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Datasheet for the decision of 3 April 2008

Case Number: T 1034/06 - 3.2.06

Application Number: 95921204.4

Publication Number: 0759826

IPC: B23B 7/16

Language of the proceedings: EN

Title of invention:
Tool holder with a clamp for apertured inserts

Patentee:
SANDVIK AKTIEBOLAG

Opponents:
Kennametal Inc.
Toshiba Tungaloy Co., Ltd.

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), 84, 83, 56
RPBA Art. 13(1)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Amendments - added subject-matter (no)"
"Clarity (yes)"
"Sufficiency of disclosure (yes)"
"Inventive step (yes)"

Decisions cited:
T 0025/03, T 1067/97, T 0714/00

Catchword:

-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1034/06 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 3 April 2008

Appellant: (Opponent I)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 11 May 2006 concerning maintenance of European patent No. 0759826 in amended form.

Composition of the Board:

Chairman: K. Garnett
Members: G. Pricolo
M. Harrison

Summary of Facts and Submissions

I. The appeal stems from the interlocutory decision of the Opposition Division posted on 11 May 2006 maintaining European patent No. 0 759 826 in amended form.

II. In the decision under appeal the Opposition Division considered that the patent in suit met the requirements of Article 83 EPC (sufficiency of disclosure) and of Articles 123(2) and (3) EPC (amendments), and that the claimed subject-matter was novel and inventive over the available prior art including documents:

D1: SU-A-1 565 593;

D2: DE-A-37 09 135;

D3: US-A-3 837 058;

D8: JP-B-57 58244, filed with an English translation;

D14: JP-A-4 92703U, filed with an English translation.

III. The opponent I (appellant) lodged an appeal against this decision. The notice of appeal was received at the EPO on 5 July 2006. Payment of the appeal fee was recorded on the same day. The statement setting out the grounds of appeal was received at the EPO on 21 September 2006.

IV. Third party's observations in accordance with Article 115 EPC were filed on 24 July 2007 by Iscar Ltd. In these observations reference was made inter alia to document

D15: DE-A-1 950 719,

which was not considered in the proceedings before the Opposition Division.

V. In the communication dated 1 February 2008, the Board raised issues in respect of Article 123(2) EPC in addition to those mentioned by the appellant in its statement setting out the grounds of appeal.

VI. In reply to this communication the respondent (patent proprietor) filed on 18 March 2008 amended claims in accordance with auxiliary requests I to IV.

VII. Oral proceedings, at the end of which the decision of the Board was announced, took place on 3 April 2008.

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

The respondent requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request filed during the oral proceedings.

The other party to the proceedings (opponent II) did not file any written submissions in the appeal proceedings and, although duly summoned, did not appear at the oral proceedings. Oral proceedings were continued without it, pursuant to Rule 115(2) EPC.

VIII. Claim 1 according to the main and sole request of the respondent reads as follows:

"1. Combination of a tool holder and a cutting insert, said tool holder (10) being provided for holding said cutting insert (11) in a pocket confined by a bottom surface (15) and at least one side surface (17) upstanding from said bottom surface (15), said insert having top and bottom faces, a center through hole (14) and edge faces intersecting said top and bottom face, said tool holder comprising a clamp (18) with forward and rear protrusions mounted on said tool holder (10) for being actuated against said insert (11) by means of a clamping screw (20) extending entirely through a recess (28) of said clamp (18) whilst threadably engaging a bore in said tool holder (10), wherein the forward end portion of said clamp is in the shape of a downward-inwards inclined protrusion (21) having a contact surface to be engaged with the hole wall of said hole (14) and the rear end portion (23) of the clamp is arranged to be in abutment with a planar contact surface (26) on the holder (10), which surface is inclined at an angle α with respect to the axis (S_1) of the clamping screw for providing a wedging action, wherein the forward protrusion (21) of the clamp (18) is a portion having an axis of symmetry that is oriented at an inclined angle ß relative to the axis of the hole (14) the latter axis being parallel to the axis (S_1) of the clamping screw, and that said forward protrusion (21) includes a contact surface facing the upstanding side surface (17) at a point distantly provided from the top face (12) of the insert such that, upon tightening said screw (20) said protrusion makes contact only with said point of said wall (14)

