BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [ ] To Chairmen
(D) [X] No distribution

D E C I S I O N
of 2 December 2003

Case Number: T 0596/02 - 3.2.7

Application Number: 92118188.9

Publication Number: 0594875

IPC: C23C 30/00

Language of the proceedings: EN

Title of invention:
Multilayer coated hard alloy cutting tool

Patentee:
MITSUBISHI MATERIALS CORPORATION

Opponent:
Sandvik AB

Headword:
-

Relevant legal provisions:
EPC Art. 56, 83, 114

Keyword:
"Fresh ground filed for the first time in appeal proceedings - not admitted"
"Late filed documents - partly admitted into proceedings"
"Inventive step (yes)"

Decisions cited:
G 0001/86, G 0009/91, G 0010/91, G 0004/92, T 0534/89, T 0017/91, T 1002/92, G 0004/95

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0596/02 - 3.2.7

D E C I S I O N
of the Technical Board of Appeal 3.2.7
of 2 December 2003

Appellant: (Proprietor of the patent)
MITSUBISHI MATERIALS CORPORATION
1-5-1, Otemachi
Chiyoda-ku
Tokyo (JP)

Representative:
Hansen, Bernd, Dr. Dipl.-Chem.
Hoffman Eitle
Patent- und Rechtsanwälte
Postfach 81 04 20
D-81904 München (DE)

Respondent: (Opponent)
Sandvik AB
S-811 81 Sandviken (SE)

Representative:
Weber, Dieter, Dr.
Weber, Seiffert, Lieke
Taunusstrasse 5a
D-65183 Wiesbaden (DE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 5 April 2002 revoking European patent No. 0594875 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: A. Burkhart
Members: H. E. Hahn
C. Holtz

Summary of Facts and Submissions

I. The appellant/proprietor lodged an appeal against the decision of the Opposition Division to revoke the European patent No. 0 594 875.

II. An opposition had been filed against the patent as a whole and was based on Article 100(a) EPC (lack of novelty and lack of inventive step).

The Opposition Division held that the subject-matter of the independent claim 1 was novel but lacked an inventive step with respect to the prior art document D2 in combination with D6 and the skilled person's desire to reduce the residual tensile stress in a cutting tool in the light of documents D4, D7 and D11 or in the light of the combination of D2 and D10.

III. The most relevant documents of the prior art submitted are considered to be:

D1: US-A-4 610 931

D2: US-A-4 548 786

D4: US-A-5 123 934

D6: US-A-4 497 874

D7: J. Japan Inst. Metals, Vol. 50, No. 3 (1986), pages 320-327

D10: JP-A-52 096 911 (& English Abstract & English translation thereof)

D12: Tungsten/Molybdenum Industry Association -4th Technical Presentation Meeting, November 20, 1992, Lecture no. 7, "Process of forming Ti(CN) powder", T. Otsuka, pages 1-10 (English translation) & Japanese original, pages 1-9

IV. Oral proceedings were held on 2 December 2003.

(a) The appellant requested that the decision under appeal be set aside and the patent be maintained as granted.

(b) The respondent requested that the appeal be dismissed.

(c) A new ground of opposition under Article 83 was raised by the respondent in a letter of 31 October 2003. The appellant did not accept its admission which was accordingly refused by the Board. Late filed document D12, although not belonging to the relevant state of the art due to the date of the oral presentation concerned, was allowed into the proceedings as an expert opinion of the appellant as well as the submitted comparative experiments, while the late filed document D13 submitted by the respondent was disregarded under Article 114(2) EPC. The issue of inventive step was discussed with respect to the most relevant documents D2 and D6, D4, D7 and D10.

V. The independent claim 1 under consideration reads as follows:

"1. A coated hard alloy cutting tool comprising a plurality of hard coatings formed on a primarily WC substrate material (12) containing Co and comprising Co-enriched surface layers and a core, having a maximum value of Co concentration occurring within a surface layer region of 50 µm from an external surface of said substrate material (12) which is less than 15 wt.-%, whereby the tensile residual stress in said primary coating (13) is not more than 30 kg/mm^2, characterized in that said surface layer region is substantially free of the carbides of Ti, Ta, and Nb containing W; the carbonitrides of Ti, Ta, and Nb containing W; and the nitrides of Ti, Ta, and Nb containing W; and wherein said plurality of surface coatings consist essentially of a primary coating (13) of TiCN deposited on said surface layer, a secondary coating of Al_2O_3 deposited on said primary coating (13), a surface coating consisting essentially of at least one coating of TiCN and TiN deposited on said secondary coating (14) of Al_2O_3."

