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Datasheet for the decision of 24 March 2015

Case Number: T 0898/11 - 3.3.02

Application Number: 00945875.3

Publication Number: 1179084

IPC: C12P13/08, C12P13/06, C12N15/77

Language of the proceedings: EN

Title of invention:
PROCESS FOR THE FERMENTATIVE PREPARATION OF L-AMINO ACIDS WITH AMPLIFICATION OF THE TKT GENE

Patent Proprietors:
Evonik Degussa GmbH
National University of Ireland

Opponent:
Paik Kwang Industrial Co., Ltd.

Headword:
Preparation of L-lysine with amplification of tkt gene/EVONIK DEGUSSA

Relevant legal provisions:
EPC Art. 123(2), 83, 56
RPBA Art. 12(4), 13(1)

Keyword:
Main request - requirements of the EPC met (yes)

Decisions cited:

Catchword:

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Case Number: T 0898/11 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 24 March 2015

Appellant: (Patent Proprietor 1)	Evonik Degussa GmbH Rellinghauser Strasse 1-11 45128 Essen (DE)
Appellant: (Patent Proprietor 2)	National University of Ireland Galway (IE)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted on 14 January 2011 concerning maintenance of the European Patent No. 1179084 in amended form.**

Composition of the Board:

Chairman	U. Oswald
Members:	K. Giebeler
	R. Cramer

Summary of Facts and Submissions

I. European patent No. 1 179 084, based on European patent application No. 00945875.3 (published as WO 01/68894) and entitled "Process for the fermentative preparation of L-amino acids with amplification of the tkt gene", was granted with four claims.

II. Claims 1, 3 and 4 of the application as filed read:

"1. A process for the preparation of L-amino acids by fermentation of coryneform bacteria which comprises carrying out the following steps:
a) fermentation of the desired L-amino acid producing bacteria in which at least the tkt gene is amplified,
b) concentration of the L-amino acid in the medium or in the cells of the bacteria and
c) isolation of the L-amino acid produced."

"3. A process as claimed in claim 1, wherein coryneform bacteria which prepare L-threonine, L-lysine or L-isoleucine are used."

"4. A process as claimed in claim 3, wherein coryneform bacteria which prepare L-lysine are used."

III. The claims as granted read:

"1. A process for the preparation of L-Lysine, using a coryneform bacterium producing L-Lysine which comprises carrying out the following steps:
a) amplification of at least the tkt gene coding for transketolase in said coryneform bacterium,
b) fermentation of the bacterium of a) in a medium,
c) concentration of L-Lysine in the medium or in the cells of the coryneform bacterium, and

d) isolation of L -Lysine produced,
wherein, during said fermentation, the concentration of L-Lysine increases above the level obtained with a coryneform bacterium, in which the tkt gene is not amplified.

2. A process as claimed in claim 1, wherein in the coryneform bacterium one or more genes chosen from the group consisting of
2.1 the dapA gene which codes for dihydrodipicolinate synthase
2.2 the zwf gene which codes for glucose 6-phosphate dehydrogenase,
2.3 the gnd gene which codes for 6-phosphogluconate dehydrogenase,
2.4 the eno gene which codes for enolase
is or are amplified or over-expressed at the same time.

3. A process as claimed in claim 1, wherein in the coryneform bacterium one or more genes chosen from the group consisting of,
3.1 the pck gene which codes for phosphoenol pyruvate carboxykinase,
3.2. the pgi gene which codes for glucose 6-phosphate isomerase,
3.3 the poxB gene which codes for pyruvate oxidase, is or are attenuated at the same time.

4. A process as claimed in claims 1 to 2, wherein to achieve the amplification, the number of copies of the genes or nucleotide sequences is increased by transformation of the microorganisms with plasmid vectors which carry these genes or nucleotide sequences."

IV. The patent was opposed by two parties. The grounds for opposition were lack of novelty and inventive step (Article 100(a) EPC), insufficiency of disclosure (Article 100(b) EPC) and added subject-matter (Article 100(c) EPC). Opponent 02 withdrew its opposition before the opposition division took its decision.

V. In its interlocutory decision posted on 14 January 2011, the opposition division held that auxiliary request 5 met the requirements of the EPC. Furthermore, the opposition division considered that the main request (claims as granted) and the first and second auxiliary requests did not comply with Article 83 EPC, and that the third and fourth auxiliary requests did not meet the requirements of Article 84 EPC.

