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Bezeichnung der Erfindung : Process for preparing biomass attached to
 Title of invention: a carrier
 Titre de l'invention :

Klassifikation / Classification / Classement : C 02 F 3/12
 C 02 F 3/28, C 12 M 1/16

ENTSCHEIDUNG / DECISION
 vom / of / du 5 June 1986

Anmelder / Applicant / Demandeur : Gist-Brocades N.V.

Patentinhaber / Proprietor of the patent /
 Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence : "Insufficiency of disclosure in Example",
 "Correction of error", "Amendment",
 EPÜ / EPC / CBE "Essential features"
 Articles 83, 84, 123(2) EPC, Rule 88 EPC

Leitsatz / Headnote / Sommaire

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Case Number : T 32 /85

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 5 June 1986

Appellant : Gist-Brocades N.V.
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Decision under appeal : Decision of Examining Division 026 of the European
Patent Office dated 09.10.84 refusing European
patent application No 80 200 764.1 pursuant to
Article 97(1) EPC

Composition of the Board :

Chairman : K. Jahn
Member : G. Szabo
Member : F. Benussi

Summary of Facts and Submissions

- I. European patent application No. 80 200 764.1 filed on 13 August 1980 and published on 20 May 1981 with publication No. 28 846, claiming priority of the prior application on 7 November 1979 (NL-79 08138) was refused by the decision of the Examining Division 026 of the European Patent Office dated 9 October 1984.

Claim 1 was worded as follows:

"Process for producing biomass attached to a carrier wherein in a reaction space a granular carrier is contacted with a continuous stream of liquid which contains a sufficiently wide flora of micro-organisms and sufficient nutrients for the growth and/or preservation of the micro-organisms until a sufficiently thick layer of micro-organisms is attached to the carrier under conditions of exposure to a significant amount of mechanical energy, characterised in that, the carrier is contacted with the liquid stream while in the liquid 0.047-1.5 kW of mechanical energy per m^3 of reactor liquid is dissipated by means of gas bubbling through the liquid and the passage of liquid in the reaction space, and the residence time of the liquid in the reaction space is kept lower than the reciprocal maximum growth rate of the micro-organisms" (emphasis added).

- II. The stated ground for the refusal was insufficient support for the claims in consequence of an amendment contrary to Article 123(2) EPC. The suggested amendment of the main claim involved an extension of the originally disclosed range for the dissipation of mechanical energy of 0.1 to 1.5 kW/m^3 to a range from 0.047 to 1.5 kW/m^3 . The new lower end-point of the range should, according to the Applicants, come from a corrected value in Example Ia, but this would, according to the Examining Division, only be acceptable

under Rule 88 EPC as a correction if it was obvious in the sense that nothing else could have been intended but what was offered as the correction. The suggested calculation was based on certain variables and values upon which the original application was entirely silent. No unequivocal result was therefore available to replace the originally quoted figure and the matter was therefore unacceptable in view of Article 123(3) EPC.

III. The Applicants filed an appeal on 30 November 1984 against this decision together with the appropriate fee. A Statement of Grounds was filed on 22 December 1984. At an oral hearing on 5 June 1986, the Appellants filed a new amended main set of claims, as well as auxiliary sets I to III. Claim 1 of the main set is as follows:

"Process for producing biomass attached to a carrier, wherein in a reaction space a granular carrier is contacted with a continuous stream of liquid which contains a sufficiently wide flora of micro-organisms and sufficient nutrients for the growth and/or preservation of the micro-organisms until a sufficiently thick layer of micro-organisms is attached to the carrier, characterised in that the carrier is contacted with the liquid stream while mechanical energy is dissipated at least partly in the form of gas bubbling through the liquid, and the residence time of the liquid in the reaction space is kept lower than the reciprocal maximum growth rate of the micro-organisms".

The main claim of auxiliary set I differs from the above in as much as the term "mechanical energy" is supplemented so as to read "in the liquid 0.05-1.5 kW mechanical energy per m³ of reactor liquid, "whilst in sets II and III the lower figure of the range is "0.047" and "0.1", respectively.