Claim 1 was divided into features (a) to (f3) by the Opposition Division, which have since been adopted by all parties:

A coated hard alloy cutting tool comprising:

(a) a WC substrate material (12) containing Co and comprising Co-enriched surface layers and a core,

(b) the maximum value of Co concentration occurring within a surface layer region of 50 µm from an external surface of said substrate material (12) is less than 15 wt.%,

(c) a plurality of hard coatings formed on said substrate,

(d) the tensile residual stress in the primary coating (13) is not more than 30 kg/mm^2, said coated hard alloy cutting tool is characterized in that,

(e) said surface layer region is substantially free of the carbides of Ti, Ta, and Nb containing W; the carbonitrides of Ti, Ta, and Nb containing W; and the nitrides of Ti, Ta, and Nb containing W;

(f) said plurality of surface coatings consist essentially of,

(f1) a primary coating (13) of TiCN deposited on said surface layer,

(f2) a secondary coating (14) of Al_2O_3 deposited on said primary coating (13), and

(f3) a surface coating (15) consisting essentially of at least one coating of TiCN and TiN deposited on said secondary coating (14) of Al_2O_3.

VI. The Appellant argued essentially as follows:

Novelty of product claim 1 is undisputed. Feature (f1) is not implicitly included in the disclosure of

document D2 and the common general knowledge referred to by the Opposition Division and the opponent (cf. reasons of the decision, point 4.2) has not been proven by suitable evidence. The same is true with respect to the statements of Dr Åkesson. Document D1 cannot prove the diffusion. Document D12 was submitted as an expert opinion in order to disprove that diffusion at temperatures of about 950-1050°C, which are used for depositing the CVD coatings in accordance with the examples of documents D2/D6, lead to the formation of TiCN. According to document D12 the formation of TiCN from a mixture of TiC and TiN particles by diffusion starts at a temperature of about 1300°C while at 1100°C no TiCN can be detected (cf. page 7, Figure 2) so that it is not credible that the coating of D2/D6 comprises a TiCN layer formed by diffusion. Furthermore, the skilled person would not combine the teachings of documents D2/D6 and D10 (which suggests a TiCN layer) since D2/D6 mentions that tools of competitors having a TiCN transition layer had a much shorter life time than those of D2/D6 (cf. D6, column 6, line 62 to column 7, line 11). The TiC layer, however, is the very essence of the teaching of documents D2 and D6 (cf. D2, column 5, line 53). Thus the disclosures of D2/D6 and D10 are incompatible. Document D4 does not give a reflection of the common general knowledge and remains silent as to the limit of the tensile stress set forth in the claims and aims to solve a different technical problem, namely fracture resistance. Document D7 only states that for TiN the residual stress upon CVD is tensile and upon PVD is compressive which only represents a recommendation for PVD coated specimens. As proven by the comparative tests and particularly the results of the machining tests of the Examples 1 to 3

made in accordance with the invention and comparative Example 1, which has been made in full agreement with the example of D2/D6, and comparative Example 2, which besides comprising a TiCN layer deposited at a temperature of 1100°C is identical with the examples in accordance with the invention, reveal a much better wear width and chipping resistance than the said comparative examples. Therefore an inventive step should be acknowledged.

The introduction of a new ground of opposition under Article 83 shortly before the oral proceedings represents an abuse of procedure, it is additionally not substantiated and should thus not be allowed. In accordance with G 10/91 and G 9/91 this ground should not be introduced. Similarly, the introduction of the late filed document D13 represents an abuse of the procedure and a tactical manoeuvre to bring the patentee into an awkward position very shortly before the oral proceedings. The respondent has neither provided any explanation for the late filing nor is it the result of any late development in this case. Consequently, D13 should also not be allowed. The naming of Dr Åkesson a an expert is also too late and not in line with the principle set forth in G 4/95.

