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D E C I S I O N
of 29 April 2004

Case Number: T 0935/01 - 3.2.6

Application Number: 92105534.9

Publication Number: 0507250

IPC: B23B 27/10

Language of the proceedings: EN

Title of invention:
A metal cutting tool

Patentee:
ISCAR LTD.

Opponent:
Kennametal Inc.
Sandvik AB

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Auxiliary request filed in oral proceedings (admissible)"
"Inventive step (main and auxiliary request (no))"

Decisions cited:
T 0056/87, T 0005/81

Catchword:
-



Case Number: T 0935/01 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 29 April 2004

Appellant: ISCAR LTD.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 30 July 2001
revoking European patent No. 0507250 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: P. Alting van Geusau
Members: H. Meinders
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. European patent No. 0 507 250 was revoked by decision of the Opposition Division dated 9 March 2001 sent to the parties on 30 July 2001. According to this decision the subject-matter of claim 1 as granted did not involve inventive step over the combination of teachings of:

D1: DE-A-3 740 814 and

D2: US-A-4 992 008.

II. An appeal was filed by the patentee on 13 August 2001 with payment of the appeal fee on that same date. The statement of grounds of appeal was filed on 7 December 2001.

III. In a communication in preparation of oral proceedings the Board gave its preliminary opinion on the case, indicating the relevance of

D8: US-A-4 558 974, cited in the course of the opposition proceedings,

as starting point for discussing inventive step.

It further addressed the issue whether the features in claim 1 relating to the use to which the claimed insert was put implied constructional features of the insert itself.

IV. Oral proceedings were held on 29 April 2004.

The final requests of the appellant patentee were to maintain the patent as granted or according to the auxiliary request filed at the oral proceedings.

The respondents (opponents 01 and 02) requested to dismiss the appeal and to not admit the auxiliary request filed at the oral proceedings.

V. Claim 1 **as granted** reads as follows:

"A metal cutting insert for use in a metal cutting tool for use in parting, grooving and turning operations, comprising upper and bottom faces (3, 4); laterally directed front and rear faces (5, 6); a pair of longitudinally directed side faces (7); a laterally directed front cutting edge (10) defined at an intersection of the upper (3) and front (5) faces; and a rake face (8) formed in said upper face (3) adjacent said front cutting edge (10); at least one recess (12c) formed in said rake face (3) and a chip forming means formed in said rake surface (3) and having at least one pair of laterally spaced apart portions (12c, 12b) which slope raisingly away from said cutting edge (10) and on which a chip cut by said cutting edge (10) rides so as to superpose the or each recess (12c) defined between the or each pair of portions (12a, 12b); characterized by a bore (15) formed in said insert extending from a bore inlet (15a) formed in said bottom face (4) to a bore outlet (15b) formed in one said recess (12c), said bore being adapted to be coupled to a cooling fluid duct (16) which is in fluid communication with a cooling fluid supply means, wherein the chip cut by said cutting edge (10) is spaced from the bore outlet (15b) in the or each recess

(12c), whereby cooling fluid emerging from said bore outlet (15b) serves to cool a cutting region of said insert adjacent said cutting edge (10) and to deflect said chip away from said insert."

Claim 1 according to the **auxiliary request** filed at the oral proceedings reads as follows:

"A metal cutting insert for use in a metal cutting tool for use in parting and grooving operations, comprising upper and bottom faces (3, 4); laterally directed front and rear faces (5, 6); a pair of longitudinally directed side faces (7); a laterally directed front cutting edge (10) defined at an intersection of the upper (3) and front (5) faces; and a rake face (8) formed in said upper face (3) adjacent said front cutting edge (10); one recess (12c) formed in said rake face (3) and a chip forming means formed in said rake surface (3) and having one pair of laterally spaced apart portions (12c, 12b) which extend from the side faces (7) and slope raisingly away from said cutting edge (10) and on which a chip cut by said cutting edge (10) rides so as to superpose the recess (12c) defined between the pair of portions (12a, 12b); characterized by one bore (15) formed in said insert extending from a bore inlet (15a) formed in said bottom face (4) to a bore outlet (15b) formed in said recess (12c), said bore being adapted to be coupled to a cooling fluid duct (16) which is in fluid communication with a cooling fluid supply means, wherein the chip cut by said cutting edge (10) is spaced from the bore outlet (15b) in the recess (12c), whereby cooling fluid emerging from said bore outlet (15b) serves to cool a cutting region of said insert adjacent said cutting

edge (10) and to deflect said chip away from said insert, said bore outlet (15b) having a transverse extent within the range of 10-40% of the overall lateral extent of the insert."

