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D E C I S I O N
of 9 December 1999

Case Number: T 0106/95 - 3.3.1

Application Number: 89306760.3

Publication Number: 0351121

IPC: C07D 501/10

Language of the proceedings: EN

Title of invention:

Process for producing exomethylene cepham compounds

Applicant:

Baldwin, Jack Edward

Opponent:

-

Headword:

Cepham compunds/BALDWIN

Relevant legal provisions:

EPC Art. 56, 84

Keyword:

"Support by the description (yes) - essential features"
"Inventive step (yes) - problem and solution approach - non-obvious solution"

Decisions cited:

-

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: T 0106/95 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 9 December 1999

Appellant: Baldwin, Jack Edward
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Representative: Hudson, Christopher Mark
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 28 September 1994
refusing European patent application
No. 89 306 760.3 pursuant to Article 97(1) EPC.

Composition of the Board:

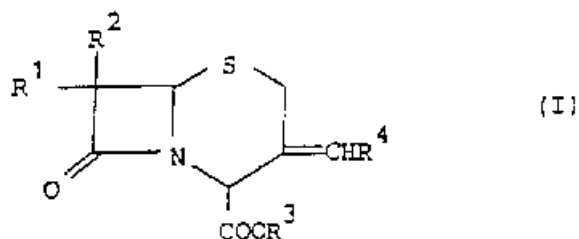
Chairman: A. J. Nuss
Members: J. M. Jonk
J. P. B. Seitz

Summary of Facts and Submissions

I. This appeal lies from the decision of the Examining Division refusing the European patent application No. 89 306 760.3, published under No. 0 351 121, and relating to a process for producing exomethylene cepham compounds.

II. The decision was based on the originally filed Claims 1 to 5, the only independent Claim 1 reading as follows:

"A process for preparing a compound of the formula



in which

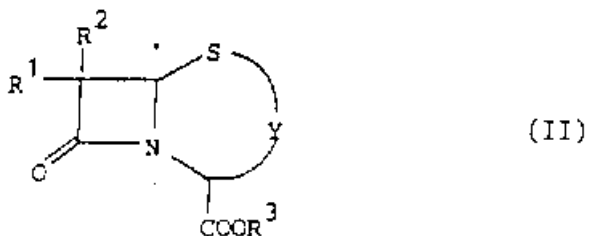
R¹ is an amino group, a protected amino group, an acylamino group or a diacylamino group,

R² is hydrogen, C₁₋₄ alkoxy or C₁₋₄ alkylthio,

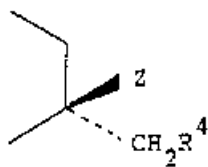
R³ is hydrogen, a salt ion or an ester-forming group,

and

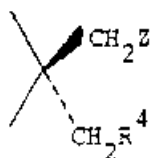
R⁴ is hydrogen or C₁₋₃ alkyl, which comprises reacting a compound of the formula



in which Y is a bridging group of the formula



or



Z is chloro, bromo or iodo, and R¹, R², R³ and R⁴ have the above defined values, with a reagent providing cobalt I, under reducing conditions.

III. The Examining Division held that the subject-matter of Claim 1 was novel, but that it did not meet the requirements of Articles 84 and 56 EPC.

In this context, they maintained their objection indicated in their communication of 21 January 1994, namely, that Claim 1 did not meet the requirement of support under Article 84 EPC, because it lacked essential features to perform the claimed process, in particular the nature of the reducing agent, the type of the cobalt I containing reagent, the proportion of reagent to be used, the reaction temperature, and the nature of the solvent.

Moreover, although they acknowledged that the use of a cobalt I reagent to perform the process of Claim 1 of the application in suit was not described or suggested in the prior art, they held that the subject-matter of Claim 1 did not involve an inventive step, since the problem underlying the patent in suit, i.e. the provision of a process to synthesise exomethylene derivatives useful as intermediates in the preparation of antibiotics, could not be solved by the claimed process within its whole scope due to the broad scope of the following technical features:

- (i) "a protected amino group" with respect to the meaning of R^1 ,
- (ii) "a reagent providing cobalt I", and
- (iii) "under reducing conditions".

IV. The Appellant argued essentially that according to the application in suit it was found that reagents comprising cobalt in its lowest oxidation state unexpectedly facilitated the conversion of intermediates of formula (II) to products of formula

(I) and that in view of the nature of this finding restrictions to the claims as filed were not appropriate.

- V. The Appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the originally filed claims as main request, or on the basis of one of the five sets of claims filed on 25 January 1995 (Appendix II to Appendix VI) as auxiliary requests.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Having regard to the Examining Division's decision and the fact that the claims of this request correspond to those of the application as filed, the only issues to be dealt with are whether the subject-matter of Claim 1 meets the requirements of Article 84 EPC and involves an inventive step under Article 56 EPC.

3. *Support under Article 84 EPC*

- 3.1 The Examining Division held that Claim 1 did not meet the requirements of Article 84 EPC, because said claim did not comprise all the essential features of the claimed invention.

- 3.2 In this context, the Board firstly observes that

according to the established jurisprudence of the Boards of Appeal, Article 84 EPC has indeed to be interpreted as meaning that a claim has to specify all the essential features which are necessary for solving the technical problem with which the application is concerned. Consequently, all technical features described in the description of an application as an essential feature of the invention, and in particular such features which distinguish the invention from the closest state of the art, have to be part of the claims.

However, since the primary function of a claim is to set out the scope of protection sought for an invention, the extent to which generalisations of technical features are permissible has to be investigated in each individual case in the light of the relevant prior art. As a general rule, a claim which is acceptable under Article 84 EPC is one which is not so broad that it goes beyond the invention nor yet so narrow as to deprive the applicant of a just reward for the disclosure of his invention.

3.3 In the present case, the process of the application in suit as defined in Claim 1 essentially differs from that of the prior art cited by the Examining Division during the substantive examination of the application in suit, namely,

- (1) GB-A-2 013 673, and
- (2) Tetrahedron Letters, Vol. 32 (1978), pages 2915 to 2918,

in that, according to the application in suit the conversion of compounds of the formula (II) is carried out in the presence of a reagent providing cobalt (I) under reducing conditions, whereas according to said prior art the same conversion is performed in the presence of a mercury salt containing a non-nucleophilic anion (see document (1), page 1, lines 16 to 23 and 33 to 37, and document (2), page 2927, first paragraph).

- 3.4 Although Claim 1 of the application in suit comprised this distinguishing essential feature, the Examining Division held that Claim 1 lacked further essential features, namely the nature of the reducing agent, the proportion of cobalt (I) providing reagent, the reaction temperature, and the nature of the solvent.

However, this point of view was not substantiated by the Examining Division.

Moreover, after having examined this issue in accordance with Article 111(1) EPC, the Board has come to the conclusion that the specification of the application does not comprise any indication that said features would be essential, but rather discloses them as preferred reaction conditions which could be properly varied by the skilled person, optionally by using routine experimentation (see page 9, lines 17 to 23, concerning the nature of the reducing agent; page 9, lines 11 to 13, concerning the amounts of the cobalt reagent which may be used; and page 9, line 24 to page 10, line 6, concerning the use of the preferred solvents and reaction temperatures).

Thus, in these circumstances and having regard to the fact that in the light of the prior art the process as claimed in the application in suit is essentially characterised by the use of a cobalt (I) providing reagent under reducing conditions, in the Board's judgment, it would be unfair to the applicant to demand a restriction of the claim to technical features which would narrow the scope of protection for his disclosed invention in an unwarranted manner. In this context, the Board emphasises that, if an invention can be performed within a broad scope, the applicant should have the benefit of a corresponding broad patent protection, and that in the absence of a reasonably concrete basis for objecting, an examination of the suitability of each and every imaginable reaction condition would not be justified.

4. *Inventive step*

4.1 Concerning inventive step, the Examining Division held that the technical problem underlying the application in suit appeared to be the provision of a process to synthesise exomethylene cepham derivatives useful as intermediates in the preparation of antibiotics, and that in view of the broad scope of certain features of the process as defined in Claim 1 of the application in suit, this technical problem could not be solved within the whole scope of said claim. Furthermore, they concluded that for this reason the subject-matter of Claim 1 did not involve an inventive step under Article 56 EPC.

4.2 In this context, the Board observes that the problem and solution approach used in assessing inventive step

comprises the step of defining the technical problem with respect to the closest prior art, i.e. the problem **which is actually solved by the invention as claimed**, before examining whether the claimed solution to this technical problem involves an inventive step in view of the state of the art in the sense of Article 54(2) EPC.

This means, in accordance with the jurisprudence of the Boards of Appeal, that in a case where an instance of the EPO dealing with substantive examination in assessing inventive step comes to the conclusion that a stated technical problem **has not been solved by the claimed invention**, a **reformulation** of the underlying technical problem becomes necessary to meet a less ambitious objective, e.g. the provision of a further process or product.

4.3 Therefore, the finding of the Examining Division that the technical problem underlying the application in suit has not been solved within the whole scope of the claim cannot justify their conclusion that the claimed subject-matter did not involve an inventive step.

4.4 In assessing inventive step in accordance with Article 111(1) EPC, the Board considers, in agreement with the Examining Division, that the closest state of the art with respect to the claimed subject-matter of the application in suit is the disclosure of document (1) or document (2).

Both prior art documents are, as indicated above (see point 3.3 above), concerned with the same process as the process of the application in suit, except that according to these documents the reaction is performed

in the presence of a mercury salt containing a non-nucleophilic anion.

- 4.5 Regarding this closest state of the art, the Respondent did not argue that the process of the application in suit represented an improvement.

Thus, in the light of the above identified closest state of the art, the technical problem underlying the application in suit can be seen in the provision of a further process for the preparation of the exomethylene cepham compounds defined in Claim 1 of the application in suit.

- 4.6 According to present Claims 1 this technical problem is essentially solved by reacting a compound of the formula (II) with a reagent providing cobalt I, under reducing conditions.

- 4.7 In this context, the Examining Division considered that the features "a reagent providing cobalt (I)" and "under reducing conditions" indicated in Claim 1 were too general in view of the fact that only one cobalt (I) reagent and only one reducing agent were exemplified in the description of the application in suit and that these two broadly defined features, as well as the broad expression "protected amino" with respect to the meaning of R¹ in said Claim 1, embraced embodiments of the claimed process which would not lead to the solution of the underlying technical problem.

However, the specification of the application in suit as filed clearly discloses:

- (a) with respect to the feature "a reagent providing cobalt (I)" (i) that such cobalt reagents are well known and comprise any compound or complex that provides cobalt in its first oxidation state, (ii) that a preferred category is one in which the cobalt is complexed with appropriate ligands, (iii) that examples include cyano cobalt complexes, cobalt phthalocyanine, cobaloximes and preferably vitamin B_{12S}, and (iv) that other suitable cobalt reagents are disclosed in R. Scheffold, Modern Synthetic Methods (1983), pages 355 ff. (see page 8, line 22 to page 9, line 10, of the application as filed),
- (b) with respect to the feature "under reducing conditions" (i) that suitable reducing agents are, for example, sodium borohydride and zinc, (ii) that such reducing agents are used in an amount of preferably at least one equivalent of the reducing agent per molecule of reactant, and (iii) that alternatively the reducing conditions can be provided electrochemically in which case the cathode acts as reducing agent (see page 9, lines 14 to 23), and
- (c) with respect to the claimed meaning of R¹ in formula (I), numerous examples of suitable protecting groups without any indication that particular ones would be essential for performing the process as claimed (see page 7, line 4 to page 8, line 4),

so that the Board does not see well-founded reasons for believing that the skilled person would be unable, on

the basis of the information given in the application as filed, to perform the process as claimed within the scope of Claim 1 as a whole.

In this context, the Board also observes with respect to the meaning of R₁ that the protecting group is substantially only relevant for the temporary protection of the amino group, and that the skilled person would of course apply a protecting group which does not interfere in the claimed process.

4.8 Thus, in view of these considerations and having regard to the examples of the application in suit the Board considers it plausible that the technical problem as defined above has been successfully solved.

4.9 The question now is whether the cited documents would have suggested to a person skilled in the art that he could solve the above-defined technical problem in the proposed way.

4.10 As indicated above (see point 3.3), documents (1) and (2) both disclose the conversion of compounds falling within the scope of formula (II) as defined in Claim 1 of the application in suit with a mercury salt containing a non-nucleophilic anion. Moreover, it has been stated in document (2) that no other metal salt was successful, although many were examined in a number of solvents (see page 2917, lines 5 and 6). Therefore, in the Board's judgment, documents (1) and (2), which are the only documents cited as being relevant by the Examining Division, do not give any incentive to the skilled person that the technical problem underlying the application in suit could be solved by providing a process as now claimed.

4.11 Thus, for the above reasons, the Board concludes that the subject-matter of Claim 1 involves an inventive step under Article 56 EPC. Dependent Claims 2 to 5 are directed to specific embodiments of the process of Claim 1, and derive their patentability from that of this independent claim.

5. *Content of the description*

5.1 Despite the fact that the Appellant's appeal was successful, the application in suit still needs amendments to meet the requirements of Rule 27(b) EPC (indication of the prior art as disclosed in document (1) and (2)). Therefore, and having regard to the fact that the function of the Boards of Appeal is primarily to give a judicial decision upon the correctness of the earlier decision taken by the first instance, the Board makes use of its competence under Article 111(1) EPC and remits the case to the first

instance for further prosecution in this respect.

Auxiliary requests

6. In the light of the above findings, it is not necessary to consider the Appellant's auxiliary requests.

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 grant a patent on the basis of the Claims 1 to 5 of the application as originally filed, and a description to be brought into conformity with the requirements of the EPC.

The Registrar:

The Chairman:

E. Görgmaier

A. Nuss