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Case Number: T 2433/13 - 3.2.08

Application Number: 03745050.9

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Language of the proceedings: EN

Title of invention:
TOOL AND CUTTING INSERT FOR CHIP REMOVING MACHINING WITH CONNECTING SURFACES BETWEEN HOLDER AND INSERT WITH RIDGE AND GROOVES IN SHAPE OF CURVES

Patent Proprietor:
Sandvik Intellectual Property AB

Opponent:
Iscar Ltd.

Headword:

Relevant legal provisions:
EPC Art. 123(2), 84, 54, 56
EPC R. 80

Keyword:
Amendments - allowable (yes)
Novelty
Inventive step

Decisions cited:

Catchword:

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Case Number: T 2433/13 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 22 December 2016

Appellant: (Patent Proprietor)	Sandvik Intellectual Property AB 811 81 Sandviken (SE)
Representative:	WSL Patentanwälte Partnerschaft mbB Postfach 6145 65051 Wiesbaden (DE)
Appellant: (Opponent)	Iscar Ltd. P.O. Box 11 24959 Tefen (IL)
Representative:	Vossius & Partner Patentanwälte Rechtsanwälte mbB Siebertstrasse 3 81675 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 17 October 2013 concerning maintenance of the European Patent No. 1485222 in amended form.**

Composition of the Board:

Chairwoman	P. Acton
Members:	M. Alvazzi Delfrate
	C. Brandt

Summary of Facts and Submissions

I. With its decision posted on 17 October 2013 the opposition division found that European patent No. 1485222, in amended form according to auxiliary request 3 then on file, and the invention to which it related met the requirements of the EPC.

II. Appellant 1 (patent proprietor) and appellant 2 (opponent) both lodged an appeal against that decision in the prescribed form and within the prescribed time limit.

III. Oral proceedings before the Board of Appeal were held on 22 December 2016. For the course of the oral proceedings reference is made to the minutes. At the end of the oral proceedings the requests of the parties were the following:

Appellant 1 requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the main request or auxiliary request 1, both filed at the oral proceedings before the Board, or on the basis of auxiliary request 2, filed with letter of 13 September 2016.

Appellant 2 requested that the decision under appeal be set aside and that the patent be revoked.

IV. The **main request** comprises three independent claims that read as follows:

"1. Tool for chip removing machining, comprising two parts, i. e. a first part, such as a basic body (1), and a second part, namely a cutting insert (2), which have connecting surfaces (12, 13) arranged to engage

each other, the cutting insert consisting of a flat and polygonal or round body having a top side, a circumferential surface, and a bottom side, whereby one or more cutting edges are formed in the transition between the top side and the circumferential surface, said bottom side forming one of said connecting surfaces, the tool further comprising a ridge (15, 15', 20, 20') having a cross-section-wise tapering shape and formed in one of the connecting surfaces (12), and a cross-section-wise tapering groove (17) in the second connecting surface (13), which groove receives the ridge, characterized in that both the ridge (15, 15', 20, 20') and the groove (17) are in the shape of curves in said connecting surfaces."

"8. Tool for chip removing machining, comprising two parts such as a basic body (1) and a cutting insert (2), which have connecting surfaces (12, 13) arranged to engage each other, the tool further comprising a ridge (15, 15', 20, 20') having a cross-section-wise tapering shape and formed in one of the connecting surfaces (12), and a cross-section-wise tapering groove (17) in the second connecting surface (13), which groove receives the ridge, characterized in that both the ridge (15, 15', 20, 20') and the groove (17) are in the shape of closed curves in said connecting surfaces, which are either elliptic or in the form of a polygon."

"15. Cutting insert (2) for chip removing machining, comprising a connecting surface (12) for interaction with an analogous connecting surface (13) in a tool part, e.g. a basic body (1), the cutting insert consisting of a flat and polygonal or round body having a top side, a circumferential surface, and a bottom side, whereby one or more cutting edges are formed in the transition between the top side and the

circumferential surface, said bottom side forming one of said connecting surfaces the connecting surface (12) comprising a cross-section-wise tapering ridge (15, 15', 20, 20'), characterized in that the ridge (15, 15', 20, 20') is in the form of a curve in said connecting surface."

Auxiliary request 1 differs from the main request in that claim 8 reads as follows (differences in respect of the main request emphasised):

"8. Tool for chip removing machining, comprising two parts detachably connected to each other, such as a basic body (1) and a cutting insert (2), which have connecting surfaces (12, 13) arranged to engage each other, the tool further comprising a ridge (15, 15', 20, 20') having a cross-section-wise tapering shape and formed in one of the connecting surfaces (12), and a cross-section-wise tapering groove (17) in the second connecting surface (13), which groove receives the ridge, characterized in that both the ridge (15, 15', 20, 20') and the groove (17) are in the shape of closed curves in said connecting surfaces, which are either elliptic or in the form of a polygon."

Auxiliary request 2 is not relevant for the present decision.

V. The following documents played a role for the present decision:

D2: US -A- 5,906,246;
D3: US -A- 5,711,702;
D5: GB -A- 5,379,854;
D6: US -A- 5,871,060;
D7: WO -A- 01/87523;

D14: US -A- 4,682,916;
D17: US -A- 6,149,695;
D18: US -A- 5,617,928;
D19: US -A- 5,611,649;
D20: US -A- 5,810,518;
D30: WO -A- 03/013770;
D31: DE -A- 1 602 817;
D35: Extract from the 25th edition of the Machinery's Handbook (1997), page 754.

VI. The arguments of appellant 2 can be summarised as follows:

Main request - amendments (Articles 123(2) and 84 and Rule 80 EPC)

Claim 1 stipulated the shape of the cutting insert. The basis for this feature had been indicated in the passage on page 1, lines 17-21. However, that passage did not disclose an insert "of a flat and polygonal or round body having a top side, a circumferential surface, and a bottom side, whereby one or more cutting edges are formed in the transition between the top side and the circumferential surface" as in present claim 1 but merely an insert of that "type". Most importantly, said passage related to the prior art and not to the claimed invention. Finally, further features which had not been included in the claim were disclosed in the same paragraph. Hence, claim 1 did not comply with the requirements of Article 123(2) EPC. Moreover, this amendment caused a lack of clarity in the claim because it was not clear which structural limitation was associated with the word "flat", in particular to what extent the surface had to be flat.