distantly from said top face (12) characterized in that said insert is an indexable insert having a centre through hole and in that upon tightening said screw a planar underneath surface of the clamp (18) only makes surface contact with the upper surface of said insert at a location between said hole (14) and the edge surface contacting said upstanding side surface (17) in the tool holder, and in that the angle ß is essentially of same size or somewhat smaller than the acute angle α at which the contact surface (26) is oriented."

IX. The arguments of the appellant in support of its request can be summarized as follows:

Claim 1 filed during the oral proceedings should not be admitted as it was late filed. It had been amended to overcome objections which had already been raised during the written proceedings, and therefore the respondent should have filed such an amended claim earlier.

Claim 1 recited that the protrusion made contact with the wall of the hole of the cutting insert only at a point distantly from the top face and thus implied the presence of a point contact. The presence of a point contact could not be derived from the application as filed. The latter only addressed the location of the engagement between the protrusion and the insert but did not address the nature of the engagement. Claim 1 was amended over claim 1 as originally filed by adding features extracted from the combination of features of the embodiment according to Figs. 1 and 2. This combination included the feature that the rear end portion of the clamp was received in a recess in the

holder. This feature was not recited in claim 1 and therefore claim 1 related to subject-matter that was not disclosed as such in the application as filed.

The amendment of claim 1 consisting of the introduction of the feature according to which the protrusion of the clamp was inclined downward-inwards introduced a lack of clarity. This feature could have a different meaning depending on whether the tool holder or the clamp was taken as reference when determining the "downward-inwards" direction.

Claim 1 recited that the protrusion had an axis of symmetry and that it only contacted the wall of the hole at a point. There was no disclosure in the patent in suit of a geometry which both resulted in point contact and had an axis of symmetry. In particular, the protrusion shown in the figures was not symmetrical at all. Therefore, the invention as claimed was insufficiently disclosed.

D1, which represented the closest prior art, disclosed a combination of a tool holder and a cutting insert according to the preamble of claim 1, and additionally the features of the characterizing portion according to which the insert was indexable and the angle ß was essentially of same size or somewhat smaller than the acute angle α. "Somewhat smaller" simply meant "smaller" and the figure of D1 clearly disclosed an angle ß smaller than the angle α. The skilled person would recognize that since it had the shape of a triangle, the insert of D1 was indexable. In any event, conventional cutting inserts were indexable. The remaining feature of the characterizing portion of

claim 1, according to which surface contact was provided between the clamp and the insert at a location between the hole and the edge surface contacting the upstanding side surface in the tool holder, was obvious in view of D3, D8 and D15. The skilled person faced with the problem of avoiding interference between the clamp and the chips produced during cutting and at the same time providing a reliable clamping of the insert, would consider clamping the insert at a rearward portion thereof as disclosed by D3, D8 and D15, rather than at a front portion as taught by D1. Since this would require a higher clamping force, the skilled person would consider providing a larger contact surface between the clamp and the insert in the tool of D1 in order to avoid localized stresses, in accordance with the disclosure of any of D3, D8 and D15.

X. The respondent's reply to these objections can be summarized as follows:

Claim 1 was amended over claim 1 according to auxiliary request IV previously on file in order to clarify it. It included no element of surprise and should therefore be admitted.

The application as filed clearly and unambiguously disclosed that the location of the contact between the protrusion and the wall of the hole was at a distance from the top face of the insert. This was what was intended by the definition in claim 1 that the protrusion made contact only with said point of said wall distantly from said top face. The feature that the rear end portion of the clamp was received in a recess in the holder was not functionally linked with the

features of the embodiment according to Figs. 1 and 3 which had been introduced into claim 1 and therefore it could be left out from claim 1 without infringing Article 123(2) EPC.