VI. The appellant argued essentially as follows:

Main request:

Contrary to the opinion expressed by the Board, the features of the chip cut by the cutting edge being spaced from the bore outlet in the recess and being deflected by the cooling fluid emerging from the bore outlet, away from the insert, had to be considered technical features of the cutting insert providing a synergistic effect and thus led to a difference over the prior art inserts disclosed in D2 or D8. In an infringement case, for instance in Germany, the national court would consider whether this effect was achieved by the alleged infringing insert, thus for the assessment of novelty and inventive step these features should also be taken into account.

These features led to the chip being deformed such that the contact surface with the insert was reduced, thus resulting in less wear and an improved cut. Starting from D2 there was no problem with chip deflection, as the necessary chip deformation and deflection was already achieved by the particular form of the chip path surface. Thus there was no reason to consider placing a cooling liquid bore in the recess of the insert disclosed in D2. D8 was not a proper starting point as it related to the accuracy of the depth of cut, thus had nothing to do with reduction of wear and

improved chip removal. Further, it did not relate to an insert for parting, grooving and turning operations, but to an insert for rotary tool holders.

D1 related only to arranging cooling liquid bores close to the cutting edge; there was no mention of any recess or ridges helping in the deflection of the chip, thus this document would not be taken into account by the skilled person through lack of indications to apply its teaching to inserts having such ridges. D2 nor D8 were mentioned amongst the many documents referred to in D1.

According to T 56/87 (OJ EPO 1990, 188) the integral teaching of prior art documents should be applied: D2 and D8 related to problems different from the one solved by the insert of claim 1, thus could not lead to the solution in which the chip was spaced from the cooling bore outlet and thus could be deflected by the cooling liquid. According to T 5/81 (OJ EPO 1982, 249) one should not interpret a document in the light of the problem defined having knowledge of the invention.

Claim 1 according to the main request was thus novel over D2 as well as D8 and also presented inventive step over the teachings of these documents.

Auxiliary request:

The amended claim should be admitted as it was in reply to the position of the Board and the respondents taken in the oral proceedings with respect to D8 as closest prior art, the appellant having prepared itself on the basis of D2 as closest prior art, the document found by the opposition division to be the most relevant.

The additional features in claim 1 presented further differences over D2, which did not disclose an insert having the claimed raised portions extending from the side faces. The now claimed transverse extent of the bore outlet was not derivable from any of the prior art documents, thus claim 1 according to the auxiliary request involved inventive step.

VII. The respondents brought forward the following:

Main request:

The features relating to the chip being spaced from the bore outlet and being deflected by the cooling fluid stream related to the chip as it was formed by the claimed insert, and/or to the use which was made of the insert. However, such features could not play a role when the claim related to an insert itself and not to a process of using an insert. Claim 1 did not define the structural features bringing about this effect, thus the effect achieved, if any, should not play a role in assessing inventive step. In any case, the insert resulting from the combination of teachings of D2 or D8 with D1 was capable of producing the claimed effect.

D8 (or D2) was to be considered the closest prior art for discussing inventive step of the claimed insert. The inserts disclosed in these documents had the disadvantage that their useful life was dependent on wear of the insert. This wear could be reduced according to D1 by cooling the chip with a cooling fluid emerging from a bore outlet close to the cutting edge. The cooling fluid emerging from the bore would be

below the chip and during cutting it would help by its lubricating and hydraulic capacity to deflect the chip away from the insert. The outlet bore or bores suggested by D1, when arranged in the insert of D2 or D8, would of necessity be located in the recess between the ridges, as that was the only available space to arrange them close to the cutting edge so as to provide its cooling function as required in D1.

Auxiliary request:

This request should not be admitted as it was filed after expiry of the latest date for filing submissions as stipulated by the Board in its communication in preparation for the oral proceedings.