Also, the introduction of the wording "said bottom side forming one of said connecting surfaces" rendered claim 1 unclear because it was doubtful whether this feature was exactly the same as a connecting surface "formed on" the bottom side, as disclosed on page 5, lines 10-11, of the original description. Due to this possible difference it also had to be concluded that this feature was not based on the application as originally filed. Even if the drawings were to be considered, the embodiments depicted therein exhibited a number of other features which were not included in the claims. Thus, this amendment also was contrary to the requirements of Article 123(2) EPC.

Nor was the feature according to which the second tool part was a cutting insert originally disclosed in combination with an unspecified first part as in present claim 1. Claim 1 as originally filed disclosed either the combination of unspecified first and second parts, or that of a cutting insert and a basic body. As to the last paragraph on page 8, it did not disclose the presently claimed combination but a shim plate. Hence, this amendment represented a further contravention of the requirements of Article 123(2) EPC.

Moreover, the added feature that both the ridge and the groove were in the shape of curves "in said connecting surfaces" caused a further lack clarity, because it was doubtful what this meant in the case of curved connecting surfaces. Indeed, this feature did not seem to add anything to the original claim and, as a consequence, did not comply with the requirements of Rule 80 EPC. If, by contrast, a limiting feature was introduced in this way, no basis for it could be seen in the original application, in particular in the

drawings. For instance, the embodiment of Figure 1 had no curves in the surface, because the curves completely covered the bottom side of the insert. Hence, this amendment was also at odds with the requirements of Article 123(2) EPC.

Finally, the deletion in claim 1 of the comma between "characterized in" and "that" did not comply with Rule 80 EPC because it did not change the meaning of the claim.

Main request - novelty

Figure 7 of D7 showed a cutting insert (22') to be connected to a basic body. The insert was provided on its bottom side with a male element 3', which extended perpendicular to the top side and formed, in its outer circumferential surface, teeth that could be regarded as ridges to be received by corresponding grooves in the basic body. Hence, the subject-matter of claim 1 lacked novelty in view of D7.

Alternatively, the whole of the male element 3' could be regarded as a ridge to be received in the basic body. Moreover, its outer circumferential surface was curved. As shown in Figure 4, said ridge had a tapered section. Hence, for these reasons too the subject-matter of claim 1 lacked novelty over D7.

D30 disclosed in Figure 4 a tool for chip removing machining, comprising a cutting insert which was pressed against the supporting tool by a pressure piece. The cutting insert exhibited a circular groove in the surface contacting the pressure piece. According to claim 14, the insert could be a "Wendeschneid-platte". Hence, it was provided with cutting edges on

both its upper and lower sides. Accordingly, the upper side of the insert could be regarded as a "bottom surface" and, as a consequence, as a "connecting surface" in the sense of present claim 1. Thus, the subject-matter of claim 1 lacked novelty in view of D30. The same considerations applied in respect of claim 8.

For the same reasons, the subject-matter of claims 1 and 8 lacked novelty in view of D31, whose disclosure was similar to that of D30.

D14 disclosed, in particular in Figures 3, 5 and 12, a cutting insert with a connecting surface formed by surfaces 82, 84 for interaction with an analogous connecting surface in a tool part. Surfaces 82, 84 defined a cross-section-wise tapering ridge and represented the bottom side of the insert. Thus, the subject-matter of claims 1, 8 and 15 was not novel over D14.

D3 disclosed a cutting compact with a superhard abrasive layer bonded to a substrate layer. The compact was to be regarded as a tool "for chip removing machining", as stipulated by present claim 1, which did not give any detail in respect of the machining to be performed. The superhard layer and the substrate shown in Figure 1 had connecting surfaces arranged to engage each other with circular ridges and grooves receiving the ridges. The abrasive layer could be regarded as a cutting insert. The fact that it had to be fixed on a support to perform cutting did not play a role in this respect, because cutting inserts often had to be fixed on a tool, for instance by brazing. In this context reference was also made to D35. Hence, the subject-matter of claims 1 and 15 lacked novelty in view of D3.

Moreover, since a circle was a particular type of ellipse, the subject-matter of claim 8 likewise lacked novelty.

In the written procedure, arguments similar to those made in view of D3 were submitted in respect of documents D2, D5, D6, D17, D18 and D19, whose disclosures were similar to that of D3.

Auxiliary request 1 - inventive step

D20, in particular Figure 4, disclosed the closest prior art for the subject-matter of claim 8. The two detachably connected parts of present claim 8 could be seen in the holder 1" and the shim 5" of D4. In this case, the ridges and grooves did not offer any clamping effect in respect of forces that acted parallel to the ridges. The objective problem to be solved could thus be seen in the provision of a tool with an improved connection of the first and the second part.

D3 disclosed parts connected with circular ridges and grooves to reduce the stresses in the bond. Hence, D3 rendered it obvious to modify the connection of D20 in the sense of claim 8. Thus, the subject-matter of this claim did not involve an inventive step.

Since it was also obvious to apply the same type of connection in the case of cutting insert 10", the subject-matter of claims 1 and 15 did not involve an inventive step either.

VII. The arguments of appellant 1 may be summarised as follows:

Main request - amendments (Articles 123(2) and 84 and Rule 80 EPC)

The amendments were based on the application as originally filed, did not cause a lack of clarity and, since they limited the claimed scope, complied with the requirements of Rule 80 EPC.

In particular, it was clear from the originally filed description that the claimed invention aimed at obviating the drawbacks of the prior-art inserts by the provision of ridges and grooves in the shape of curves in the connecting surfaces. Hence, said curves were also to be applied to the prior-art inserts disclosed on page 1, lines 17-21, i.e. inserts with flat and polygonal or round bodies of the type that had a top side, at least one side surface or circumferential surface, and a bottom side, whereby one or more cutting edges were formed in the transition between the top side and the circumferential surface.

Also, the feature that the bottom side formed one of said connecting surfaces was disclosed in the application as originally filed, not only in the discussion of the prior art and on page 5 but also in the drawings.

The last paragraph on page 8 disclosed that, also in the case where the second part was a cutting insert, the first part did not need to be a basic body.

The feature that the ridge and the groove are in the shape of curves "in" the connecting surfaces indicated

that the curves added a further curvature to the (possibly curved) connecting surface. It was the object of the invention to add this further curvature to provide improved fixation.

As to the deletion of the comma between "characterized in" and "that", it was a correction to be considered together with the other changes to the wording of the claim.

Main request – novelty

None of the prior-art documents disclosed the subject-matter of independent claims 1, 8 and 15.

Even if the teeth on the male element of the insert of Figure 7 of D7 were to be seen as ridges in the outer surface of the male element, said outer surface could not represent a connecting surface in the sense of the invention because said teeth were not in the shape of curves in said outer circumferential surface. If by contrast the whole of the male element were to be regarded as a ridge and the whole bottom side as a connecting surface, no tapered cross-section of the ridge but only of a part of it could be seen in the insert of D7. Hence, the subject-matter of claims 1, 8 and 15 was novel over D7.