VII. The respondent argued essentially as follows:
Document D2 represents the closest prior art which explicitly discloses the features (a) to (c), (e) and (f3) of claim 1. D2 mentions a multilayer coated cutting insert having instead of a TiCN layer two layers of TiN and TiC (cf. column 5). The Opposition Division stated that it belongs to the common general knowledge that during the heating a diffusion of

nitrogen into the adjacent TiC layer takes place so that the neighbouring TiN and TiC layers form a TiCN layer. Dr Ákesson's statement has only been accepted as a statement on behalf of a party which is also evidenced by D12. Document D12 teaches that diffusion takes place and at highest temperatures a solid solution of TiCN is formed with the highest rate. At lower temperatures the TiCN also forms, but to a lesser extent. Since diffusion is not only temperature but also time dependent it just takes a longer time to achieve the same result. The heating period according to D12 was only 90 minutes while according to the experiments of D6 the total heating time at a temperature between 950-1030°C was 240 minutes (i.e. 2.5 times longer), so that TiCN will form under the conditions of D6. Taking account of the technical teaching of D10 it would be obvious for the skilled person to replace the inner TiN and TiC layers according to D2 by a TiCN layer in order alternatively to improve the wear resistance or the toughness whereby the features (f1) to (f3) are obtained. Feature (d) is not explicitly disclosed in D2 but is rendered obvious by common general knowledge as evidenced by D4. According to D4 ceramic coated cemented carbides have a residual tensile stress which is removed by shot peening (cf. D4, column 2, lines 15 to 24 and lines 54 to 61; column 4, lines 16 to 30; examples) whereby the wear and fracture resistance is improved (cf. column 1, lines 59 to 61). The patent in suit uses the same "shot peening" process to eliminate the tensile stress. The tensile stress limit in claim 1 has no inventive significance since in any case it would be intended to remove the residual tensile stress as much as possible. It is thus obvious to the skilled person to apply the

"shot peening" treatment because he could expect advantages in order to solve the technical problem of the patent in suit, which is to obtain high toughness and wear resistance as well as chipping resistance (cf. patent, page 4, lines 29 to 31).

The new ground of opposition under Article 83 EPC arose from a discussion between the representative and the respondent when preparing for the oral proceedings. New document D13 was submitted as a reaction to the proposed auxiliary requests which comprise a feature from the description. D13 discloses that MT TiCN layers have less residual stress than HT-TiN (cf. page 838, "Residual Stress") and that MT-Ti(C,N) coatings with HT-CVD coatings like TiN or Al_2O_3 opens new possibilities for the development of coated cemented carbides with a broad application field (cf. page 840, left column, first paragraph). According to Figure 8 of D13 an example having the layer order of MT Ti(C,N), Al_2O_3 and TiN is shown (cf. Figure 8). Therefore the skilled person would combine the teachings of documents D2 and D13 and thereby derive the subject-matter of claim 1. The presence of Dr Åkesson as an expert was correctly notified in full agreement with the decision G 4/95.

Reasons for the Decision

Formal issues

Admissibility of late filed documents D12 and D13 and the experimental report

1. Document D12 and the experimental report were submitted by the appellant after a communication of the Board. The first page of document D12 states that the lectures were held on 20 November 1992, i.e. after the filing date of the patent in suit. Consequently, document D12 does not belong to the relevant state of the art. However, D12 describes experiments made with mixtures of TiC and TiN particles at temperatures in the range of 1100-1800°C which appear to disprove the assumption that diffusion leads to the formation of TiCN at a temperature at or below 1100°C. The experimental report was submitted as a reaction to the Board's communication wherein the appellant was invited to do so. Therefore, the Board exercises its discretion under Article 114(1) EPC and allows the introduction of the experimental report and of document D12 as an expert opinion of the appellant.

2. Document D13 was submitted by the respondent for the first time by fax on 1 November 2003, i.e. only one day and a month before the date of the oral proceedings which were arranged for 2 December 2003.

The appellant was informed about this new evidence by a communication dated 6 November 2003 which was stated to have been received on 7 November 2003. The appellant submitted that in the present case with a Japanese patentee, it is practically impossible adequately to discuss document D13 with the patentee and to provide a respective response in good time before the oral proceedings.