IV. The Appellants submitted earlier in prosecution and in the appeal stage substantially the following arguments:

- (a) There was really no need to specify the energy dissipation value for the process since this was not an essential feature of the invention. The governing aspect was the discovery that the residence time must be less than the reciprocal maximum growth rate for the micro-organism (generation time). The characteristics of the result enabled the skilled person to adjust the conditions of the process on this basis without having to confine himself to the suggested range.
- (b) Although the specification expressly suggested the 0.1 to 1.5 kW/m³ range for dissipation energy as "essential", the priority document disclosed the invention without such requirement. The range had been added as an afterthought on the basis of some calculations alone without noticing the contradiction with the first example. If anything, it represented only the preferred values for a process under aerobic conditions. The value for an anaerobic process could be much lower than this.
- (c) The skilled person would have immediately recognised that the 0.071 value in the Example Ia fell outside the given range. He could not only have established that the example was reproducible with success on the basis of the operative data therein but would have noticed even without repeating the experiment that the calculated value for the energy dissipation was 0.047, or 0.05 in view of a more accurate calculation suggested by the Rapporteur. Such a figure should, under Rule 88 EPC, form the basis for correcting the Claim 1 of the auxiliary sets I or II, and the

supporting Example Ia. The discrepancy was not only recognisable in an obvious manner but the intention could not have been to state an erroneous figure or to exclude the example from the scope of protection.

- (d) The energy dissipation under the exact conditions of Example Ia could be accurately and unequivocally calculated on the basis of the given formula. This could either be derived from first principles in physics and Bernoulli's Law (p.6 of attachment to letter dated 28.02.83 from Applicants) or be taken from the article by Lee, I.C. et al., from the book entitled Biological Fluidised Bed Treatment of Water and Wastewater, (editors: Cooper and Atkinson, published by Ellis Horwood Ltd., 1980) (1).
- (e) All parameters of the formula were directly derivable from the data of the example in question except the gas hold up value (g) which was obtainable from the article of Freedman, W., et al., Trans. Inst. Chem. Eng., 1969, 47, T251 (Fig. 1) (2).

Even if the latter article was not available for the purpose the Appellants had shown that a rough figure inserted on the basis of the common knowledge of the skilled person would not appreciably influence the value of the dissipation energy. The results of the calculation suggested 0.047 or more accurately 0.05 kW/m³, instead of 0.071 stated in the Example. Since the accurate value is clearly implied, the amendments would not represent objectionable new matter on grounds of Article 123(2) EPC either.

(f) The proposition that perhaps the 0.071 kW/m^3 figure was accurate and some other parameter, such as the gas input rate ($0.71 \text{ Nm}^3/\text{h}$), might be erroneous in the example, could be countered by pointing out that the latter figure was also mentioned in the general description (p. 4, line 34) and that both conceivable workable models fell within the suggested extended range and provide therefore support for the same.

V. The Appellants request that the decision under appeal be set aside and that a patent be granted on the basis of the main request or of any one of the auxiliary requests corresponding to claim sets I to III, in this order of preference, as submitted during the oral proceedings.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. Claim 1 of the main request now omits the requirements for energy dissipation range, which was originally incorporated in the claim as filed. This is in spite of the fact that the supporting specification mentions the range 0.1 to 1.5 kW/m^3 twice and suggests that the feature is "essential" (cf. p. 5, lines 24-31, and p.6 first paragraph). Although Example Ia appears to fall outside this range, this is in itself no proof to the effect that the limitation is inessential. The discrepancy may only mean that the range is inaccurately stated.
3. The explanations (cf. p.6 first paragraph) suggest that within the specifically stated range the generated shearing forces must be high enough to wash away the non-adhering micro-organisms. On the other hand, it is also understood that too high energy dissipation causing

undesirable shearing forces in the three-phase system would prevent the micro-organisms from establishing themselves on the carrier material (cf. p.2, lines 17-18 in connection with p.4, lines 21-22). Thus there are minimum and maximum dissipation energies beyond which the desired result of effective attachment might not be attained at all.

4. It appears from the explanations in the specification that the control of one factor is insufficient to guarantee the result and that "other factors are important" (p.5, lines 20-23). The description then goes on specifying two of these, i.e. the dissipation energy with the stated range and the adjustment of timing. If the former were to be left unspecified all other conditions of the process would also remain unspecified with the exception of timing. This would mean that these other conditions would have to be determined solely on the basis of a successful outcome of the process.
5. According to the Appellants the energy dissipation value is a calculable unique result of the other physical conditions of the process. In the absence of suitable instructions as to the choice of the other design features, at least the governing energy dissipation should be numerically defined so that the rest could in advance be estimated accordingly. Without such limitation the only feature ascertaining the promised effect is a functional one referring to a proper attachment of the biomass to the carrier, as a result in the preamble of Claim 1. To rely on this alone would mean that the skilled person could only establish by trial and error whether or not his particular choice of numerous parameters would provide a satisfactory result. This is considered to be an undue burden in the circumstances. This is why the specification of a range for dissipation values is essential, since these are, according to the Appellants, unequivocally determined by the parameters in advance and thereby limit their choice.

The argument that the specific range for dissipation values was no essential feature in the priority document, is irrelevant as the character of the disclosure in the European application is solely determined by the content of the specification as filed. In view of the nature of such disclosure revealing the essential character of the feature, its deletion would offend against Article 123(2) EPC in this particular instance. The same applies to the rest of the dependent claims with the exception of Claims 2 and 3 which have limitations corresponding to those in auxiliary set III.