In the cutting insert of Figure 4 of D30 the connecting surface was not the upper one, which was in contact with the pressure piece, but the lower one. Indeed the cutting edge of the tool was opposite to the connecting surface, i.e. on the upper side of the insert in Figure 4. Thus, there were no engaging ridge and groove in the corresponding connecting surfaces of the first and second part. Therefore, the subject-matter of claims 1

and 8 was novel over D30. The same applied to claim 15, because the insert of D30 had no ridge.

The same considerations applied in view of D31.

In the cutting insert of D14 there was no ridge in the form of a curve in the connecting surface, because the whole ridge was in contact with the elements of the supporting body. Thus, the subject-matter of claims 1, 8 and 15 was also novel over D14.

D3 disclosed a cutting compact with a superhard abrasive layer bonded to a substrate layer. However, the compact was not a tool "for chip removing machining" as stipulated by present claim 1, but rather for subterranean drilling as disclosed in column 1, lines 12-16. Moreover, the abrasive layer was not a cutting insert because it did not have the necessary mechanical stability. Finally, the ridges and grooves of D3 were circular in form. By contrast, claim 8 required an elliptical form, which was to be understood as excluding rotational symmetry. Hence the subject-matter of claims 1, 8 and 15 was also novel over D3.

In the written procedure, analogous arguments were presented in respect of D2, D5, D6, D17, D18 and D19, whose disclosures were similar to that of D3.

Auxiliary request 1 - amendments and novelty

In auxiliary request 1 it was further specified, in claim 8, that the two parts were "detachably connected". This feature was disclosed in the application as originally filed and represented a difference in respect of D3.

Hence, the subject-matter of claim 8 (and claims 1 and 15) was novel.

Auxiliary request 1 - inventive step

D20, in particular Figure 4, represented the closest prior art for the subject-matter of claim 8.

The two detachably connected parts of present claim 8 could be seen in the shim 5" and the insert 10". Between these parts good clamping in different directions was provided by the ridges and the grooves. Hence, the objective problem to be solved could be seen in the provision of a tool with an alternative connection of the first and the second part.

The person skilled in the art would not have consulted D3 to solve this problem because D3 did not deal with detachable parts and with clamping. Hence, the subject-matter of claim 8 involved an inventive step.

The same considerations applied to claims 1 and 15.

Reasons for the Decision

1. Main request - amendments (Articles 123(2) and 84 and Rule 80 EPC)

1.1 Feature (A), according to which the cutting insert consists "of a flat and polygonal or round body having a top side, a circumferential surface, and a bottom side, whereby one or more cutting edges are formed in the transition between the top side and the circumferential surface", was added to claim 1 during the opposition proceedings.

1.1.1 The description as originally filed discloses, on page 1, lines 17-21, that a frequently occurring form of cutting inserts consists of flat and polygonal or round bodies of the type that has a top side, at least one side surface or circumferential surface, and a bottom side, whereby one or more cutting edges are formed in the transition between the top side and the circumferential surface.

Hence, the application as originally filed discloses inserts with the shape according to feature (A). The fact that in said passage the expression "of the type" is used may at most imply that in addition to those inserts also slightly modified inserts are contemplated, but does not affect the fact that feature (A) is directly and unambiguously disclosed.

1.1.2 It is true that the passage on page 1, lines 17-21, relates to the prior art. However, the sentence on page 1, line 11-12, in combination with the paragraph relating to the technical field of the invention on page 1, lines 5-8, discloses that the invention relates to this kind of prior-art cutting inserts.

Indeed the originally filed description explains that the prior-art inserts originally had a smooth bottom side, which was subsequently modified in a ridge-provided connecting surface (last paragraph on page 1 and first paragraph of page 2). Due to the straight shape of the ridges, the prior-art inserts still had some drawbacks (second paragraph on page 2). The present invention aims at obviating said drawbacks by the provision of ridges and grooves in the shape of curves in the connecting surfaces (paragraph bridging pages 2 and 3 and the third full paragraph on page 3).

Hence, the application as originally filed discloses that the inventive ridges and/or grooves are provided to the prior-art inserts, in particular those with a shape according to feature (A). Thus, it discloses that the inventive tools may exhibit feature (A).

1.1.3 Although feature (A) is disclosed in a paragraph which also mentions other features (page 1, lines 11-23), such as the possibly intended uses of the tools ("Tools of the above generally mentioned kind are usually used for machining workpieces of metal, such as steel, aluminium, titanium, etc."), no structural or functional link can be seen between those other features and feature (A). Hence, the fact that said other features have not been added to claim 1 together with feature (A) does not represent an unallowable intermediate generalisation.

1.1.4 Therefore, the addition of feature (A) to claim 1 does not introduce subject-matter which extends beyond the content of the application as filed.

1.1.5 Appellant 2 also argued that the introduction of feature (A) caused a lack of clarity in the claim because it was not clear which structural limitation was associated with the word "flat", in particular in respect of the surface of a cutting insert, because it did not specify to what extent the surface had to be flat.

However, the term "flat" in feature (A) does not refer to a surface but to the body of the insert. The person skilled in the art of cutting inserts immediately understands that a flat body cutting insert is an

insert whose extension in one dimension (the height) is more limited than in the other dimensions.

Therefore, no lack of clarity is caused by the addition of feature (A) to the claim.

1.2 Claim 1 has been further amended by the introduction of the wording (B) "said bottom side forming one of said connecting surfaces".

1.2.1 The person skilled in the art has no problem in establishing whether the connecting surface is formed by, i.e. is provided by, the bottom side or by another side. Hence, feature (B) does not introduce any lack of clarity.

1.2.2 Feature (B) is also based on the application as originally filed. The sentence on page 5, lines 10-11, discloses a connecting surface "formed on" the bottom side.

Appellant 2 argued that the wording on page 5 might mean something different from feature (B), which requires that the bottom surface forms the connecting ridge. This point does not need to be further explored, because all the drawings clearly depict embodiments exhibiting a bottom side of the insert which forms the connecting surface. Hence, feature (B) is directly and unambiguously disclosed in the application as originally filed.

Moreover, as explained above, the invention aims at improving the prior-art inserts which originally had a smooth bottom side connecting surface (subsequently provided with a straight ridge). Hence, feature (B) is clearly a central aspect of the invention, which has no

functional or structural link with other features not included in claim 1 and specific to the preferred embodiments shown in the drawings.