It is established case law of the Boards of Appeal that late filed evidence might exceptionally be admitted at the appeal stage, if it can be considered at first sight to be more relevant than the evidence relied on at first instance and to be prejudicial to the maintenance of the patent (see e.g. T 1002/92, OJ 1995, 605, point 3.4 of the reasons). However, it is a primary requirement of inter partes appeal proceedings, because of their judicial character, that all parties involved have the guarantee of a fair and equitable procedure (see G 1/86, OJ 1987, 447, points 13 to 15 of the reasons) and that facts and evidence are brought to the attention of the opposing parties and of the Board in sufficient time for their consideration (see G 4/92, OJ 1994, 149, points 5 to 7 of the reasons).

At the oral proceedings the respondent argued that document D13 was submitted as a reaction to the proposed auxiliary requests which comprised a limiting feature from the description, namely the use of lower CVD temperatures and of acetonitrile as source for the primary TiCN coating. In the circumstances of this case the respondent, though knowing the appellant's arguments at least since the oral proceedings in the opposition procedure on 23 January 2002, waited almost two years till shortly before the arranged oral proceedings before introducing the new document D13. This document could have been introduced into the proceedings at a much earlier stage, particularly since the use of said lower temperature CVD process including the use of acetonitrile represents an essential element of the invention of the patent in suit which directly (i.e. in the as-deposited state) leads to a tensile residual stress of less than 30 kg/mm^2, as proven by the

examples (cf. patent, page 6, lines 39 to 41; page 7, Table 1). Hence such an amendment was predictable.

The Board finds that the introduction of evidence at a very late stage of the proceedings which could have been filed much earlier, used as a strategic measure for improving its own case against the opposite party, amounts to an abuse of procedural rights and therefore should be dismissed independently of the possible relevance of the evidence (see T 534/89, OJ 1994, 464, points 2.5 to 2.7 of the reasons, and T 17/91, not published in OJ, point 5 of the reasons).

Additionally, the Board after having heard the parties examined document D13 with respect to its relevance and came to the conclusion that document D13 is *prima facie* not relevant.

As a consequence the Board exercises its discretion and disregards the document D13 in accordance with Article 114(2) EPC.

New ground of opposition

3. The new ground of opposition under Article 83 EPC was also mentioned for the first time in the appeal procedure one day before the time limit set for further submissions before the oral proceedings.

The introduction of new grounds of opposition is governed by G 9/91 (OJ 1993, 408, see in particular point 10) and G 10/91 (OJ 1993, 420, see in particular points 16 and 18). A board of Appeal may only allow the introduction of a new ground of opposition with the

consent of the proprietors of the patent (cf. Case Law of the Boards of Appeal of the European Patent Office, 4th edition, 2001, page 479, second paragraph).

Relying on G 9/91 and G 10/91, the proprietor protested against introduction of this fresh ground. Under G 9/91 and G 10/91 the Board has no discretion to allow a belated ground for opposition into the proceedings.

4. The appellant requested that Dr Åkesson not be allowed to make contributions during the oral proceedings because his nomination as an expert was too late and not in agreement with decision G 4/95.

The Board rejected this request as the presence of Dr Åkesson as an expert had been notified on the last day for making further submissions as set out in the Board's communication. His qualifications were mentioned as well as the intended topics of measurement of tensile residual stress and of the migration of carbon and nitrogen between adjacent layers of TiN and TiC. Furthermore, the presence of Mr Åkesson was counter-balanced by the presence of an inventor on the side of the appellant. Mr Åkesson was therefore allowed to make technical submissions in full agreement with decision G 4/95 (cf. OJ 1996, 412).

Novelty

5. Novelty of the subject-matter of product claim 1 was undisputed and the Board concurs with the Opposition Division's view that the product of claim 1 is novel since it differs in at least features (d) and (f) (compare point 7.3 down below) from the submitted prior

art, and particularly the closest prior art according to document D2 (cf. reasons of the decision, points 3, 3.1 and 4.2).

6. The Board therefore concludes that the subject-matter of claim 1 is novel with respect to the prior art of the submitted documents.

Inventive step

7. *Closest prior art*

7.1 It is undisputed that document D2 represents the closest prior art which reveals the features (a) to (c), (e) and (f3) of claim 1.