Having regard to the whole text of claim 1, there could be no doubt that the protrusion was "downward-inwards inclined" towards the tool holder.

Even if the schematic figures did not clearly show a protrusion having an axis of symmetry, a skilled person would nevertheless have no difficulty in providing a protrusion having an axis of symmetry. Accordingly, the patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

D1 disclosed a combination according to the preamble of claim 1 of the patent in suit and did not disclose the features of the characterizing portion. D3 related to a tool holder having a clamping mechanism of a different type. Rather than having a clamp with a downward-inwards inclined protrusion for engaging the hole of the insert, in this known mechanism it was a pin of the tool holder which was received in a hole of the insert. A clamp member engaged the insert at rear portions thereof to force the insert downwards towards the bottom wall of the pocket and forwards against the pin. D3 did not mention the specific advantages of providing a contact location between the clamp and the top face of the insert at a rear portion thereof. Also D8 concerned a tool holder having a clamping mechanism of a different type and did not contain any indication motivating the skilled person to modify the tool of D1

such that the clamp contacted the insert's top face rearwards of the hole. D15 disclosed that the contact surface between the clamp and the insert extended all around the protrusion of the clamp and therefore could not suggest the provision of a contact location only between the clamp and the insert at a rear portion of the protrusion.

Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of the request*

The admissibility of the respondent's request presented during the oral proceedings was disputed by the appellant, it having been filed late.

Claim 1 however corresponds to claim 1 according to auxiliary request IV previously on file, which was amended in particular to meet an objection raised for the first time during the oral proceedings by the appellant, according to which the claim did not specify that the protrusion was downward-inwards inclined. Moreover, the subject-matter claimed was perfectly familiar to the appellant so that it did not argue that it was taken by surprise or not reasonably prepared for discussing it. In fact, the features added to claim 1 according to auxiliary request IV previously on file (whereby the protrusion is downward-inwards inclined and the clamp is arranged to be in abutment with a planar contact surface), can be regarded as clarifying amendments, serving to avoid interpretations of the

claim which do not fall under its obviously intended scope. Such interpretations (e.g. that the surface 26 is not planar) are however remote from the normal reading of the disclosure of the patent in suit and were in fact never mentioned during the written proceedings. Hence, it was apparent that the admission of the late filed auxiliary request would not delay the proceedings.

For these reasons the Board admitted the request into the proceedings.

3. *Amendments*

3.1 Claim 1 is based upon claim 1 as originally filed and further includes features taken from the description which are disclosed in connection with the embodiment of Figs. 1 and 3 (see page 3, line 22 to page 4, line 5 and page 4, line 26 to end of page 5).

3.2 According to the wording of claim 1, which is also present in claim 1 as granted, the forward protrusion makes contact *only* with a point of the wall of the hole distantly provided from the top face of the insert (upon tightening the screw).

The appellant referred to the lack of support in the application as filed for a point contact. In practice the expression "point contact" is used to indicate a very narrow contact area between two bodies, which only in theory and under no load would be a point. It is common general knowledge that point contact leads to high stress concentrations, and therefore mechanical parts are usually designed such as to any avoid point

contact. In the absence of any information in the patent in suit on the nature of the contact, and since the claim does not specify a "point contact" but states that the contact is "only with said point", it would be clear for the skilled reader that in the present context the term "point" does not indicate a geometrical "point", but generally a "place", in accordance with the broad meaning of "point". Therefore, the expression "contact only with said point" can only be understood as meaning "contact only with a place".

It can be clearly and unambiguously derived from the description (page 5, line 19 to 21) and Fig. 1 of the original application that the contact between the forward protrusion and the wall of the hole is at a single place and that there are no further contact places.