Therefore, the introduction of feature (B) in claim 1 likewise does not introduce subject-matter which extends beyond the content of the application as filed.

1.3 Claim 1 further requires that (C) the second tool part is a cutting insert. By contrast, the nature of the first tool part is not specified, since the claimed tool comprises a first part "such as a basic body".

Claim 1 as originally filed is directed to a tool "comprising two parts, such as a basic body (1) and a cutting insert (2)". In other words, claim 1 as originally filed discloses the combination of two unspecified tool parts or, as an example, the combination of a cutting insert as second part (feature (C)) and a basic body as first part.

The last paragraph on page 8 discloses that "the connecting surfaces do not necessarily need to be present on precisely a cutting insert and a basic body, but may be included in interfaces between two or more parts, e. g. extension parts that together form a basic body. It is also feasible to form connecting surfaces of the type in question in shim plates of the type that may be found between a cutting insert and a basic body."

Hence, the original application discloses that the first part does not necessarily need to be a basic body, even in the case of a second part being a cutting insert. Nor does the first part need to be a shim plate, which is not disclosed as the sole possible

alternative to a basic body, since claim 1 as originally filed and the last paragraph on page 8 likewise refer to an unspecified first part.

Therefore, the introduction of feature (C) into claim 1 without specifying that the first part is a basic body or a shim plate does not represent an unallowable intermediate generalisation and does not introduce subject-matter which extends beyond the content of the application as filed.

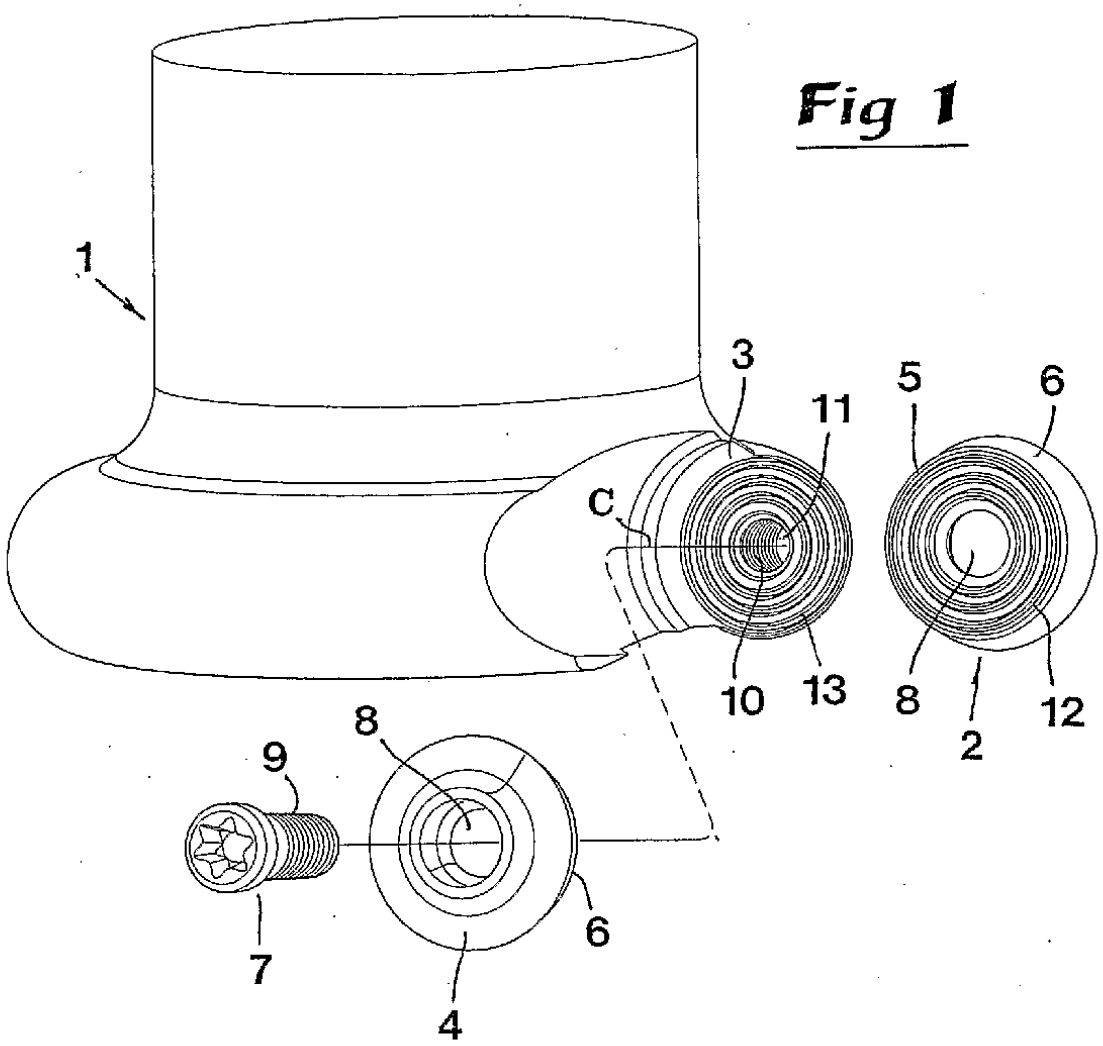
1.4 Claim 1 was also amended post-grant to stipulate that both the ridge and the groove are in the shape of curves (D) "in said connecting surfaces", while granted claim 1 merely states that they are in the shape of curves.

1.4.1 Feature (D) specifies that the ridge and the groove define curves in respect of the connecting surface. Hence, in the case of a curved connecting surface they do not merely follow the surface but add a further curvature. Thus, the meaning of this feature is clear and its introduction into the claim does not contravene the requirements of Article 84 EPC.

1.4.2 Moreover, feature (D) limits the claim and may thus contribute to establishing novelty or inventive step. Accordingly, the thus-amended claim 1 complies with Rule 80 EPC.

1.4.3 All the embodiments shown in the original drawings exhibit ridges and grooves of this type. This also applies to Figure 1 (reproduced hereafter), where the whole bottom side forming the connecting surface is covered by ridges and grooves, because each ridge and

groove is a curve "in" the surface formed by the bottom side.



Thus, the introduction of feature (D) into claim 1 does not introduce subject-matter which extends beyond the content of the application as filed.

1.5 Finally, (E) the comma between "characterized in" and "that" in claim 1 was deleted. This deletion has to be considered as part of the whole amendment of claim 1, in particular its characterising part, which, as explained above, complies with Rule 80 EPC. Thus, deletion (E) is not at odds with Rule 80 EPC.