The features added to claim 1 could not provide inventive step to its subject-matter, because first, the laterally spaced apart portions of the chip forming means disclosed in D8 already extended from the side faces and second the range of the transverse extent of the bore outlet given in claim 1 was a large range in which in fact any practicable bore size chosen by the skilled person for arrangement in the recess would fall.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request - inventive step (Article 56 EPC)*
 - 2.1 Novelty was not disputed. Also the Board has ascertained that none of the available prior art documents discloses all features of claim 1.
 - 2.2 Closest prior art for the discussion of inventive step of claim 1 according to the **main and the auxiliary request** is in the opinion of the Board D8, for the reasons that follow.

Contrary to what the appellant argues, D8 clearly relates to an insert for a stationary parting and grooving tool as shown in figure 4 and 5 and discussed in column 3, line 67 to column 4, line 17 and column 4, lines 51 to 63 of D8.

The insert discussed in D8 has all the features of the preamble of claim 1 of the main request and in particular the feature of the raised portions extending from the side faces of the insert as added to the preamble of claim 1 of the auxiliary request. The latter feature is not present in the insert disclosed in D2.

With the insert according to D8 it is envisaged to control the accuracy of the depth of cut (see column 1, lines 8 to 11), as argued by the appellant. This statement of purpose, however, does not detract from the fact that with such an insert the general problem

of wear continues to exist, as with all types of cutting inserts. Thus this document can without doubt be considered relevant prior art for the subject-matter of claim 1 according to the main and the auxiliary request.

Inserts of the kind described in D8 have the disadvantage that their useful life is reduced due to wear of the cutting edge (see patent in suit, column 1, lines 8 to 20), which is influenced by the degree of heating of the cutting edge. D8 mentions specifically that the chip is still hot and malleable when it rides over the raised portions on the top face of the insert and is being deformed by said portions so as to free itself from the side surfaces of the cut (see D8, column 4, lines 31 to 34 and figures 5 and 5a). Thus the question of high temperatures governing the conditions during cutting applies also to the insert as proposed in D8.

- 2.3 The insert as claimed in claim 1 of the main request does not have the above mentioned disadvantage, as it has a bore formed in said insert which extends from a bore inlet formed in said bottom face to a bore outlet formed in the recess, said bore being adapted to be coupled to a cooling fluid duct which is in fluid communication with a cooling fluid supply means, whereby cooling fluid emerging from said bore outlet serves to **cool** a cutting region of said insert adjacent said cutting edge.

The other features of the characterising part of claim 1, being:

- wherein the chip cut by said cutting edge is spaced from the bore outlet in the or each recess"

and

- "wherein cooling fluid emerging from said bore outlet serves to **deflect** said chip away from said insert",

which were argued by the appellant to form further distinguishing features, will be discussed further on in this decision.

2.4 However, D1 already discloses a solution for the cooling of the cutting edge of inserts (column 1, lines 11 to 36), so that their useful life is increased. In D1 it is discussed that the effect known from providing cooling ducts in drilling and threading tools is used for inserts, such that not only the cutting edge, but also the surface upon which the chip moves, is cooled.

The solution proposed by D1 for inserts (see column 4, lines 9 to 60) consists of providing a bore 23 in the insert extending from a bore inlet 35 formed in the bottom face of the insert to a bore outlet 17 formed in the upper surface of the insert, the bore being adapted to be coupled to a cooling fluid duct 34, 31 which is in fluid communication with a cooling fluid supply means (column 3, lines 35 to 38). The bore outlet is arranged in a recess 24, thus is spaced from the

surface of the insert upon which the chip moves (column 4, lines 18 to 22). This cooling duct is specifically there to cool the cutting region of the insert (column 1, lines 32 to 34).

The Board considers that the skilled person in the field of cutting inserts as used in parting, grooving and turning operations has knowledge of the teaching of D1 in this respect and will apply it to prolong the useful life of an insert as discussed in D8, column 4, lines 27 to 34 and figure 5. When applying this teaching of D1, he will arrive at the insert as claimed in claim 1, as the only available space for the bore outlet is in the recess between the two spaced apart portions 34. This bore outlet will have to be, according to the teaching of D1, arranged close to the cutting edge 27, so as to perform its function of cooling this "cutting region", according to the terminology used in claim 1.

- 2.5 The further feature in claim 1: "wherein the chip cut by said cutting edge is spaced from the bore outlet in the or each recess", irrespective of whether it amounts to a further technical feature of the insert, will be present in the insert according to D8 as modified by the skilled person following the teaching of D1 as discussed above, as according to D1 the bore outlet 17 should be vertically spaced from the recess surface by the fact that it ends in a funnel arranged in the recess. Thus a chip, even if it would move over and remain in contact with the recess surface, would be spaced from this bore outlet, as claimed in claim 1.

