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D E C I S I O N
of 1 February 2000

Case Number: T 0747/97 - 3.3.3

Application Number: 92912024.4

Publication Number: 0585348

IPC: C08J 9/14

Language of the proceedings: EN

Title of invention:
Blowing agent and process for preparing polyurethane foam

Applicant:
E.I. DU PONT DE NEMOURS AND COMPANY

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no) absence of relevant comparisons - reformulation of technical problem in less ambitious terms - arbitrary alternative features"

Decisions cited:
T 0020/81, T 0248/85, T 0246/91, T 0495/91, T 0882/92, T 0939/92

Catchword:

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Case Number: T 0747/97 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 1 February 2000

Appellant: E.I DU PONT DE NEMOURS AND COMPANY
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 11 September 1996, issued in writing on 20 November 1996 refusing European patent application No. 92 912 024.4 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. Gérardin
Members: R. Young
A. Lindqvist

Summary of Facts and Submissions

I. European patent application No. 92 912 024.4, based on International Application PCT/US92/03878, filed on 15 May 1992 and published under No. WO-A-92 20729, relating to "Blowing agent and process for preparing polyurethane foam", was refused by a decision of the Examining Division taken at an oral proceedings held on 11 September 1996 and issued in writing on 20 November 1996. The decision was based on two sets of claims, forming a main and an auxiliary request, respectively, both filed at the oral proceedings. The main request consists of a set of Claims 1 to 4, of which Claim 1 reads as follows:

"A process for producing a closed cell, rigid polyurethane foam which comprises mixing an isocyanate-containing compound with a polyol in the presence of 2 to 25 weight per cent based on the combined weight of the isocyanate-containing compound and the polyol, of 1,1-difluoroethane as the sole blowing agent and in the substantial absence of water so as to minimise generation of carbon dioxide, the polyol having an equivalent weight of 90 to 270, being selected from a polyester polyol, a polyether polyol or polyhydroxy-terminated acetal resin and the blowing agent being blended with the polyol prior to contacting the polyol with the isocyanate-containing compound."

Claims 2 to 4 are dependent claims directed to elaborations of the process according to Claim 1.

The auxiliary request consists of a set of Claims 1 and 2, Claim 1 of which reads as follows:

"A process for producing a closed cell, rigid polyurethane foam which comprises mixing an isocyanate-containing compound with a polyol in the presence of 5 to 25 weight per cent, based on the combined weight of the isocyanate-containing compound and the polyol, of 1,1-difluoroethane as the sole blowing agent and in the substantial absence of water so as to minimise generation of carbon dioxide, the polyol having an equivalent weight of 90 to 270, being selected from a polyester polyol, a polyether polyol and containing 3 to 8 active hydrogen atoms per molecule and the isocyanate index being from 1 to 4."

Claim 2 is a dependent claim, directed to an elaboration of the process according to Claim 1.

II. According to the decision, whilst the subject-matter of Claim 1 of the main request was distinguished from the cited state of the art, in particular the documents:

D1: US-A-4 997 706; and

D3: FR-A-1 247 044,

by certain features, the technical problem arising in relation to D3, which was the closest state of the art, and disclosed water-free compositions, was to provide a process for the production of thermally highly isolating polyurethane foams in which only blowing agents were utilised which had no effect on the ozone layer depletion process. The replacement of the chlorine containing fluoroalkanes of D3 by 1,1-difluoroethane, which formed the sole distinction from D3 was, however, obvious in view of the general

knowledge, acknowledged in the application itself, of the harmful influence of chlorine and bromine atoms, which the skilled person would therefore avoid, and of the fact that 1,1-difluoroethane was described in D3 as a potential blowing agent for closed cell polyurethane foam. The comparative examples in the application in suit, which allegedly showed the 1,1-difluoroethane blowing agent to be nearly as good as the best known blowing agent, were of no assistance, because: (i) the tests had not been carried out by way of comparison with D3; and (ii) only tests based on identical concentration ranges for the isocyanate could give a meaningful comparison between different blowing agents. The further features characterising Claim 1 of the auxiliary request were also known from D3. Consequently, the claimed subject-matter did not involve an inventive step.

III. On 16 January 1997, a Notice of Appeal against the above decision was filed, together with payment of the prescribed fee.