1.6 Some of the amendments considered for claim 1 have been carried out in independent claims 8 and 15 as well. They comply with the requirements of Articles 123(2) and 84 EPC for the same reasons as given above.

The further amendments present in claim 8, according to which the ridge and the groove are in the shape of closed curves which are (F) "either elliptic or in the form of a polygon" (while in a previous version of the main request the curves were "either elliptic or polygonal"), are based on originally filed claims 7 and 8 (corresponding to granted claims 7 and 8).

As a consequence, claims 8 and 15 also comply with the requirements of Articles 123(2) and 84 and Rule 80 EPC.

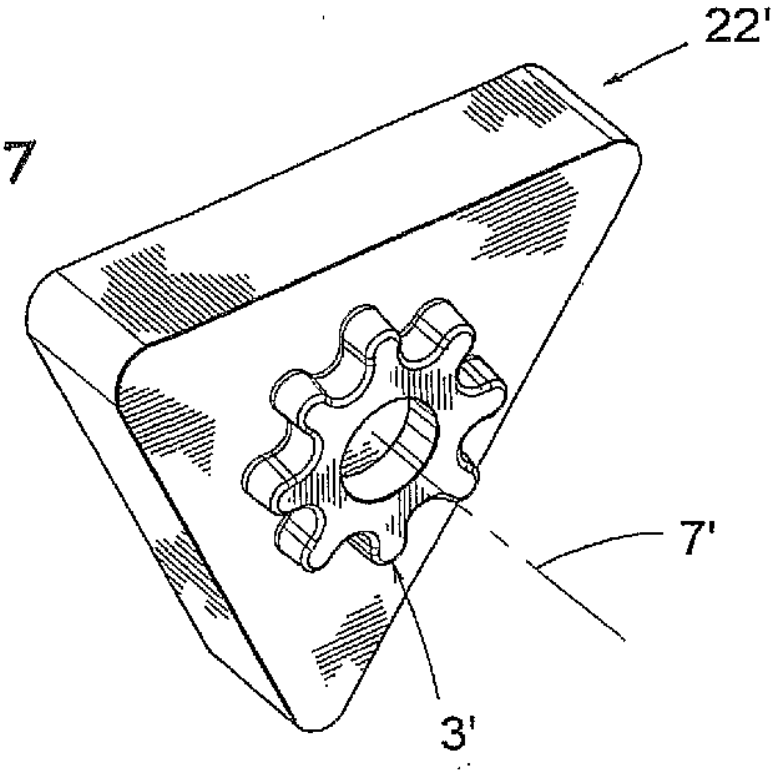
2. Main request - novelty

Novelty objections have been raised in view of D7, D30, D31, D14 and D3 and (in the written proceedings) D2, D5, D6, D17, D18 and D19.

2.1 D7

Figure 7 of D7 (reproduced hereafter) shows a cutting insert (22') for chip removing machining, consisting of a flat and polygonal body having a top side, a circumferential surface, and a bottom side, whereby one or more cutting edges are formed in the transition between the top side and the circumferential surface.

Fig. 7



The insert is provided on its bottom side with a male element 3', which extends perpendicular to the top side and whose outer circumferential surface forms teeth and recesses. The teeth can be seen as ridges to be received by corresponding grooves in the basic body.

Feature (D) of claim 1 requires that the ridges/grooves are in the shape of curves in the connecting surface. However, in D7 the teeth are not in the shape of curves in the outer circumferential surface of the male element since they do not add any curvature to that of said outer circumferential surface. Hence, said outer circumferential surface cannot be regarded as a connecting surface in the sense of the patent in suit. Rather, the connecting surface is to be seen in the whole bottom side, comprising said male element in its entirety and the rest of the triangular bottom surface.

In this case the whole of the male element 3' can be regarded as a ridge to be received in the basic body. Since the outer circumferential surface of the male element is curved, said ridge can be considered to be in the form of a curve in the connecting surface.

As shown in Figure 4, the teeth have a section (along the line A-A of Figure 9) which is tapered. However, the taper is provided only in the teeth and not over the whole cross-section of the ridge. Therefore, the ridge represented by male element 3' is not a cross-section-wise tapering ridge.

Hence, the subject-matter of claims 1, 8 and 15 is novel over D7.

2.2 D30 and D31

2.2.1 D30 discloses in Figure 4 (reproduced hereafter) a tool for chip removing machining, comprising a cutting insert (Schneidplatte 10), which is pressed against the supporting tool (13) by a pressure piece (Druckstück 14). The cutting insert comprises a groove (Spannmulde 11) in the surface contacting the pressure piece, i.e. on its upper side in Figure 4.

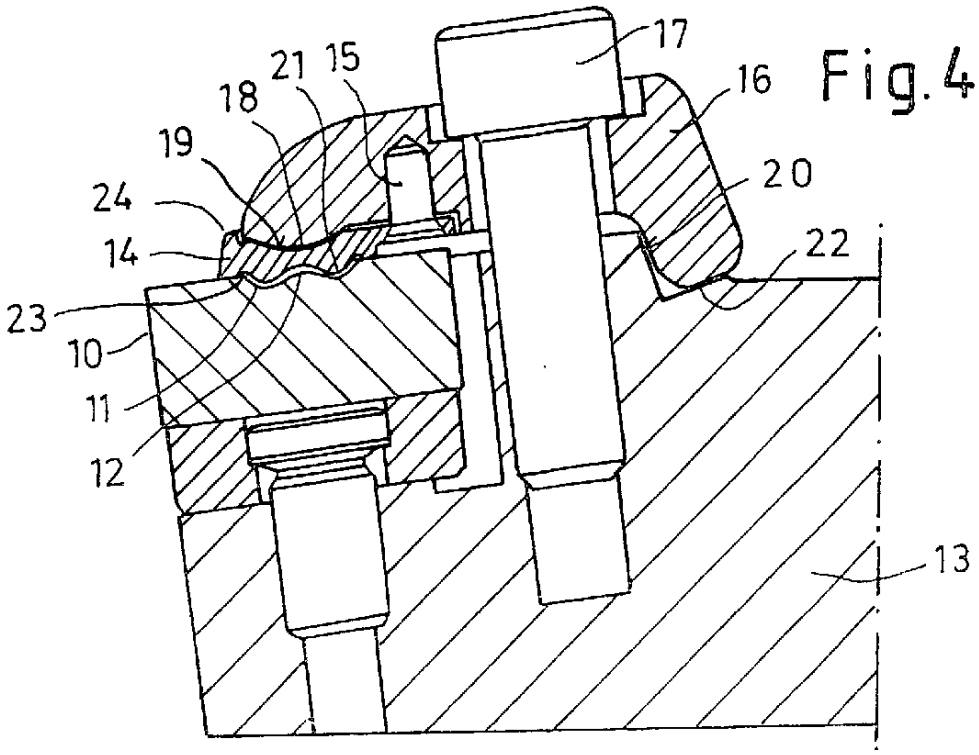


Fig.4

In the tool of D30, cutting is performed by the edge in the transition between the circumferential surface and the surface exhibiting the groove (the upper side of the insert in Figure 4). By contrast, the edges on the opposite side (the lower side in Figure 4) cannot provide any cutting action when the cutting insert is mounted in the tool. This also applies in the case where, as disclosed in claim 14 of D30, the insert is a "Wendeschneidplatte".