6. Claim 1 of auxiliary set I carries a specific limitation to an energy dissipation range of "0.05 to 1.5 kW/m³". The lower limit replaces "0.1" in the range appearing in the claim as originally filed. Since the correction is requested under Rule 88 EPC, it "must be obvious in the sense that it is inevitably evident that nothing else would have been intended than what is offered as a correction". Even if the skilled person were to find that it could not have been the intention of the Applicant to exclude the method described in Example Ia in view of the value of "0.071" for dissipation energy there, the corrected value of "0.05" both in the extended claim and in the supporting example must be shown to be the only possible correction in the circumstances.
7. There are no instructions in the specification as to how the required dissipation energy may be provided or calculated from the conditions of the process. Nevertheless, this apparent insufficiency of disclosure could, in the opinion of the Board, be bridged if the skilled person could provide the missing information on the basis of common general knowledge alone. (cf. "Herbicides/ICI", T 206/83, 26.03.86, to be reported, and "Redox catalyst/AIR PRODUCTS", T 171/84,

OJ 4/1986, 95). The Appellants submitted that the appropriate equation could be derived from Bernoulli's Law and first principles in physics, or from the book reviewing important questions in wastewater treatment (1). The parameters are given in the example itself with the exception of the approximate gas retention figure, which could be estimated on the grounds of common general knowledge or on the basis of data tabulated in (2).

8. Without going, however, into the question of whether or not the suggested calculation route is available on the basis of common general knowledge, the Board has come to the conclusion that the result of the calculation to rectify the allegedly incorrect value in Example Ia is not unequivocal. Notwithstanding the submissions of the Appellants in this respect, the skilled person recognising that there is a contradiction between the energy dissipation figure "0.071" and the rest of the data in Example Ia, would not necessarily know for sure where the error lies. It would be equally reasonable to come to the conclusion that the energy dissipation figure is correct but the air input figure is somewhat low. Such a conclusion would be based upon an expectation of higher input values since these would be nearer to those in the other Examples Ib and II and should provide results closer to the range "0.1 to 1.5" declared as essential for dissipation values in the specification.
9. The argument that a very similar air input figure was mentioned in the general description (p.4, line 34) is not convincing since the cited and subsequent passages described unsuccessful experiments which cannot be interpreted as supporting successful ones. The present case is not one of those either in which one of two possible answers is clearly implied by the application as a whole, or could be resolved

by experimentation, and represents therefore the only reasonable answer to a question of ambiguity. There is no obvious and unequivocal answer in any form and no correction under Rule 88 EPC is therefore allowable.

10. The alternative approach to amend the specification and claims cannot be entertained either, since the insertion of the new dissipation value of "0.05" would represent subject-matter extending beyond the content of the application as filed. It has already been explained that the implications of the disclosure are not unequivocal with regard to the correct dissipation value in Example Ia. Apart from the two main possibilities, viz. 0.05 or 0.071, there may be others if there is an error in the rest of the engineering data. Unless the implications of the disclosure are indeed uniquely derivable and expressible as an amendment, the latter contains information not available to the skilled person as a necessity in the circumstances. Such ambiguous features, if unresolvable on the basis of common general knowledge, cannot be considered as a basis for a new claim, which disposes of an otherwise expressly supported essential feature and replaces the same with something substantially broader in scope. If at all, claims extended in such a manner must have a very clear and undisputable basis in the disclosure.

11. Claim 1 of auxiliary set I is therefore contrary to Article 123(2) EPC and is unacceptable. The same applies to Claim 1 of set II which is based on the value of "0.047", as presented in prosecution by the Applicants. The rest of the Claims 2 to 6 or 7, respectively, in these sets also carry the same corrected values and are equally deficient. Claim 1 of the auxiliary set III is, however, confined to the range "0.1 to 1.5" as originally filed and is therefore properly supported by the disclosure. The same applies to the rest of the Claims 2 to 6 in this particular set, which could form

the basis of further prosecution. Since no decision has yet been taken on the question of inventive step the Board finds it inappropriate to decide the issue and makes use of its power under Article 111(1) EPC to remit the case to the Examining Division for further prosecution.

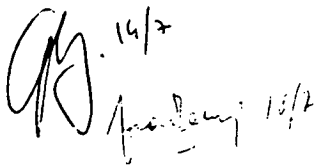
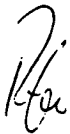
Order

For this reason it is decided that

1. The decision of the Examining Division is set aside.
2. The case is remitted to Examining Division for further prosecution on the basis of claims according to auxiliary request III submitted on 5 June 1986.
3. The other requests are rejected.

The Registrar:

The Chairman:



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