In the Statement of Grounds of Appeal, which was filed on 20 March 1997, the Appellant submitted in essence the following arguments:

(a) Whilst it was agreed that D3 had been the closest state of the art for the assessment of novelty, the document was over 30 years old, not concerned with the same problem as that of the application in suit, and proposed a completely different solution. It was, consequently, not the closest state of the art for the assessment of inventive step. On the contrary, the art had reverted in

recent years to the use of water as at least one of the blowing agents, as was clear, for instance from D1, which, unlike D3 had been acknowledged as prior art in the application.

(b) The problem faced by the application in suit was to produce a rigid, closed cell polyurethane foam which avoided the use of environmentally damaging chlorofluorocarbons, but at the same time achieved practically the same performance in terms of its heat insulating characteristics as the closed cell foams prepared using established chlorofluorocarbon blowing agents. The results given in the application in suit showed that the insulating performance obtained by selecting, as the sole blowing agent, 1,1-difluoroethane (HFC-152a) was almost as good as the industry standard (fluorotrichloromethane), and significantly better than chlorodifluoroethane, when measured at ambient temperature. This was surprising since the thermal conductivity of 1,1-difluoroethane was higher than that of both fluorotrichloromethane and chlorodifluoroethane, but gave a more highly insulating foam.

(c) Furthermore, whereas the insulating performance of polyurethane foams blown with fluorotrichloromethane deteriorated as the temperature was reduced below 0°C, the performance of foams blown with 1,1-difluoroethane increased, and was superior at -20°C, which made it useful for insulating freezers. The improved properties were thought to be achieved by substantially all the cells being closed and the structure being

fine. The foams disclosed in D3, in contrast, did not have fully closed cells.

IV. The Appellant requested that the decision under appeal be set aside and a patent granted on the basis of the claims set forth in main request or the auxiliary request.

Reasons for the Decision

1. The appeal is admissible.

2. *Text of the application*

Although the "fair copies" of the claims filed with the Notice of Appeal contain a typing error ("comprising" instead of "comprises" in Claim 1 of the main request), it is clear that the claims to be considered in the appeal are the same as those forming the main and auxiliary requests underlying the decision under appeal (section I., above). The present decision is, consequently, based on the wording of the latter claims.

3. *Amendments*

The decision under appeal did not raise any objection that the amendments which had been incorporated in the claims of the main and auxiliary requests failed to meet the requirements of Article 123(2) EPC. Nor does the Board see any reason to raise such an objection. Consequently, it is held that the amended claims meet

the requirements of Article 123(2) EPC.

4. *Novelty*

The claims of both requests were found, in the decision under appeal, to be distinguished from the relevant disclosures of D1 and D3, the reasons given being acceptable to the Board. Consequently, the subject-matter of the claims of the main and auxiliary requests is held to be novel.

5. *Inventive step; the closest state of the art;*

A. Main request

The Appellant has disputed the choice, in the decision under appeal, of D3 as closest state of the art and pointed instead to D1 as being a more relevant starting point. This is reflected by the specific acknowledgment of D1 in the description of the application in suit, and the absence of any reference to D3 (page 4, lines 24 to 37).

The Boards of Appeal have held on more than one occasion that an objective definition of the technical problem to be solved should normally start from the technical problem actually described by the Applicant. Only if it turns out than an incorrect state of the art was used to define the technical problem or that the technical problem disclosed has in fact not been solved, can an enquiry be made as to which other technical problem objectively existed (T 882/92 of 22 April 1996, Reasons for the decision, point 4.1,

referring to T 246/91 of 14 September 1993 and to T 495/91 of 20 July 1993, none published in OJ EPO).

Since, furthermore, the Applicant has evidently considered D1 as the relevant state of the art for the derivation of the technical problem, the Board is prepared, in view of the case law above, to consider the matter initially from this point of view.

5.1 According to D1 there is provided a closed-cell rigid polymer foam having improved heat insulation properties, which is prepared from a foam forming composition containing up to about 20 weight percent, based on the total weight of the composition, of a physical blowing agent comprising a polyfluorocarbon compound containing no chlorine or bromine atoms (Claim 1). The absence of chlorine or bromine atoms is desirable as such compounds generally have very low or zero ozone depletion potentials relative to fluorotrichloromethane (column 4, lines 53 to 56). The polyfluorocarbon compound may be one or more selected from, amongst others, 1,1-difluoroethane (Claim 2). The cells of the foam may contain a gas mixture that comprises up to 60 mole percent of the polyfluorocarbon compound and the remainder carbon dioxide (Claim 5; column 6, lines 7 to 28). The polymer may be a polyurethane or a polyisocyanurate (Claim 9). It may be prepared by a method in which an isocyanate-containing compound is mixed and allowed to react with an active hydrogen containing compound in the presence of the physical blowing agent (Claim 12; column 7, lines 38 to 48). The active hydrogen-containing compound may be a polyol, and preferably has an equivalent weight of 90 to 200 (column 7,

lines 38 to 53). The polyol(s), blowing agent and other components except for polyisocyanates may be blended, and this mixture then contacted with the polyisocyanate (column 9, lines 53 to 56).