VI. The patent proprietors and the remaining opponent lodged appeals against this interlocutory decision.

VII. Oral proceedings before the board were held on 24 March 2015.

VIII. The following documents are mentioned in this decision:

D2: Appl. Microbiol. Biotechnol. (1999) 51: 201-206
D3a: EP 0 733 712 A1
D5: Biotechnol. Bioeng. (1996) 49: 111-129
D8: EP 0 600 463 B1
D10: Römpp Lexikon Biotechnologie und Gentechnik, Georg Thieme Verlag 1999, pages 593-594
D11b: Experimental data filed by BASF SE on 27 December 2010
D12: Experimental data filed by the proprietors on 12 August 2010

D22: Experimental data filed by the proprietors with grounds of appeal
D24: Experimental data filed by appellant-opponent on 6 October 2011
D28: Biotechnol. Lett. (1991) 13: 727-732
D29: Biotechnol. Genet. Eng. Rev. (1984) 2: 101-120
D30: J. Gen. Microbiol. (1993) 139: 3115-3122

IX. The appellant-opponent's arguments, insofar as they are relevant for the present decision, can be summarised as follows:

Admissibility of documents D28 to D30

Documents D28 to D30 should not be admitted into the proceedings since they had been filed at a very late stage of the proceedings and without any explanation as to why they could not have been filed earlier.

Main request (claims as granted)

Added subject-matter (Articles 100(c) and 123(2) EPC)

Claim 1 extended beyond the application as filed, because it comprised a combination of features which were arbitrarily selected from different passages and lists of the original application. A first selection was made by singling out the amino acid L-lysine, and a second selection was made by selecting coryneform bacteria producing L-lysine. Furthermore, the feature that, during the fermentative process, the concentration of L-lysine increases above the level obtained with a coryneform bacterium in which the transketolase gene is not amplified was only disclosed in the examples and only in the context of using very specific conditions, media, timing and strains. The

term "improvement" referred to in the general part of the application as filed not only covered an increased concentration, but for instance also the cases where the same amount was produced at an earlier time or where fewer side-products were formed. Claim 2 constituted a selection of four genes out of a list of ten genes, without there being any basis for this selection in the application as filed.

Sufficiency of disclosure (Articles 100(b) and 83 EPC)

The claimed invention could not be carried out over the whole scope of the claims without undue burden; the breadth of claim 1 did not reflect the actual contribution that the patent made to the art. The effect referred to in claim 1 could not be achieved with any coryneform bacteria producing L-lysine, as was apparent from document D2 which disclosed that the *C. glutamicum* strain SL64 when over-expressing the transketolase gene produced less L-lysine than the control. Moreover, document D11b showed that the L-lysine over-producing strains LU11716 and LU11424 when over-expressing the transketolase gene produced less L-lysine than the controls in most cases. Since the exact genetic background of the strains used in the examples of the patent in suit was not disclosed, the skilled person would be at a loss to select suitable strains. Furthermore, document D24 showed that the claimed effect could not be achieved when using the wild-type strain *C. glutamicum* ATCC13032, although the patent in suit described said strain as preferred. This provided further proof that the claimed invention was not reproducible.

Inventive step (Articles 100(a) and 56 EPC)

The claimed subject-matter was obvious in view of the closest prior art document D3a, alone or in combination with document D5. Document D8 provided further confirmation of this obviousness.

X. The appellant-proprietors' arguments, insofar as they are relevant for the present decision, can be summarised as follows:

Admissibility of documents D28 to D30

Documents D28 to D30 should be admitted into the proceedings because they were relevant with respect to the nomenclature used by the skilled person, especially documents D28 and D29 relating to co-producers. The documents had been filed one month before the oral proceedings, giving the appellant-opponent enough time to study them.

Main request (claims as granted)

Added subject-matter (Articles 100(c) and 123(2) EPC)

No selection from more than one list was necessary in order to arrive at the claimed subject-matter directly and unambiguously, having regard to the application as filed. The functional feature relating to an increase of the concentration of L-lysine was not only disclosed in the examples, but was also derivable from page 1, line 23, and page 10, lines 5-7 of the application as filed. Furthermore, the skilled person knew from numerous prior art documents that the expected improvement was an increase of the concentration of L-lysine.

Sufficiency of disclosure (Articles 100(b) and 83 EPC)

The claimed invention could be performed over the whole scope of the claims. Document D2 was not relevant in the context of sufficiency of disclosure, because strain SL64 described therein was not covered by claim 1. It could not be explained why the experiments described in document D11b did not work. Document D24 demonstrated that the claimed invention even worked for wild-type strains.

Inventive step (Articles 100(a) and 56 EPC)

The claimed subject-matter involved an inventive step since it could not be expected from the prior art that the amplification of the transketolase gene would influence the L-lysine production of coryneform bacteria.

XI. The final requests of the parties were as follows:

The appellant-proprietors requested that the decision under appeal be set aside and that the patent be maintained as granted (main request), or alternatively that it be maintained in amended form on the basis of one of auxiliary requests 1 to 3 as submitted with the letter of 23 February 2015.

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

Reasons for the Decision

1. The appeals are admissible.

2. Non-admittance of late-filed documents

The appellant-proprietors submitted documents D28, D29 and D30 one month before the oral proceedings in order to support their argumentation that the prior art made a distinction between the term "producer" on the one hand and the terms "co-producer" or "wild-type" on the other. Since the appellant-proprietors failed to show that the documents could not have been filed earlier, and since said documents were not more relevant than the documents already on file, it was decided not to admit the documents into the proceedings (Articles 12(4) and 13(1) RPBA)

Main request (claims as granted)

3. Added subject-matter (Articles 100(c) and 123(2) EPC)

3.1 The appellant-opponent submitted that claim 1 did not fulfill the requirements of Article 123(2) EPC, because the combination of the preparation of L-lysine with the use of a coryneform bacterium producing L-lysine was not disclosed in the application as filed.

3.1.1 The board cannot agree. Claim 1 of the application as filed is directed to a "process for the preparation of L-amino acids by fermentation of coryneform bacteria" and refers to the step of "fermentation of the desired L-amino acid-producing bacteria (...)". Dependent claim 3 of the application as filed states that coryneform bacteria which prepare L-threonine, L-lysine

or L-isoleucine are used, and claim 4, which is dependent on claim 3, specifies that coryneform bacteria which prepare L-lysine are used. There can be no doubt for the skilled person that the fermentation of coryneform bacteria which produce L-lysine will result in the preparation of L-lysine. Therefore, the application as filed provides a direct and unambiguous disclosure of a process for the preparation of L-lysine using a coryneform bacterium producing L-lysine.

3.2 The appellant-opponent furthermore submitted that the feature in claim 1 relating to the increase of the concentration of L-Lysine during fermentation above the level obtained with a coryneform bacterium in which the transketolase gene is not amplified constituted an unallowable generalisation of a feature taken from the examples, which had the consequence that the claimed subject-matter extended beyond the content of the application as filed.

3.2.1 Page 2, lines 1-5 of the application as filed states that the object of the invention was to provide "improved processes" for the fermentative preparation of L-lysine, L-threonine and L-isoleucine with coryneform bacteria, and page 4, lines 7-9 states that it was found that coryneform bacteria produced L-amino acids in an "improved manner" after over-expression of the transketolase gene, without however specifying the exact kind of improvement achieved.

Example 4 of the application as filed describes the transformation of two L-lysine producing *Corynebacterium glutamicum* strains with a plasmid carrying the transketolase gene, and the culturing of the resulting strains in order to prepare L-lysine; Table 1 shows that for both strains, the concentration

of L-lysine formed was increased above the level obtained with the corresponding strains that were not transformed with the plasmid carrying the transketolase gene. Similarly, Example 9 discloses that a *C. glutamicum* strain lacking a functional poxB gene and transformed with a plasmid carrying the transketolase gene resulted in an increased concentration of L-lysine when compared to the level obtained with the corresponding strain that was not transformed with the plasmid (see Table 2). Said examples thus show that the amplification of the transketolase gene resulted in an improved process, the improvement being an increase of the concentration of L-lysine above the level obtained without amplification of the transketolase gene.

In view of this disclosure, the board is convinced that a skilled person reading Examples 4 and 9 as well as the general part of the application as filed would immediately understand that if coryneform bacterial strains, culture conditions, media or measurement times other than those of the examples were used, then this could affect the exact values of measured L-lysine concentrations, but not the nature of the expected improvement, i.e. the improvement caused by the amplification of the transketolase gene would always be expected to lie in an increase of the concentration of L-lysine, and not in some other improvement such as a higher purity or an earlier accumulation of unchanged amounts. A skilled person would thus immediately recognise without any doubt that the increased concentration of L-lysine is not inextricably linked to the other characteristics of the examples. Therefore, the skilled person would apply the feature of an increased concentration of L-lysine directly and unambiguously to the more general context.

It follows that the subject-matter of claim 1 does not extend beyond the content of the application as filed.

3.3 The appellant-opponent further submitted that dependent claim 2 did not comply with Article 123(2) EPC, because page 7, lines 4-27 of the application as filed referred to ten genes which could be over-expressed, whereas claim 2 only referred to four out of those ten genes, without there being a basis for this selection in the application as filed.

3.3.1 The board notes that the deletion of the six genes from the original list of ten genes does not result in any singling out of a combination not originally disclosed. Therefore, the subject-matter of claim 2 is directly and unambiguously derivable from the application as filed.

3.4 Consequently, the claims of the main request fulfill the requirements of Article 123(2) EPC.

4. Sufficiency of disclosure (Articles 100(b) and 83 EPC)

4.1 Claim 1 relates to a process for the preparation of L-lysine using a coryneform bacterium producing L-lysine, said process comprising the step of amplification of at least the transketolase gene, and wherein, during the fermentation, the concentration of L-lysine increases above the level obtained with a coryneform bacterium in which the transketolase gene is not amplified.

4.2 Examples 4 and 9 of the patent in suit show that *C. glutamicum* strains in which the transketolase gene was amplified produce an increased concentration of L-lysine when compared to the level obtained with the

corresponding strains in which the transketolase gene was not amplified (cf. point 3.2.1 above). This disclosure has not been contested by the appellant-opponent.

4.3 The appellant-opponent has submitted that the claimed process was not sufficiently disclosed, because the desired effect, namely that the concentration of L-lysine increases above the level obtained with a coryneform bacterium in which the transketolase gene is not amplified, could only be achieved in very specific cases and not over the whole scope of the claim. In order to support its argumentation, the appellant-opponent has referred to documents D2, D11b and D24.

4.4 Document D2 is a scientific publication belonging to the prior art of the patent in suit and relating to the cloning of the transketolase gene and its expression in *C. glutamicum*. The document reports that the over-expression of transketolase in a tryptophan and lysine co-producing strain of *C. glutamicum* designated SL64 resulted in increases in tryptophan production along with a concomitant decrease in lysine production (see abstract and Table 1).

4.4.1 The board considers that strain SL64 as disclosed in document D2, which strain produces both tryptophan and lysine, is a "coryneform bacterium producing L-lysine" in the sense of claim 1, and that the document thus shows that the effect specified in claim 1 cannot be achieved with said strain.

However, document D2 was published before the priority date of the patent in suit and is cited therein, and a skilled person reading the disclosure of the patent in suit would thus be well aware of the fact that bacteria

producing more than one amino acid (so-called co-producers) represent an exceptional case for which the desired improvement of an increased concentration of L-lysine following the amplification of the transketolase gene could not be expected in the same way as for bacteria which produce only L-lysine. Therefore, the non-suitability of such co-producing strains for the claimed process would not come as a surprise to the skilled person, and he/she would be able to select other, suitable L-lysine producing strains and reproduce the claimed invention without undue burden or inventive skill. The board is thus convinced that document D2 is not prejudicial to the enablement of the claimed invention.

4.5 Document D11b is a report on experiments carried out by former opponent 02. In these experiments, the transketolase gene was over-expressed in two lysine producing strains of *C. glutamicum* derived from stain ATCC13032, and cultivated either in "MM" medium (the medium also used in Examples 4 and 9 of the patent in suit) or in "FPK" medium. Table E shows the results for the measurements of the lysine production after 24, 48 and 72 hours. It can be seen that in 10 out of 12 measurements, over-expression of the transketolase gene resulted in a decreased concentration of lysine below the concentration obtained for the corresponding control in which the transketolase gene was not over-expressed.

As counter-evidence, the appellant-proprietors have submitted experimental reports D12 and D22, which describe experiments carried out with lysine producing *C. glutamicum* strains derived from stain ATCC13032, whereby it was shown that in all cases, over-expression of the transketolase gene resulted in an increased

concentration of lysine above the concentration obtained for the corresponding control in which the transketolase gene was not over-expressed.

The board is thus confronted with experimental reports which have contradictory results. Whereas strains derived from *C. glutamicum* strain ATCC13032 cultivated in MM medium when over-expressing the transketolase gene were found to produce increased concentrations of lysine in the experiments of documents D12 and D22, the experiments of document D11b found that such strains did not produce increased concentrations of lysine. It appears that neither the kind of strain nor the medium used is responsible for the differing results, since in all three experimental reports, strains derived from *C. glutamicum* ATCC13032 cultivated in MM medium were examined. It remains open whether other characteristics, parameters or conditions were responsible for the failure to obtain an increased concentration of L-lysine in the experiments of document D11b, but it is not possible to draw any conclusion in this regard on the basis of the technical information on file.

In this situation, the contents of document D11b cannot provide the board with serious doubts, substantiated by verifiable facts, that the claimed process lacks enablement in the sense that the skilled person would not be able to achieve the specified improvement over the whole area claimed without undue burden or the application of inventive skill.

4.6 Document D24 is a report on experiments carried out by the appellant-opponent. The experiments examine the L-lysine productivity of the wild-type strain ATCC13032 of *C. glutamicum* when the transketolase gene was over-

expressed. Table 2 shows that the strain over-expressing the transketolase gene produces similar amounts of L-lysine as the wild-type strain and as the wild-type strain carrying the empty plasmid. However, the appellant-proprietors have pointed out that in Table 2, the optical density (OD) of the transketolase-over-expressing stain was noticeably lower than the optical densities of the other two strains, which means that the specified L-lysine concentration was produced at a lower cell density, i.e. by fewer cells. The board can follow the appellant-proprietors' argumentation that if a comparison is made on the basis of equal amounts of cell mass, which is what a skilled person would do in view of his/her common general knowledge, then the result was that more L-lysine was produced by the transketolase-over-expressing stain. It follows that the evidence provided by document D24 supports rather than prejudices the enablement of the claimed invention.

4.7 In the absence of any serious doubts, substantiated by verifiable facts, the board concludes that the claimed invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person as required by Article 83 EPC.

5. Novelty (Articles 100(a) and 54 EPC)

The appellant-opponent has not objected to the novelty of the claimed subject-matter, and the board sees no reason to raise any such objection either.

6. Inventive step (Articles 100(a) and 56 EPC)

6.1 The closest prior art is represented by document D3a, which relates to methods for producing a target

substance using a microorganism; the target substance may be an L-amino acid such as L-lysine and the microorganism may be a coryneform bacterium (see claims 1, 3 and 5). The document stresses the role of the coenzyme NADPH as reducing substance in the biosynthesis of substances such as L-amino acids, and states that NADPH is mostly prepared in the pentose phosphate cycle (page 3, lines 11-21). It is hypothesised that if intracellular NADH could be efficiently converted into NADPH by utilising the enzyme transhydrogenase, then target substances would be produced at a higher productivity (page 3, lines 36-39). Example 3 confirms that an L-lysine producing coryneform bacterium in which a transhydrogenase gene was amplified produced an increased concentration of L-lysine when compared to the corresponding bacterium in which the transhydrogenase gene was not amplified.

6.2 In view of this disclosure, the technical problem to be solved can be formulated as the provision of an alternative process for the preparation of L-lysine.

6.3 As a solution to this problem, claim 1 proposes a process for the preparation of L-lysine in a coryneform bacterium producing L-lysine, comprising the steps of amplification of at least the tkt gene coding for transketolase in said coryneform bacterium and the fermentation of the bacterium, wherein, during said fermentation, the concentration of L-Lysine increases above the level obtained with a coryneform bacterium in which the tkt gene is not amplified.

6.4 Having regard to Examples 4 and 9 of the patent in suit, the board is satisfied that the problem has indeed been solved.

6.5 It remains to be examined whether the claimed solution involves an inventive step. In this context, the question to be asked is whether, at the priority date, starting from the disclosure of document D3a, the skilled person would have reasonably expected that the amplification of the transketolase gene in a coryneform bacterium would result in an increased concentration of L-lysine when compared to a coryneform bacterium in which the transketolase gene is not amplified.

6.5.1 Document D3a outlines the strategy of producing target substances at increased productivity by increasing the intracellular NADPH levels (page 3, lines 28-31), and mentions that NADPH is mostly prepared through metabolism of glucose in the pentose phosphate pathway (page 3, lines 18-21). In order to achieve the desired increase of NADPH levels and target substance, however, the document only proposes to increase the activity of the enzyme transhydrogenase, which is not an enzyme of the pentose phosphate pathway.

The board considers that on the basis of the disclosure of document D3a, a skilled person looking for an alternative process for the preparation of L-lysine at increased concentration would at best contemplate the amplification of an enzyme which, like trans-hydrogenase, catalyses a reaction that directly leads to the formation of NADPH, such as glucose-6-phosphate dehydrogenase or 6-phosphogluconate dehydrogenase, which are commonly known to form part of the pentose phosphate pathway. However, the enzyme transketolase is commonly known to catalyse the transfer of a C2-moiety from xylulose-5-phosphate to either ribose-5-phosphate or erythrose-4-phosphate and, although forming part of the pentose phosphate pathway, is not directly involved in the formation of NADPH (see for instance document

D10). The board thus takes the position that a skilled person would not reasonably expect on the basis of the disclosure of document D3a that the amplification of transketolase would result in increased production of L-lysine.

6.5.2 Document D5 relates to the determination of the fluxes in the central metabolism of *C. glutamicum*. The document describes that the flux through the pentose phosphate pathway in the L-lysine producing *C. glutamicum* stain MH20-22B was 66.4%, and that a particularly high exchange rate was observed for the transketolase reaction (see abstract; Figure 3; page 115, column 1, last two lines; page 122, column 1, lines 22-38).

The board is convinced that the mere finding in document D5 of a high exchange rate for the transketolase reaction in a lysine-producing strain would not allow the skilled person to draw any conclusion with respect to a possible effect of the amplification of the transketolase gene on L-lysine production. The document would thus not provide the skilled person with any reasonable expectation that the amplification of the transketolase gene would result in increased L-lysine production. Moreover, document D3a stresses the importance of increasing the intracellular NADPH levels in order to increase L-lysine production, and transketolase was known to be not directly involved in NADPH formation. In view of the complexity of the reactions of the intracellular metabolism, the skilled person would not have been able to predict whether amplification of transketolase would increase intracellular NADPH levels.

Therefore, the combination of documents D3a and D5 does not render the claimed subject-matter obvious.

6.5.3 The appellant-opponent has submitted that document D8 further confirmed the obviousness of the claimed subject-matter, because Example (4) of this document showed that the amplification of the transketolase gene in *C. glutamicum* resulted in increased production of the aromatic amino acids L-tryptophan, L-tyrosine or L-phenylalanine due to increased flux through the pentose phosphate pathway.

The board takes the position that the skilled person would not consider the patent document D8 without also considering document D2, a scientific publication which was authored by the inventors of document D8 but published several years later. As already set out in point 4.4 above, document D2 discloses that the over-expression of transketolase in a tryptophan and lysine co-producing strain of *C. glutamicum* resulted in increases in tryptophan production along with a concomitant decrease in lysine production. In view of this finding in document D2 of a decreased lysine production in *C. glutamicum* due to the amplification of the transketolase gene, the skilled person would not extend the teaching in document D8 of an increased production of the aromatic amino acids to the production of lysine.

6.6 The board further considers that the remaining documents cited during the appeal proceeding in the context of inventive step are less relevant than those discussed above; hence they also do not render the claimed subject-matter obvious when taken either alone or in combination.

6.7 Consequently, the board comes to the conclusion that the subject-matter of claim 1 involves an inventive step (Article 56 EPC). The same applies to the subject-matter of dependent claims 2 to 4.

7. In view of the above, the main request fulfills the requirements of the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained as granted.

The Registrar: The Chairman:

K. Götz-Wein U. Oswald

Decision electronically authenticated