2.6 The remaining feature of claim 1 "wherein cooling fluid emerging from said bore outlet serves to **deflect** said chip away from said insert" relates to the circumstances during the use to which the insert is put and only insofar such a use implies a constructional feature of the claimed insert can such a limitation be taken into account when assessing inventive step.

Considering whether the use as mentioned in claim 1 implies such a constructional feature, the angle of the bore with the plane of the rake face can hardly have been meant, as according to the description this angle could be anywhere between 5° and 85°, which covers practically all feasible angles. In any case, the angle of the bore shown in figure 11 of D1 would fall in such a range.

Further, according to D1, column 4, lines 27 to 31 the funnel shaped end of the bore results in a swirling of the cooling fluid which produces a regular wetting of the surface upon which the chip moves with cooling fluid. Thus, already by being at that location below the chip and by its hydraulic capacity, the cooling fluid will serve to deflect the chip away from the insert.

2.7 Moreover, also the pressure used for the cooling fluid cannot be considered to produce a chip deflection effect over the claimed range, as this pressure, according to the patent in suit, column 5, lines 26 to 28, can be anywhere between **atmospheric** pressure and 20 atm.

In that respect it is noteworthy that D1, column 3, line 38 mentions the use of a pump to supply the cooling fluid, which thus will also be at a pressure generally higher than atmospheric pressure. As the claim does not comprise further technical features giving support to the synergistic effect as alleged by the appellant, other than the above discussed combined possible effect of angle of impingement on the chip and pressure of the cooling fluid emerging from the funnelled bore in the recess surface, because of lack of presence in the claim of corresponding features such an effect cannot contribute to inventive step.

2.8 The appellant also argued that the features discussed above under points 2.5 to 2.7 had to be considered as forming part of the claimed invention, as they played a role in determining the extent of protection, i.e. the subject-matter of the claim, in national infringement cases. Apart from the fact that the assessment of which products under which circumstances may constitute an infringement of the patent lies outside of the scope of examining appeals by a Board of Appeal, it follows from the above considerations that even if these features are taken into account as technical limitations of the claimed subject-matter as far as this can reasonably be expected, they cannot provide support for inventive step.

2.9 The appellant argued that the principle as developed in T 56/87 (loc. cit.) as concerns the consideration of the integral teaching of a document when assessing inventive step, should be taken into account in the present case, in connection with D2 and D8, which concerned inserts designed with a different purpose in

mind. Thus the skilled person would not consider these inserts.

In this decision the deciding Board stated that in its opinion "the skilled person who studies a document does not consider individually the various single items described therein but looks at their technical interrelation in order to try to understand the functioning of the disclosed apparatus or process. The skilled person is thus used to seeing all the detailed information contained in a document in their technical context. Therefore, the technical disclosure in a prior art document should be considered in its entirety, as it would be done by a person skilled in the art. It is not justified arbitrarily to isolate parts of such document from their context in order to derive therefrom a technical information, which would be distinct from or even in contradiction with the integral teaching of the document".

D2 has been considered less relevant than D8 by the Board, see point 2.2 above and has not played a further role in this decision, thus need not be discussed in connection with the cited decision.

In the present case the Board has considered one particular embodiment of D8, however in its integrality, for the purpose of determining what would be the proper starting point for discussing inventive step. This embodiment is the one disclosed in figure 5 and discussed in column 4, lines 27 to 34 and which is expressly mentioned as being usable in a stationary tool holder, just as the insert which figures as the starting point for the present invention, as discussed

in column 1, lines 1 to 7 of the patent in suit. The Board cannot see where it has singled out any features as discussed in D8 or which features have been derived from it which are distinct from or even in contradiction with the integral teaching of that document.

The same applies to D1, of which the integral teaching, in the opinion of the Board, is that one should cool the cutting edge and the surface upon which the chip moves by providing cooling fluid to that region through a bore which ends in that region, close to the cutting edge. This principle is then applied to a number of different cutting tools, among which a cutting insert capable of turning and grooving is an important embodiment. Thus the principle developed in this decision has been adhered to by the present Board.

- 2.10 Finally, the appellant offered T 5/81 (loc. cit.) as support for his contention that the interpretation of the disclosure of document D8 should not be influenced by the problem definition, which is done *ex post facto*, i.e. with knowledge of the invention. The appellant referred specifically to the fact that D8 was concerned with accuracy with the depth of cut, whereas the invention solved the problem of cooling the insert to increase its useful life. One should take into account the problem discussed in the prior art document and compare it with the problem actually solved by the invention. One should not simplify or modify the problem to be solved so as to be able to combine the teachings of two documents more easily.

In the present case the Board considers that its definition of the problem concerning the cutting insert disclosed in D8 is not affected by the principle developed above, as the question of wear of cutting inserts is probably the most basic problem any skilled person working in the field of cutting inserts is confronted with. Cutting inserts like the ones disclosed in D8 will - in the opinion of the Board - without doubt be affected by wear and it can be expected of the skilled person that he tries to find a solution to this problem. He will at least try out such known solutions for this problem.

Since the subject-matter claimed in claim 1 lacks inventive step the main request is to be rejected.

3. *Auxiliary request - admissibility*

The request was filed in the oral proceedings after discussion of the main request in respect of the documents D8 and D1. In contrast to this the decision under appeal concentrated upon the combination of the teachings of D2 and D1. The amendments to claim 1 as granted can be considered a legitimate response to the objections made by the respondents as well as the Board in these oral proceedings on the basis of these documents. There is therefore a reason for their filing at such a late stage of the proceedings.

They consist of an adaptation of the preamble to D8, which was considered by the Board to be closer prior art than D2 (as explained by the Board in the oral proceedings) and of a limitation of the bore to a single bore and the bore outlet having a transverse

extent of 10-40% of the overall lateral extent of the insert (which was the subject-matter of dependent claim 4 as granted). They do not pose particular problems of understanding nor direct the claimed subject-matter in an unexpected direction; the auxiliary request can therefore be admitted in the appeal proceedings.

4. *Auxiliary request - amendments*

In view of the outcome of these proceedings (see point 5 below) in respect of inventive step of the subject-matter of claim 1 according to the auxiliary request the question of the allowability of the amendments pursuant to Article 123(2) and (3) EPC need not be addressed.

5. *Auxiliary request - inventive step*

5.1 The features added to the preamble of claim 1 as granted concern features also present in the insert according to D8. According to column 1, line 9, the insert disclosed in D8 is used for grooving; the insert shown in figure 5 of this document has only one recess between the two laterally spaced apart raised portions; the raised portions extend from the side faces of the insert, see figure 5. The added features thus do not change the above consideration that D8 is the closest prior art, disclosing all features of the preamble of claim 1 of the auxiliary request.

5.2 In view of the fact that grooving and parting tools have a limited lateral extent, the skilled person, when applying the teaching of the cooling fluid bore of D1

to the insert disclosed in D8 will have no other choice than to provide a single bore in the recess between the laterally spaced raised portions, as he also has to accommodate for the transverse extent of the funnel in which the bore outlet ends, as suggested by D1. In his choice of size for the bore he will have to weigh the necessity to have a sufficiently large bore diameter to provide the cutting edge with sufficient cooling fluid against the weakening effect which such a bore and its funnel outlet (which has to be close to the cutting edge to have its wear reducing effect according to D1) has on the overall strength of the insert.

The lateral extent of the insert is there for accommodating at least the two laterally spaced raised portions upon which the chip will ride and the lateral width of the funnel, if this width would use up all the lateral space between the raised portions. The Board considers that in view of the size of the bore outlet in respect of the size of the funnel as suggested by D1, the range of 10-40% of the overall lateral extent of the insert as claimed for the transverse extent of the bore outlet (= bore diameter in case of a circular bore) covers the whole range of possible sizes the skilled person could decide on when applying the teaching of D1 to the insert of D8. This choice of size for the bore outlet thus cannot impart inventive step to the subject-matter of claim 1 either.

- 5.3 In view of the above considerations the subject-matter of claim 1 of the auxiliary request is the obvious result of the application of the teaching of D1 to the insert of D8 as discussed above under point 2 and therefore lacks inventive step.

This request is therefore to be rejected as well.

Order

For these reasons it is decided that:

1. The auxiliary request is admissible.
2. The appeal is dismissed.

The Registrar:

The Chairman:

M. H. A. Patin

P. Alting van Geusau