical recesses (56) provided in a flat surface (53a) of the tool cutting tip (53; see page 7, 2nd paragraph). As acknowledged by the appellant during the oral proceedings, this is the only available document disclosing a joint comprising conical parts. Assuming

that the skilled person would consider using this configuration when providing an adhesive joint in the boring bar of D1, there is no apparent reason why he should depart from the general teaching of D11 to provide the bonding material on the whole abutting surfaces (see claim 1 of D11 and page 2, last paragraph), i.e. also between the abutting flat surfaces (51d, 53a) of the tool shown in Fig. 5. Accordingly, even if the skilled person would consider the teaching of D11, he would not arrive at the configuration according to claim 1 of the patent in suit in which the adhesive joint is provided between two conical parts, i.e. in which the adhesive material is provided exclusively between said two conical parts thereby providing a joint which is very effective in damping the torsional vibrations of the boring bar.

Therefore, the subject-matter of claim 1 is not suggested by the available prior art. It thus involves an inventive step (Articles 52(1), 56 EPC).

- 5.5 Dependent claims 2 to 3, and claims 4 and 5 which relate to a process for the production of the inventive boring bar and use thereof, respectively, likewise involve an inventive step.
6. It follows that claims 1 to 5 together with the amended description and Fig. 4 filed at the oral proceedings, and the Figs. 1 to 3 as granted, 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 department of first instance with the order to maintain the European patent on the basis of the following documents:

claims: 1 to 5 as filed during the oral proceedings of 19 December 2006;

description: columns 1 to 5 and insert page 1a as filed during the oral proceedings of 19 December 2006;

drawings: Figures 1 to 3 as granted;
Fig. 4 as filed during the oral proceedings of 19 December 2006.

The Registrar:

The Chairman:

M. Patin

P. Alting Van Geusau