According to Example 1, a polyurethane foam derived from a crude polymeric methylene diphenylisocyanate and a fully formulated polyol system comprising a sucrose-glycerine initiated polyether polyol and about 3% water, which contains a cell gas mixture comprising about 50 mole percent carbon dioxide and about 50 mole percent of tetrafluoroethylene as physical blowing agent (6.0 weight percent based on the composition), has a smaller increase in thermal conductivity after aging for 40 days, than a similar foam in which the physical blowing agent is fluorotrichloromethane (column 11, lines 22 to 28; column 12, Tables I and II).

5.1.1 Thus, D1 is primarily concerned with the loss, with aging, of thermal insulation properties (measured as an increase in thermal conductivity, mW/MK), of a rigid polymer foam, especially one of polyurethane.

5.1.2 The smallest increase in thermal conductivity is achieved, according to the relevant example of D1, when the physical blowing agent is "R-134a" (1,1,1,2-tetrafluoroethane) which is better than the industry standard physical blowing agent, "R-11" (fluorotrichloromethane), when used in conjunction with a carbon dioxide blowing agent precursor.

5.2 Compared with this state of the art, and following the approach taken in the application in suit, the

technical problem arising may be seen as the provision of a further rigid, closed cell polyurethane foam which avoids the use of environmentally damaging chlorofluorocarbons, but at the same time achieves practically the same performance in terms of its heat insulating characteristics as the closed cell foams prepared using established chlorofluorocarbon blowing agents.

5.3 The solution proposed according to Claim 1 of the application in suit is to replace the tetrafluoroethane/carbon dioxide mixture according to D1 by 1,1-difluoroethane as sole blowing agent in the substantial absence of water so as to minimise the generation of carbon dioxide, the polyol having an equivalent weight of 90 to 270, and being blended with the polyol prior to contacting with the isocyanate containing compound.

5.4 In order to establish whether the stated problem has been credibly solved, it is necessary to compare the results achieved according to the application in suit with those according to the closest state of the art (T 248/85, OJ EPO 1986, 261). Furthermore, according to the established case law of the Boards of Appeal, advantages not supported by sufficient evidence cannot be taken into consideration in determining the underlying problem and hence in assessing inventive step (T 20/81 OJ EPO 1982, 217).

5.4.1 In the present case, no evidence has been offered based on a direct comparison with D1. In particular, no meaningful comparison of the loss, with aging, of thermal insulation properties is derivable, since the

application in suit fails to specify the extent of aging of the samples tested. Nor are the polyurethane foam compositions of D1 otherwise identical with those of the application in suit. Consequently, no direct comparison with D1 of the performance of the compositions according to the application in suit is possible.

5.4.2 Quite apart from this, the terms of the technical problem call for "practically the same performance... as established chlorofluorocarbon blowing agents". The latter correspond, however, to "R-11", which is not the most advantageous blowing agent taught according to D1 ("R-134a"), but rather the conventional blowing agent with which the teaching of D1 is itself compared. This is, in turn, structurally more remote from the 1,1-difluoroethane blowing agents according to the application in suit than "R-134a". Consequently, the comparison implied by the terms of the stated problem is not strictly with the "closest state of the art" identified by the Appellant.

5.4.3 On the contrary, the Appellant relies rather on comparative data presented in the examples of the application in suit itself, which do not, however, contain unambiguous information concerning loss of properties with aging, but rather absolute values of thermal conductivity (K-factor) for particular foams. Whilst these data represent a still closer comparison than D1, to the extent that the relative performance of different blowing agents **in the absence of carbon dioxide** is compared, nevertheless the comparison is still not with the relevant blowing agent "R-134a" taught as advantageous in D1, but rather with the

blowing agent "R-11", to which it refers as conventional. Consequently, this comparison is, again, not strictly with the "closest state of the art" identified by the Appellant.