3.3 Claim 1 does not include all the features disclosed in the embodiment according to Figs. 1 and 3.

However, in accordance with the established case law of the boards of appeal (see e.g. the Case Law Book, 5th edition 2006, III.A.1.1), extracting an isolated feature from an originally disclosed combination and using it to delimit claimed subject-matter is allowable, having regard to Article 123(2) EPC, if there is no clearly recognisable functional or structural relationship among the features of the combination (see for instance T 25/03, point 3.3; see also T 1067/97; T 714/00).

In the present case the Board is satisfied that this requirement is met in respect of the features of the

embodiment according to Figs. 1 and 3 that have been extracted and introduced into claim 1. The appellant referred to the feature according to which the rear protrusion of the clamp (23) is received in a recess (24). The description of the application as filed indeed discloses (page 3, line 33 to page 4, line 5) that the rear protrusion of the clamp is received in a recess, which is inclined at an angle α in relation to the central axis S1 of the clamp screw (20). It would be clear for the skilled person that the only feature of the recess that has a functional or structural link with the additional features introduced into claim 1, which concern the manner in which the clamp acts on the insert, is its inclined surface (26). This feature is recited in claim 1. The other surfaces of the recess, namely the bottom surface and the left-hand surface shown in Fig. 1, are clearly irrelevant in this respect because they are not intended to interact with the clamp at all. They might in fact even be absent or assume any form that does not interfere with the abutment of the rear end portion of the clamp against said inclined surface (the fact that these surfaces do not interfere with this abutment is implied by the definition of claim 1 that the "*the rear end portion (23) of the clamp is arranged to be in abutment with a planar contact surface (26) on the holder (10)").*

3.4 The appellant submitted that the expression "*downward-inwards inclined*", which was added to claim 1 during the oral proceedings, introduced a lack of clarity. Considering that the claim mentions a "bottom" surface of the tool holder's pocket, "top" and "bottom" faces of the insert, "forward" and "rear" protrusions of the clamp, it is clear that the same reference system is

intended for all the components of the claimed combination, namely a reference system in which the main directions (such as up, down, front, rear) correspond to the main axes of the tool holder holding a cutting insert. The forward portion of such a tool is clearly the outer portion where the cutting insert is located, and its rear portion is clearly the portion where the tool is held in a machine tool. Accordingly, there is no doubt that in the above-mentioned expression "downward" means in the downwards direction of the tool holder (i.e. towards the bottom surface of the cutting insert) and "inwards" means towards the rear portion of the tool holder.

3.5 Therefore, the Board comes to the conclusion that the objections raised by the appellant in respect of the amendments made to claim 1 are unfounded.

3.6 No other objections under Articles 123(2), (3) or 84 EPC were raised by the Appellant or were apparent to the Board with respect to the amendments made to the patent documents.

4. *Sufficiency of disclosure*

4.1 The appellant submitted that there was no disclosure in the patent in suit of a geometry which both resulted in point contact and had an axis of symmetry. However, as explained above (point 3.2), the feature of claim 1 according to which the protrusion makes contact only with a point of the wall of the hole cannot be read as meaning that there is only point contact. Moreover, although Fig. 1 of the patent in suit shows a protrusion that does not have an axis of symmetry, the

Board takes the view that the skilled person would not have any difficulty in putting into practice the teaching according to claim 1 that the protrusion has an axis of symmetry. The provision of a portion having an axis of symmetry is in fact a matter of normal design procedure which requires simple geometrical considerations. The same applies to the provision of a clamp having a protrusion with an axis of symmetry inclined relative to the axis of the hole which makes contact only with a point of the wall distantly from the top face of the insert.

4.2 It follows that that the appellant's objection as to insufficiency of disclosure is unfounded.

5. *Novelty*

The appellant did not raise any objection with regard to the novelty of the claimed subject-matter. The Board also does not see any reason to take a different view.