7.2 The Opposition Division in its decision relied on common general knowledge known to the Opposition Division and to the opponent's expert Dr Åkesson (cf. reasons, point 4.2) and came to the conclusion that feature (f1) would be implicitly included in the disclosure of documents D2 and D6 due to the diffusion of nitrogen from the described thin TiN layer into the thick TiC layer at the mentioned CVD deposition temperature of 1100°C which would result in the formation of TiCN.

The Board does not share this view for the following reasons.

Firstly, the respondent failed to submit any evidence, although it was invited by the Board to do so, in support of its and the Opposition Division's allegation that at a temperature of 1100°C the diffusion of carbon and/or nitrogen from one layer to the other results in the formation of TiCN. If this diffusion actually belongs to common general knowledge then it should have been easy for the respondent to submit at least one piece of written evidence in order to support the oral statements made by its expert Dr Åkesson. The expert stated before the Board that at least at the grain boundaries of said TiN and TiC layers a diffusion of carbon would take place resulting in TiCN. However, the respondent has not proven this alleged diffusion.

Secondly, the Board concurs with the appellant that the passage of D1 quoted by the Opposition Division (cf. reasons, point 4.2; D1, column 4, lines 12 to 52) actually relates to a sintering step of cemented carbide substrates at a temperature within the range of 1285-1540°C (most preferably 1370-1500°C; cf. column 5, lines 24 to 27 and lines 34 to 37) which is at least about 185 to 540°C above the CVD temperature ranges as disclosed in the cross-referenced D6 (cf. column 5, lines 48 to 58; column 6, lines 3 to 7; Examples II to III). The sinter process utilizes totally different process conditions including a binder phase at much higher temperatures and thus is not comparable with the conditions of a CVD process. Hence document D1 cannot prove a diffusion at CVD deposition conditions of about 1100°C.

Similarly, the Japanese document D7 fails to prove such a diffusion at 1100°C since the only English passages thereof (abstract and description of the figures) although mentioning a diffusion of carbon from the substrate into the TiN coating layer does not mention the temperatures used for the CVD coating process but only mentions annealing temperatures.

Finally, the Board concurs with the appellant that document D12 disproves that a substantial diffusion, which would result in the formation of a TiCN layer, takes place at temperatures of about 950-1050°C, which are used for depositing the CVD coatings in accordance with the examples of documents D2/D6 and which are below said temperature of 1100°C. As is derivable from document D12 the formation of TiCN from a mixture of TiC and TiN particles by diffusion starts at a temperature of about 1300°C while at 1100°C no TiCN can be detected (cf. page 7, Figure 2). Therefore it is not considered to be credible that the coating of D2/D6 comprises a TiCN layer formed by diffusion. In this context it is remarked that according to document D2 each coating layer TiN, TiC, TiN shall be laid down as an independent layer and the process is sharply altered when depositing the different layers (cf. D6, column 5, lines 29 to 35) which is interpreted to mean that no graded layers between said coating layers, such as a TiCN layer, are desired. And even if it is assumed that some TiCN could be formed at the grain boundaries between adjacent TiN and TiC layers it will not represent a primary coating layer in the sense of claim 1 of the patent in suit which according to the examples has to be interpreted as meaning a thickness of 5 µm and 8.5 µm (cf. patent, Examples 1 to 16).

7.3 Consequently, the subject-matter of claim 1 is considered to differ from the closest prior art document D2 in features (d), (f1) and (f2).

8. *Problem to be solved*

The Board concurs with the appellant that the problem to be solved is to provide a hard alloy cutting tool of high toughness having a multilayer surface coating having good adhesion, and having good wear and chipping resistance (cf. patent, page 2, lines 7 to 8; page 4, lines 29 to 31).

9. *Solution to the problem*

The problem is solved by a cutting tool as defined in claim 1 wherein the tensile residual stress of a primary coating layer has been limited to a specific value (feature (d)) and wherein a specific layer structure including the primary TiCN layer and the secondary Al_2O_3 layer has to be present (features (f1) and (f2)).

As demonstrated by the machining results of comparative experiments of cutting tools made in accordance with the invention with comparative samples which include a sample made in full accordance with the closest prior art D2/D6 (comparative Example 1) as submitted by the appellant with letter of 14 October 2004 it is credible that the claimed measures provide an effective solution to the technical problem (cf. Tables 1 to 4 and Figures 1 to 2).