5.4.4 Even if it had been, however, the comparisons of the thermal conductivities (K-values) of foams prepared using, as sole blowing agent, on the one hand 1,1-difluoroethane and, on the other hand, "R-11" (fluorotrichloromethane), are deficient in that differing polyol/isocyanate ratios, and therefore different isocyanate indices have been used for the different blowing agents.

5.4.4.1 This deficiency was specifically criticised in the decision under appeal, which stated that, "...Only tests based on identical concentration ranges... can give a meaningful comparison between different blowing agents" (Reasons for the decision, point 2.2.3, last sentence).

5.4.4.2 The Board is, however, unable to trace, in the submissions of the Appellant, any mention of this criticism, which was crucial to the ultimate refusal of the application, let alone a refutation. In the absence of any counterarguments, therefore, the Board has no alternative but to accept that the criticism was justified.

5.4.4.3 The attempt of the Appellant to heal this deficiency by referring, in the Statement of Grounds of Appeal, for the first time to a completely different effect, namely of a relatively favourable change of K-factor with the relevant blowing agent at low temperatures (section III.(c), above) cannot alter the situation, since such an effect, even if present, represents a comparison which is, for the same reasons as given previously (section 5.4.2, above), not with the closest state of the art. Furthermore, it is in any case not supported by so much as a shred of evidence.

5.4.5 Consequently, there is no convincing evidence available to the Board, that the claimed measures provide an effective solution of the stated problem, whether as stated in relation to "R-134a", or in relation to conventional blowing agents such as "R-11".

5.4.6 It is therefore necessary to re-formulate the problem in less ambitious terms, namely, "to provide a further rigid, closed cell polyurethane foam which avoids the use of environmentally damaging chlorofluorocarbons, but **regardless** of whether it achieves the same performance in terms of its heat insulating characteristics as the closed cell foams prepared using established chlorofluorocarbon blowing agents".

5.4.7 The solution of the reformulated problem is in any case the same (section 5.3, above). Nor does the Board have any reason to doubt that the claimed measures provide an effective solution, since the relevant blowing agent, like the others preferred according to D1, does not contain any chlorine or bromine atoms.

5.5 Given the established principle that the answer to the question as to what a person skilled in the art would have done depends on the result he wished to obtain (T 939/92, OJ EPO 1996, 309; Reasons for the decision, point 2.5.3), the fact that, in the present case, the skilled person is deemed to be seeking alternatives to the process of D1 regardless of whether the desired thermal insulation characteristics are achieved or not (section 5.4.5, above), it is evident that almost any measure may be regarded as obvious, since, if the relevant result need not be achieved, any available measure is equally useful (or useless) and therefore arbitrary.

5.6.1 In this connection, the 1,1-difluoroethane blowing agent used in the solution of the stated problem is a selection from the polyfluorocarbon compounds broadly defined under the heading "physical blowing agent" in Claim 1 of D1, the relevant compound being specifically mentioned in the list of preferred such species in D1, and in fact being the first on the list (claim 2; column 5, lines 19 to 28). Consequently, the choice of the relevant blowing agent is practically the first option which presents itself to the eye of the skilled reader.

5.6.2 Furthermore, the amount of this blowing agent, based on the whole foam composition (1 to 20 wt%, preferably 0.5 to 15 wt%) is virtually coterminous with that forming the solution of the technical problem, and that in Example 1, at around 6.0% clearly falls within it. Consequently, it is difficult for the skilled reader, following the teaching of D1, to utilise the physical blowing agent in an amount falling outside

the range forming the solution of the stated problem, and, if the examples are followed, impossible to do so.

5.6.3 Whilst the polyurethane foams specifically exemplified in D1 admittedly employ the polyfluorocarbon compound blowing agents together with carbon dioxide as "precursor", this is not a requirement in the general case as defined in Claim 1 of D1, which merely refers to a "physical blowing agent" without any reference to the presence of a precursor. This is corroborated by the fact that Claim 9 of D1, which provides the limitation that the foam is a polyurethane or polyisocyanurate foam, is dependent only on Claim 2, which itself recites the preferred polyfluorocarbon compounds without any reference to carbon dioxide or other precursor, and is, furthermore, dependent on Claim 1.