6. *Inventive step*

6.1 There is agreement between the appellant and the respondent that document D1 represents the closest prior art and that it discloses a combination of a tool holder and a cutting insert according to the preamble of claim 1. In fact, using the wording of claim 1 of the patent in suit, D1 discloses (see Fig. 1) a tool holder (7) for holding a cutting insert (3) in a pocket confined by a bottom surface and at least one side surface upstanding from said bottom surface, said insert having top and bottom faces, a through hole and edge faces intersecting said top and bottom face, said

tool holder comprising a clamp (2) with forward and rear protrusions mounted on said tool holder for being actuated against said insert by means of a clamping screw (5) extending entirely through a recess of said clamp whilst threadably engaging a bore in said tool holder, wherein the forward end portion of said clamp is in the shape of a downward-inwards inclined protrusion (1) having a contact surface to be engaged with the hole wall of said hole and the rear end portion of the clamp is arranged to be in abutment with a planar contact surface (6) on the holder, which surface is inclined at an angle with respect to the axis of the clamping screw for providing a wedging action, wherein the forward protrusion (1) of the clamp is a portion having an axis of symmetry that is oriented at an inclined angle relative to the axis of the hole, the latter axis being parallel to the axis of the clamping screw, and that said forward protrusion (1) includes a contact surface facing the upstanding side surface at a point distantly provided from the top face of the insert such that, upon tightening said screw said protrusion makes contact only with said point of said wall distantly from said top face.

Although the insert (3) has a triangular shape (see Fig. 2), there is no clear and unambiguous disclosure in D1 that the insert is indexable, i.e. that it has multiple cutting edges, whereby once a cutting edge is excessively worn it can be indexed to another edge.

Moreover, as can be seen in Fig. 1, the protrusion 1 is inclined at an angle ß which is very small as compared to the angle formed by the planar surface 6 with the axis of the hole. In this respect it is noted that the

expression "somewhat smaller" should be read as "slightly smaller" and that it cannot be read, as was argued the appellant, as meaning that ß may simply be smaller than α.

Therefore, document D1 does not disclose the features of the characterizing portion of claim 1 according to which the insert is an indexable insert having a centre through hole and in that upon tightening said screw a planar underneath surface of the clamp only makes surface contact with the upper surface of said insert at a location between said hole and the edge surface contacting said upstanding side surface in the tool holder, and in that the angle ß is essentially of same size or somewhat smaller than the acute angle α at which the contact surface is oriented.

6.2 The provision of an indexable cutting insert allows the same cutting insert to be used even when a cutting edge becomes worn.

According to D1 (see Fig. 1), the underneath surface of the clamp contacts the insert at a location which is forward of the hole. Due to this configuration, the downwards directed cutting force acting on the insert during a cutting operation tends to lift the rear end of the cutting insert from the supporting surface of the pocket (see par. [0005] of the patent in suit; see also the explanations given in D14, page 5/16 of the English translation). This tendency is avoided by the feature whereby the clamp contacts the insert essentially rearward of the hole as required by claim 1. This also implies that, as compared to D1, the clamp can be at an increased distance from the cutting edge

so that the risk of interference with cutting chips during a cutting operation is reduced (see also the explanations given in D14, par [0005] of the English translation).

By providing an angle ß which is essentially of same size or somewhat smaller than the angle α, a favourable wedging action is provided (see par. [0017] of the patent in suit).

Therefore, the objective technical problem solved when starting from D1 can be regarded as allowing the use of the cutting insert for a longer time and ensuring that the insert is kept firmly and safely in place in its location so avoiding or reducing any tendency for it to come away from its underneath supporting surface (see par. [0005] of the patent in suit) and reducing the risk of interference with the chips produced during cutting operations.

6.3 Document D3 discloses a tool holder (see Fig. 4) having a pin (30) extending upwardly into a pocket for receiving an insert (34), the pin engaging a hole (32) in the insert and thus determining the forward position of the insert in the pocket (see col. 3, line 40). A clamp member (44) has a lip (46) at its forward end that overhangs the insert so as to engage the top face thereof at a region spaced rearwards from the centre hole (32) of the insert (col. 3, lines 1 to 4). The clamp member further has protrusions (48) which engage the back wall of the insert and force it forwards against the pin (30), when a screw (38) is tightened.

Even under the assumption, favourable to the appellant, that the skilled person would consider the solution disclosed by D3 when faced with the aspects of the above-mentioned technical problem of avoiding or reducing the tendency of the cutting insert to come away from its underneath supporting surface and of reducing the risk of interference with the chips (in relation to which aspects there is however no explicit indication in D3), he would not arrive at the subject-matter of claim 1 for the following reasons. When implementing the teaching of D3 in the tool of D1, the skilled person would have no reason to extract only the feature according to which the area of contact between the underneath surface of the clamp and the top face of the insert is located rearwards of the hole of the cutting insert. He would in fact remark that this feature of the clamp is presented in combination with the presence of a pin, that the pin is incompatible with the presence of a protrusion in the clamp, and that the combination disclosed by D3 allows a minimal overhang of the clamp over the insert to be provided, thus efficiently avoiding interference with the chips and any tendency of the insert to come away from its underneath supporting surface in use. D3 does not suggest anywhere that the risks of the insert coming away from its underneath surface and, to a lesser degree, of interference with chips could be reduced in the tool of D1 only by displacing rearwards the contact surface between the underneath surface of the clamp and the top surface of the insert.

6.4 The clamping mechanism for clamping the insert according to D8 is of a different kind than that according to the patent in suit. Having regard to

Figs. 1 to 3 of D8, when the screw 13 is tightened for securing the cutting insert B in the tool holder, the clamp C is rotated about shaft 11. As a consequence, since the clamp has a protrusion 10 which engages the hole 8 of the cutting insert, the cutting insert is rotated and then firmly pressed against the wall 3 of the tool holder (see page 4 of the English translation, 2nd full paragraph). D8 is not concerned at all with the manner in which the clamp contacts the top face of the insert. Although Figs. 1 to 3 show a clamp which contacts the top face of the cutting insert rearwards of the protrusion 10, Figures 4 to 8 show that the clamp extends forwards of the protrusion and thus suggest that the contact surface also extends forwards of the protrusion. Accordingly, D8 does give any hint to the claimed solution of the above-mentioned problem.

6.5 D15 constitutes new evidence in these appeal proceedings (see point IV above) and thus may be admitted and considered at the Board's discretion, pursuant to Article 13(1) of the Rules of Procedure of the Boards of Appeal. Considering that the appellant relied upon this document in reaction to the filing of the amended request during the oral proceedings, the Board decided to admit it into the appeal proceedings.

D15 discloses a tool in which the insert is held in the tool holder by means of a clamp (13) having a protrusion (17) engaging a hole (18) of the cutting insert (12). It is clear from the figures, in particular Figs. 1 and 3, that the whole planar underneath surface (16) of the clamp, which surface extends all around the protrusion, is intended to contact the top face of the insert. Contrary to the

appellant's view, it cannot be derived from the fact that in Fig. 3 the line from reference numeral 16 contacts the rear portion of the planar underneath surface of the clamp, that only this rear portion is intended as the contact surface. In fact, Fig. 3 shows that the profile of this surface is a continuous line and therefore clearly indicates that the surface 16 extends rearwards and forwards of the protrusion 17.

6.6 It follows from the above that the appellant's arguments concerning inventive step do not succeed in persuading the board that the subject-matter of claim 1 lacks an inventive step. Nor does the Board see any reason to take a different view. Claim 1 is thus considered to meet the requirement of inventive step set out in Articles 52(1) and 56 EPC.

7. Therefore the patent documents in accordance with the main request of the respondent 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 patent as follows:

   (a) Claims 1 to 4 of the main request filed during the oral proceedings;

   (b) The amended description filed during the oral proceedings; and

   (c) Figures 1 and 2 as granted.

The Registrar: The Chairman:

M. Patin K. Garnett