Present claim 1 is not directed to a cutting insert but to a tool. Hence, the "cutting edge" in the sense of claim 1 must be able to provide a cutting action when mounted in the tool. Moreover, in the claimed tool one or more cutting edges are formed in the transition between the top side and the circumferential surface. Therefore, the only side of the insert of D30 which can be regarded as the "top side" in the sense of claim 1 is the upper side (in Figure 4).

Conversely, the lower side (in Figure 4) of the insert of D30 represents the bottom side, i.e. the "connecting surface" in the sense of the patent in suit. Said "connecting surface" however, even when it is provided with a groove because the insert is a "Wendeschneid-platte", does not engage with another "connecting surface" with a ridge to be received by the groove.

Hence, the subject-matter of claim 1 is novel over D30.

2.2.2 Claim 8 also requires that a "connecting surface" engages with another connecting surface with a ridge to be received by the groove. Hence, its subject-matter is novel over D30 for the same reasons as given for claim 1.

2.2.3 The subject-matter of claim 15 is directed to a cutting insert with a ridge in the connecting surface. By contrast, as acknowledged by appellant 2, the insert of D30 has a groove in the connecting surface. Hence, the subject-matter of claim 15 is novel over D30.

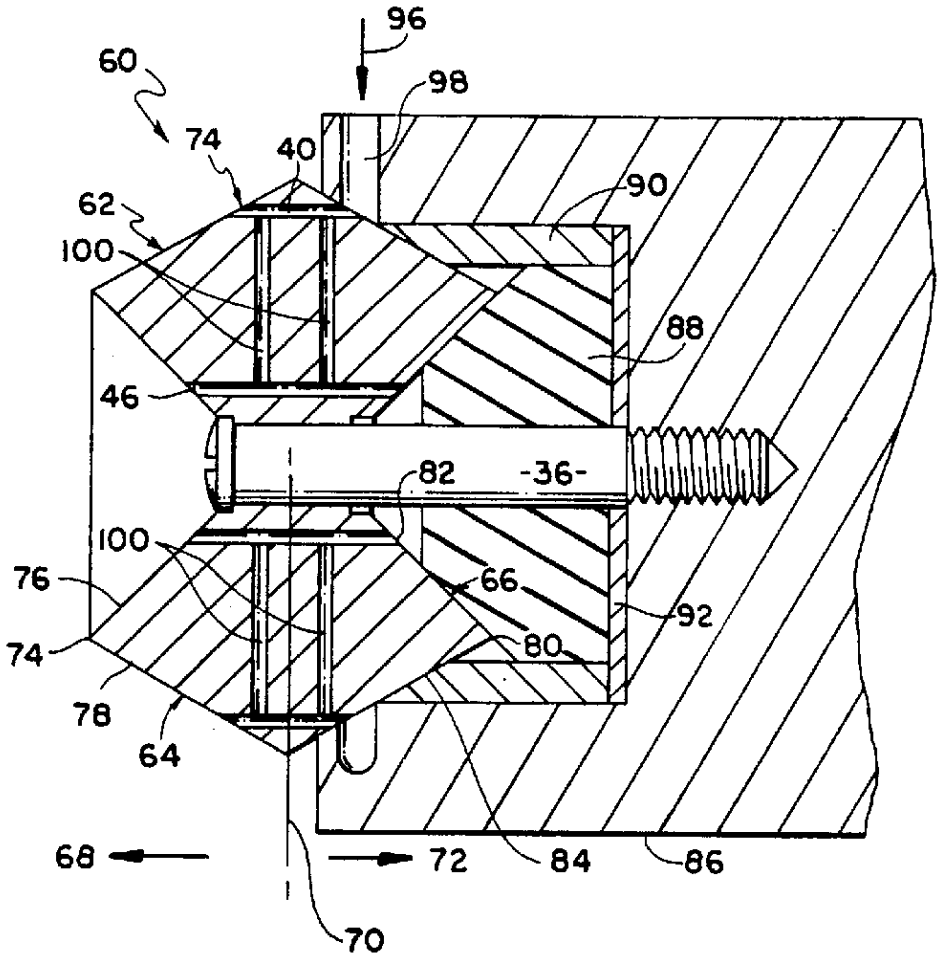
2.2.4 Analogous considerations apply, *mutatis mutandis*, in respect of D31 (see Figures 1, 3 and 5). Hence the subject-matter of claims 1, 8 and 15 is also novel over D31.

2.3 D14

D14 discloses (see Figure 3 reproduced hereafter, as well as Figure 5 and Figure 12) a cutting insert (62) for chip removing machining, comprising a connecting surface (82, 84) for interaction with an analogous connecting surface in a tool part, e.g. a basic body, the cutting insert having a top side, a circumferential surface, and a bottom side, whereby one or more cutting

edges (74) are formed in the transition between the top side (76) and the circumferential surface (78).

FIG. 3



The surfaces 82, 84, which define a cross-section-wise tapering ridge, can be considered to represent the bottom side of the insert and form one of said connecting surfaces. However, since the ridge formed by surfaces 82 and 84 represents the whole connecting surface, it cannot be said that the ridge is in the form of a curve in said connecting surface. Therefore, the subject-matter of claim 15 is novel over D14.

For the same reasons the subject-matter of claims 1 and 8 is also novel over D14.

2.4 D3 (and D2, D5, D6, D17, D18, D19)

2.4.1 D3 discloses (see in particular Figure 1 reproduced hereafter) a cutting compact with a superhard abrasive layer (30) bonded to a substrate layer (20). D3 does not literally disclose that the compact is a tool "for chip removing machining" as stipulated by present claim 1. However, claim 1 does not specify which kind of chip is to be formed, which material is to be worked or which specific machining operation is to be considered. Therefore, the cutting compact of D3, which is suitable not only for subterranean drilling but also for a number of applications, such as cutting, machining, milling and grinding (column 1, lines 12-16), is to be regarded as a tool for chip removing machining in the sense of claim 1.

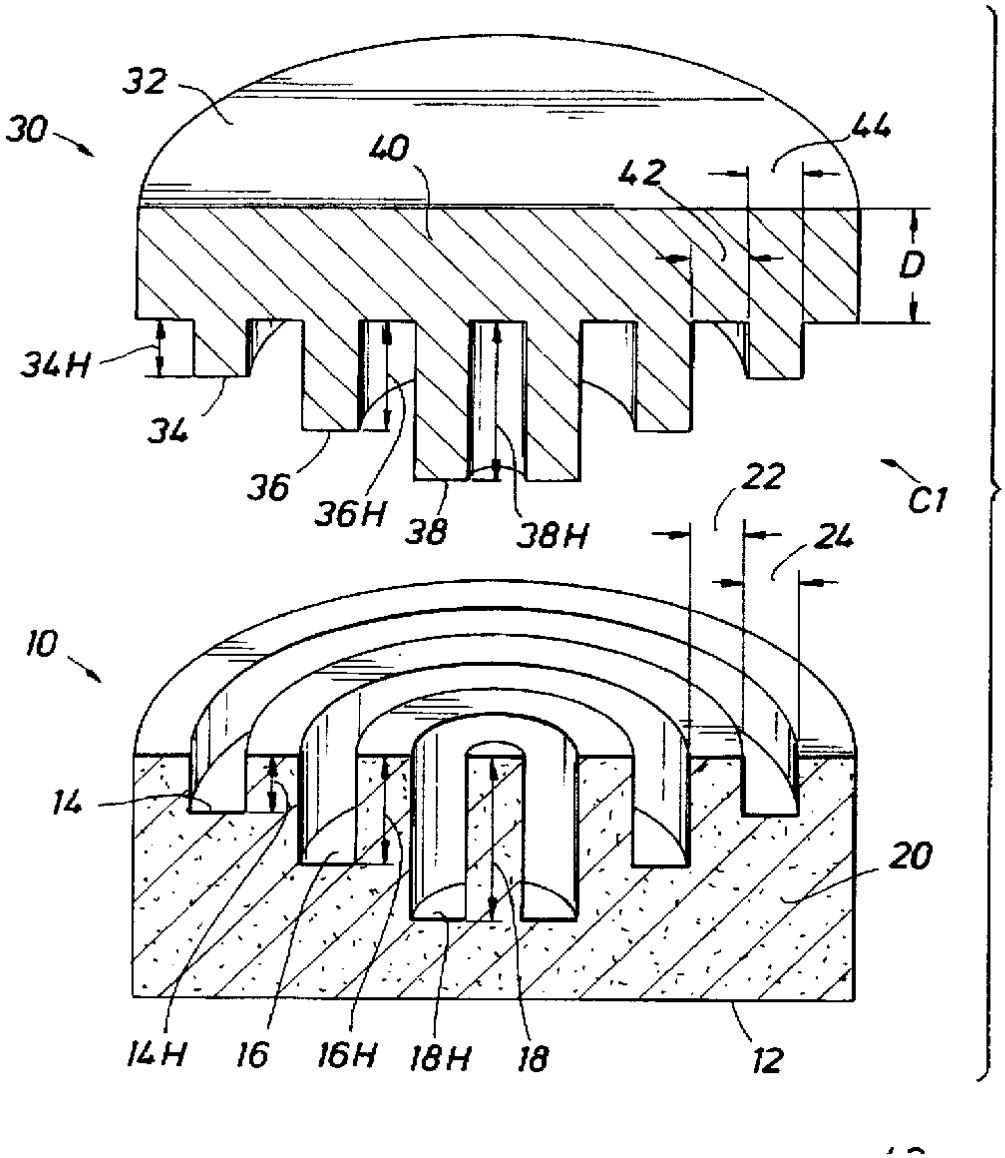


FIG.1

The superhard layer and the substrate shown in Figure 1 have connecting surfaces arranged to engage each other. The superhard layer consists of a flat round body having a top side, a circumferential surface, and a bottom side, whereby one or more cutting edges are formed in the transition between the top side and the circumferential surface, said bottom side forming one of said connecting surfaces. An embodiment shown in Figure 5 exhibits a ridge with a cross-section-wise tapering shape and formed in one of the connecting

surfaces, and a cross-section-wise tapering groove in the second connecting surface, which groove receives the ridge, wherein both the ridge and the groove are in the shape of curves in said connecting surfaces.

The abrasive layer can be bound to the substrate by sintering or sintered bonding (column 1, lines 35-38). Before being bound to the substrate, the (unsintered) abrasive layer does not exhibit enough mechanical stability to perform a cutting operation. A cutting insert, by contrast, exhibits such a mechanical stability, also in the case where it has to be fixed on a tool, for instance by clamping or by brazing, in order to maintain its position. Indeed, document D35, cited by the appellant, also uses the wording "cutting insert" to refer to the whole of the superhard layer and the carbide backing and not only to the superhard layer (see second paragraph on page 754).

Therefore, the abrasive layer of D3 cannot be regarded as a cutting insert. Hence, the subject-matter of claims 1 and 15 is novel over D3.

2.4.2 The same applies in respect of documents D2, D5, D6, D17, D18 and D19 (see abstracts), whose disclosure is similar to that of D3.

2.4.3 Claim 8 does not, unlike claim 1, stipulate that the second part is a cutting insert.

Moreover, the ridges and the grooves of the connecting surfaces of the two parts of the tool of D3 shown in Figures 1 and 5 are circular in shape. A circle is a special type of ellipse having both focal points at the same location. Thus, since the wording of claim 8 is not limited to elliptic curves which are not

rotationally symmetrical, the tool of D3 exhibits all the features recited by claim 8. Hence, the subject-matter of claim 8 lacks novelty in view of D3.

3. Auxiliary request 1 - amendments and novelty

3.1.1 Auxiliary request 1 differs from the main request by specifying, in claim 8, that the two parts are "detachably connected". It is undisputed that this feature is disclosed in the application as originally filed. In particular, it can be found *verbatim* on page 1, lines 14-16. Moreover, all the embodiments described in the application exhibit this feature. Therefore, auxiliary request 1 meets the requirements of Article 123(2) EPC.

3.1.2 The feature introduced in claim 8 provides a difference in respect of the tool of D3, where the two parts are not detachably connected.

The same applies in respect of documents D2, D5, D6, D17, D18 and D19 (see abstract), whose disclosure is similar to that of D3.

Hence, the subject-matter of claim 8 (and claims 1 and 15) is novel.