5.6.3.1 The argument of the Appellant, that D1 required the presence of carbon dioxide, and hence water, in the case that the foam was a polyurethane foam, is not supported by the relevant disclosure of D1. In particular, the passage referring to the use of a gas mixture comprising carbon dioxide in the relevant context states, "In a preferred embodiment of this invention when the rigid polymer foam is a polyurethane or polyisocyanurate polymer, **especially** prepared in the presence of a blowing agent precursor such as, for example, water providing carbon dioxide gas: the initial gas composition within the closed cells of the foam comprises...." (column 6, lines 7 to 12; emphasis by the Board).

5.6.3.2 Hence, the use of carbon dioxide as a component of the blowing agent is only a preferred feature, even in the case of a polyurethane foam, and the use of 1,1-difluoroethane as physical blowing agent, in the absence of precursor, i.e. as sole blowing agent, is thus an option arising as the remaining alternative within the disclosure of D1.

5.6.3.3 As to whether the skilled person would, in practice, choose this option, there is nothing in the state of the art in the proceedings which would specifically exclude this. On the contrary, according to the remaining document D3, a process of preparing a stable, rigid, polyoxyalkylene-polyol based polyurethane foam consists essentially of mixing:

a. a polyoxyalkylene-polyol addition product containing 2 to 6 hydroxy groups, having a molecular weight between 270 and 1200 and an equivalent weight between 90 and 300;

b. a tetra(hydroxyalkyl)alkylene diamine having a molecular weight between 220 and 400 and an equivalent weight between 55 and 100;

c. an organic polyisocyanate;

d. a surface active agent; and

e. a solvent blowing agent,

letting the temperature of the mixture rise during the resulting reaction to above the boiling point of the solvent blowing agent, the vaporisation of which

produces a rigid polyurethane foam; the NCO/OH equivalent ratio of the mixture being from 0.8/l to 1.2/1, the equivalent ratio of b/a being between 0.75/1 and 6.0/1, the mean of the equivalent weights of a. and b. combined being between 80 and 130 (Claim 1). The solvent blowing agent may be, apart from fluorotrichloromethane, a fluorinated compound such as CH_3-CHF_2 (Claim 2i). The process is designed to avoid the necessity of adding water, since this tends to release vapours which destroy the cellular structure of the product (page 2, left column, lines 13 to 35; right column, lines 3 to 9). Thus, in addition to indicating the use of the relevant blowing agent, the simultaneous desirability of operating in the absence of water means, in practice, that the relevant blowing agent will be used as the sole blowing agent, as in the application in suit.

5.6.3.4 The argument of the Appellant, that D3 is "not concerned with the same problem" (section III.(a), above) is not convincing, since D3 is also concerned with the production of a rigid polyurethane foam, and is concerned more specifically with avoiding the negative effect on thermal insulation properties caused by the presence of water as a carbon dioxide blowing agent precursor (section 5.6.3.3, above). It is thus concerned with a problem closely akin to that of the application in suit. Nor is it relevant that the solution provided by D3 is "completely different" from that of the application in suit in that it requires the presence of a selected diamine in more than catalytic quantities (Statement of Grounds of Appeal, paragraph 2., last two sentences). As explained in this citation (page 1, right column,

first full paragraph to page 2, left column, line 12) the structure of these amines is chosen so as to overcome the drawbacks associated with the use of volatile amine catalysts as well as ensure adequate catalytic activity without formation of urea bonds. This is achieved by amines which react through hydroxyl groups, which from the point of view of their reactivity are not different from ordinary components having primary hydroxyl groups, such as component a. Moreover, although these amines are identified as being tetra(hydroxyalkyl)alkylene diamines, they are in fact reaction products of epoxy compounds with alkylene diamines (page 3, left column, third full paragraph) and correspond thus to the hydroxyl-terminated amines acknowledged in the application as originally filed as being suitable as polyether polyols for carrying out the claimed process (page 7, lines 7 to 17). It follows that for a skilled person the nitrogen containing compound b. does not represent, in the framework of the reactive system (a. to c.) a component fundamentally different from component a. and that, consequently, the specific process features disclosed in this citation would be considered by the skilled person for the solution of the above-defined technical problem. In any case, the solution proposed according to the application in suit does not exclude the use of such diamines in the relevant quantities.