In this context the Board cannot accept the respondent's arguments that the patent would not show that the value of the tensile residual stress of 30 kg/mm^2 is critical. The examples and particularly the comparative Examples E to G of the patent in suit as well as the said comparative experiments (comparative Examples 2 to 3) clearly prove the opposite (cf. patent, Table 3), i.e. that a tensile residual stress of 30 kg/mm^2 or more results in a worse wear width and a shorter time until the occurrence of chipping.

10. The Board considers that the subject-matter of independent claim 1 is not obvious for the person skilled in the art for the following reasons:

10.1 The respondent argued that the skilled person would combine the teachings of documents D2 and D10 and additionally would apply the tensile stress releasing treatment according to D4 in order to keep the tensile residual stress of the coating at a low level to thereby solve the technical problem.

10.2 Document D10 suggests a TiCN layer on cemented carbides as replacement for a TiC layer or a TiN layer in order to overcome the disadvantages of the TiC or TiN layer (cf. page 2, lines 1 to 14 and lines 26 to 31) and in order to provide a cutting tip having prolonged tool life (wear resistance and toughness) and being capable of being used under severe conditions (cf. page 3, lines 5 to 15). The said cutting tool according to D10 thus comprises a primary coating of TiCN and a secondary coating of Al_2O_3.

10.3 As already concluded (cf. point 7.3 above), document D2 as well as the cross-referenced D6 do not disclose any TiCN layer in their multilayer coatings. Said coatings preferably comprise a first layer of TiN with a second layer of TiC and a third layer of Al_2O_3 with a final TiN layer. The TiC layer represents the most essential layer (cf. D2, column 5, line 45 to column 6, line 14; and D6, column 4, lines 48 to 56 and lines 63 to 68). The cross-referenced document D6 describes that commercial cutting tool inserts according to D6 having a thick TiC coating of about 7 µm on the TiN underlayer were compared with inserts of competitors which have a TiC layer of less thickness and which generally utilize a significant Ti(CN) transition region between layers. This comparison resulted in positive comparative remarks with regard to materials being cut and speed and feed factors were given at a ratio of 2 to 1 in favour of the inserts of document D6 (cf. column 6, line 62 to column 7, line 13). From the context of said passage it appears that the said inserts of competitors comprised cemented carbide substrates having the Co-enriched layer as required by claim 1. This passage of document D6 actually suggests to the skilled person the opposite of using a TiCN primary layer, namely the use of a thick TiC layer which represents the primary coating layer in the sense of the patent in suit.

Furthermore, it has to be considered that document D10 dates back to 1977 while both documents D2 and D6 are from 1985. During the intervening eight years the technology has progressed, as can be seen from the type of cemented carbides used as the substrates, and thus documents D2/D6 represent a much more recent technology.

Therefore the Board considers that the skilled person taking account of the implicit suggestion not to use TiCN in the cross-referenced documents D2/D6 and taking into account that they are more recent would not combine documents D2 and D10. Consequently, the skilled person would not arrive at a cutting tool having a cemented carbide with a Co-enriched layer in accordance with D2 in combination with a multilayer coating of a first layer of TiN, a primary layer of TiCN, a secondary layer of Al_2O_3 and a final layer of TiN.

10.4 Consequently, the Board considers that even if the skilled person would apply the shot peening treatment according to document D4 (cf. column 1, lines 62 to 65; column 2, lines 15 to 24 and lines 54 to 61) onto the cutting tools of documents D2/D6 in order to release the tensile residual stress thereof (which is interpreted as reducing said stress to a value as low as possible to thereby improve the fracture resistance), as argued by the respondent, he would not arrive at the subject-matter of claim 1, but at cutting tools having a primary layer of TiC.

11. The subject-matter of independent claim 1 thus involves an inventive step within the meaning of Article 56 EPC.

The same applies to the subject-matter of the dependent claims 2 to 13 which define further preferred embodiments of the product according to claim 1.

Order

For these reasons it is decided that:

1. The appealed decision is set aside.

2. The patent is maintained as granted.

The Registrar: The Chairman:

D. Spigarelli A. Burkhart