4. Auxiliary request 1 - inventive step

4.1 It is common ground that D20, in particular Figure 4 (reproduced hereafter), discloses the closest prior art for the subject-matter of claim 8.

Fig. 4

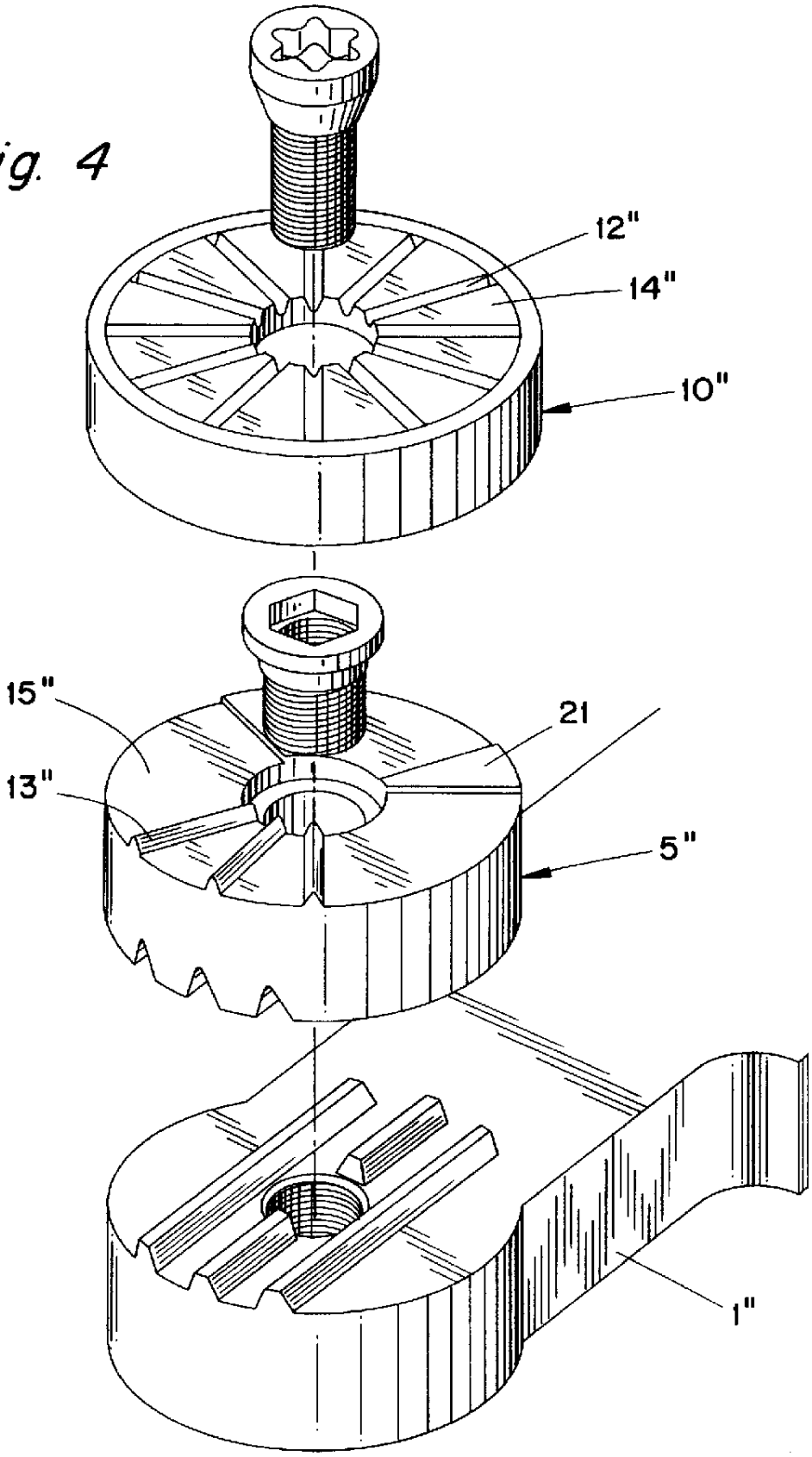


Figure 4 shows an insert holder 1", whose front part comprises a base surface, on which are arranged ribs intended to fit into grooves on the bottom side of a shim 5". A round cutting insert 10" is fastened on the shim 5". A number of radial grooves 12" are arranged on the two opposed main sides of the insert. A number of those grooves enclose an equally large number of ribs 13" on the top side 15" of the shim 5". Thereby, a statically well-defined three-point or three-region abutment is obtained (column 4, lines 32-52).

4.2 In a first approach the two detachably connected parts of present claim 8 may be seen in the holder 1" and the shim 5" of D20. In these parts, the ridges and grooves in the connecting surfaces provide good clamping in respect of forces that act at an angle with the ridges, but do not offer any clamping effect in respect of forces that act parallel to the ridges. The objective problem to be solved can thus be seen, as formulated by appellant 2, in the provision of a tool with an improved connection of the first and the second part.

Alternatively, in a second approach, the two detachably connected parts of present claim 8 may be seen in the shim 5" and the insert 10" of D20. In these parts, because of the radial orientation of the ridges and grooves in the connecting surfaces, good clamping is provided not only in respect of forces that act parallel to the ridges but also in respect of forces acting in different directions. Hence, the objective problem to be solved can be seen, as formulated by appellant 1, in the provision of a tool with an alternative connection of the first and the second part.

Whichever of the approaches above is taken, in D20 the connection must provide a very strong and very stable fastening between two detachably connected parts by clamping (D20, column 2, first paragraph).

4.3 While seeking to improve (cf. first approach above) or provide an alternative to (cf. second approach above) the connection of D20, the person skilled in the art would have no reason to consider the arrangement disclosed in D3. D3 namely discloses parts which are not detachably but permanently bonded. Moreover, the geometry of the ridges and grooves is not chosen to improve clamping stability but rather to increase the surface area and reduce the thermal stresses that may cause delamination of said permanent bond (column 2, lines 20-25, and column 1, lines 35-40). Thus, D3 does not render it obvious to arrive at the subject-matter of claim 8. As a consequence, said subject-matter involves an inventive step.

4.4 The same considerations apply, *mutatis mutandis*, to claims 1 and 15. Therefore, the subject-matter of these claims also involves an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

   Claims: claims 1 to 25 of auxiliary request 1 of 22 December 2016.

   Description: columns 1 and 2 as filed during the oral proceedings, columns 3 to 7 of the patent as granted.

   Drawings: Figures 1 to 11 of the patent as granted.

The Registrar: The Chairwoman:

C. Moser P. Acton

Decision electronically authenticated