5.6.3.5 The other argument of the Appellant, that D3 could not be regarded as relevant because it was over 30 years old, is not convincing, since mere age is not necessarily a disqualifying factor. Where, as here, a requirement unconnected with the technical advantages

or disadvantages specific to the process (the necessity of avoiding the use of ozone depleting compounds as blowing agents) is subsequently imposed by law, and applies with equal force to the whole state of the art, the likelihood is that the skilled person will include, in his review of the state of the art, processes which historically may have become superseded, but which nevertheless meet the newly imposed requirement, and thus become relevant teachings. Since furthermore, D3 is concerned with a closely similar problem, its teaching cannot be regarded as irrelevant.

5.6.3.6 The argument of the Appellant, that the foams according to D3 did not have fully closed cells, is not convincing, since D3 specifically seeks to avoid the destruction of the closed cells caused by the presence of water (section 5.6.3.3, above), the examples of D3 achieving proportions of closed cells of between 84% (Example 1) and 88.9% (Example 4), which is high, in any case in comparison with D1, in which no such proportion is specified.

5.6.3.7 In the light of such a teaching, the skilled person would thus have good reason to operate the process according to D1 in the absence of water, and hence of carbon dioxide in the blowing agent.

5.6.4 The remaining measure forming the solution of the stated problem, namely the choice of polyether polyol with an equivalent weight of 90 to 270, corresponds to a standard practice in the art, and is also mentioned as a preferred embodiment of D1 (column 7, lines 37 to 53).

5.6.5 Consequently, there is no feature of the solution of the reformulated problem which departs from the framework of the disclosure of D1, and the only such feature which is not preferred according to D1, is the characterising feature of D3.

5.6.5 In summary, the solution of the stated problem arises in an obvious way, starting from D1.

B. Auxiliary request

5.7 Claim 1 is narrower in scope than that of the main request in that (i) the lower limit amount of 1,1-difluoroethane is 5 wt% instead of 2 wt% based on the whole composition, (ii) the polyol is selected from a polyether polyol and a polyester polyol having 3 to 8 active hydrogen atoms, and (iii) the isocyanate index is 1 to 4.

No further effect has, however, been demonstrated, or even alleged, for these further features. Hence, the statement of problem is the same (section 5.4.6, above) and the solution differs only in that it includes the further restrictions (i), (ii) and (iii).

5.8 The restriction represented by feature (i) does not result in a significant encroachment on the extremely wide range permitted for the amount of blowing agent used, and in any case does not exclude the quantity used in Example 1 of D1. As regards feature (ii), this corresponds to standard polyols conventionally used in the preparation of such foams, such as the glycerine-sucrose derived polyether of Example 1 in D1. Finally, the isocyanate in index fully embraces the preferred

range of 1.0 to 2.0 in D1 (column 7, lines 32 to 37).

5.9 Consequently, there is no basis for coming to a different conclusion in relation to Claim 1 from that already arrived at in respect of the main request.

5.10 In summary, the solution of the reformulated problem is, according to both the main and auxiliary requests, obvious starting from D1 as closest state of the art.

6. The finding that the technical problem as described by the Appellant has not been credibly solved (section 5.4.5, above) has, as one of its further consequences, that there is no obligation to start from the statement of problem given in the application in suit itself (section 5., above), or, therefore, to take, as the closest state of the art, the document associated with its derivation, in this case D1. On the contrary, it is appropriate, in such a case, to seek for a more relevant state of the art than D1, bearing in mind that the closest state of the art is always that state of the art from which the most effective attack on the subject-matter of the application or patent in suit can be mounted. In this connection, the choice, in the decision under appeal, of D3 as closest state of the art appears to the Board to be entirely appropriate.

6.1 The arguments of the Appellant, that D3 does not concern "the same problem" and that it cannot be regarded as relevant because it is over 30 years old, are not convincing to the Board, for reasons already given (sections 5.6.3.4; 5.6.3.5, above).

6.2 Hence, the Board concurs with the choice of D3 as a relevant starting point in the art for the assessment of inventive step.

6.3 Since, furthermore, the Appellant has not contested the logic of the decision under appeal in its analysis of the relationship of the claimed subject-matter to the disclosure of D3 from the point of view of inventive step, the Board has no alternative but to concur with the conclusion reached on this matter, which was that the subject-matter of Claim 1 of both the main and auxiliary requests lacked an inventive step.

6.4 In summary, the subject-matter of Claim 1 of both the main and auxiliary requests does not involve an inventive step in the sense of Article 56 EPC, whether starting from D1, or from D3.

7. Since none of the Appellant's requests can be granted, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin