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D E C I S I O N
of 19 January 2006

Case Number: T 0370/04 - 3.2.05

Application Number: 97934747.3

Publication Number: 0865890

IPC: B29B 9/14

Language of the proceedings: EN

Title of invention:

Method of designing multicomponent material, optimization analyzer and storage medium on which multicomponent material optimization analysis program is recorded

Applicant:

Bridgestone Corporation

Opponent:

-

Headword:

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Relevant legal provisions:

EPC Art. 54

Keyword:

"Novelty (main and auxiliary requests, no)"

Decisions cited:

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Catchword:

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Case Number: T 0370/04 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 19 January 2006

Appellant: Bridgestone Corporation
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 17 October 2003
refusing European application No. 97934747.3
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: W. Moser
Members: P. E. Michel
H. Schram

Summary of Facts and Submissions

- I. The appellant (applicant) lodged an appeal against the decision of the Examining Division refusing European patent application No. 97 934 747.3.

The Examining Division held that the independent claims of a main request and an auxiliary request were unclear and lacked novelty in view of the disclosure of the document "The Role of Integrated AI Technologies in Product Formulation", VerDuin, ISA Transactions, 1992, vol. 31, No. 2, pages 151 to 157, XP-002098468 (hereinafter referred to as document D1).

- II. Oral proceedings were held before the Board of Appeal on 19 January 2006.

- III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following documents filed on 15 December 2005:

- (a) claims 1 to 12 as main request; or
- (b) claims 1 and 8 as auxiliary request, and claims 2 to 7 and 9 to 12 as for the main request.

- IV. Claim 1 of the main request reads as follows:

"1. A method for manufacturing multi-component materials comprising the steps of:

- (a) determining a conversion system in which a non-linear correspondence between compositional ratios of multi-component materials composed of a plurality of components as inputs and mechanical

- behaviours of the multi-component materials as outputs is established;
- (b) determining an objective function expressing said mechanical behaviours and setting a constraint condition constraining the allowable range of at least one of said mechanical behaviours and said compositional ratios of the multi-component materials; and
 - (c) determining compositional ratios of a multi-component material which give an optimal solution of said objective function, while considering said constraint condition, on the basis of the conversion system determined in said step (a) to design and manufacture the multi-component materials on the basis of the compositional ratios which give the optimal solution of the objective function."

Claim 1 of the auxiliary request differs from claim 1 of the main request in that the words "optionally, at least one of" are introduced before the words "said compositional ratios of the multi-component materials" in step (b).

- V. In the written and oral proceedings, the appellant argued substantially as follows:

The subject-matter of claim 1 of the main request is novel having regard to the disclosure of document D1. In particular, the claim is distinguished over the disclosure of document D1 by the features of step (c). The optimisation procedure involves starting from a trial composition which is optimized in a series of steps. According to the invention, the constraint

condition is applied at each step, in which an intermediate result is tested against the constraint condition. The use of the term "while considering" indicates that optimisation and application of the constraint condition are carried out in parallel. In contrast, according to the prior art, the constraint condition is only applied before or after optimisation.

In addition, the prior art requires two separate components; a neural net and an expert system. In contrast, according to the invention, only a single unit is used, as shown at (36) in Figure 3. It is stated at page 153 of document D1, second column, lines 30 to 33, that the "Integrated Technology Platform combines neural networks, expert systems, and optimization technology". These elements work in different ways. Expert systems contain rules for, for example, product formulation and are different from neural networks.

The subject-matter of claim 1 of the auxiliary request is also novel having regard to the disclosure of document D1.

The claim is restricted to the constraint condition being applied to at least one of the mechanical behaviours. Document D1 only discloses constraint conditions applied to compositional ratios and process temperatures (page 155, right hand column, lines 5 to 13). Whilst Figure 1 of document D1 shows that maximum and minimum values of mechanical behaviours are entered by a user, there is no disclosure that these values are applied as constraint conditions during iteration to arrive at the optimal solution.

Reasons for the Decision

1. *Main Request*

Novelty

Document D1 discloses a conversion system in which there is a non-linear relationship between compositional ratios and mechanical behaviours. In Figure 1, four possible types of such a relationship are disclosed: the so-called tent, up-hill, down-hill and flat relationships. These represent respectively the cases in which an optimum value occurs within a compositional ratio, towards one end or the other of a compositional ratio and where the compositional ratio does not have an effect on the mechanical behaviour. Whilst the relationships are made up of straight lines, a form such as a tent cannot be referred to as being linear.

In the system disclosed in document D1, values of an objective function expressing mechanical behaviours are analysed to determine which compositional ratio gives the optimal objective function. In particular, reference is made to the cake baking example illustrated in Figures 1 to 3 and referred to at page 155, second column, line 31 to third column, line 39. An objective function expressing mechanical behaviours (for example, weight, texture, crust consistency, etc.) is analysed in terms of the compositional ratios of fat and flour. The allowable range of the mechanical behaviours is constrained

within limits set by the user as maxima and minima as illustrated on the screen shown in Figure 1.

The function of the system of document D1 is to provide an optimal solution of the objective function on the basis of the conversion system. The constraint conditions are initially set by the user as stated in the preceding paragraph. The Board regards it as inconceivable that, during the subsequent determination of the compositional ratios which result in the optimal solution of the objective function, the constraint conditions are not taken into account. It would make no sense at all for the system simply to ignore the constraint conditions as entered by the user. Document D1 thus discloses implicitly that the determination of the compositional ratios which result in the optimal solution of the objective function takes place while considering the constraint conditions.

Claim 1 cannot be seen as excluding a method carried out using a system comprising a neural net and an expert system as disclosed in document D1. The term "while considering" is construed as meaning that the constraint conditions are taken into account during optimisation of the compositional ratios. As stated in the preceding paragraph, this feature is considered to be implicitly disclosed in document D1.

The subject-matter of claim 1 of the main request accordingly lacks novelty within the meaning of Article 54 EPC.

2. *Auxiliary Request*

Claim 1 of the auxiliary request lacks novelty within the meaning of Article 54 EPC for the same reasons as for claim 1 of the main request. Although the claim is restricted to the feature of "setting a constraint condition constraining the allowable range of at least one of said mechanical behaviours", this feature is disclosed in document D1 as set out under point 1 above in connection with claim 1 of the main request.

3. *Additional Requests*

At the oral proceedings, the appellant asked to be allowed to file additional auxiliary requests in the event that his main and auxiliary requests were to be refused. The Board did not allow such requests to be made owing to the very late stage in the proceedings. The issue of lack of novelty in view of the disclosure of document D1 was raised in the procedure before the Examining Division and was discussed in the communication of the Board accompanying the summons to oral proceedings. Whilst no mention of the implicit disclosure of document D1 was made in the communication, it is noted that the question of novelty involves consideration of the subject-matter which can be derived from a prior art document when read by a person skilled in the art who reads the document in an attempt to carry out the teaching of that document. The question of whether or not a particular feature is explicitly or implicitly disclosed is thus not regarded as being a fresh issue only raised by the Board at the oral proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Dainese

W. Moser