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Datasheet for the decision of 15 September 2009

Case Number: T 0345/07 - 3.3.10

Application Number: 97910068.2

Publication Number: 0946470

IPC: C07C 7/20

Language of the proceedings: EN

Title of invention:
A method for preventing or retarding the formation of gas hydrates

Patentee:
ISP INVESTMENTS INC.

Opponent:
BASF Aktiengesellschaft

Headword:
Composition for preventing formation of gas hydrates/ISP Investments

Relevant legal provisions:
EPC Art. 56

Keyword:
"All requests: Inventive step (no) - obvious alternative"

Decisions cited:
T 0249/88, T 0939/92, T 1053/93, T 0318/02

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0345/07 - 3.3.10

D E C I S I O N
of the Technical Board of Appeal 3.3.10
of 15 September 2009

Appellant: (Patent Proprietor)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 19 December 2006 revoking European patent No. 0946470 pursuant to Article 102(1) EPC 1973.

Composition of the Board:

Chairman: R. Freimuth
Members: C. Komenda
J.-P. Seitz

Summary of Facts and Submissions

I. The Appellant (Proprietor of the Patent) lodged an appeal on 22 February 2007 against the decision of the Opposition Division posted on 19 December 2006 revoking European patent No. 946 470 and on 29 April 2007 filed a written statement setting out the grounds of appeal.

II. Notice of Opposition had been filed by the Respondent (Opponent), requesting revocation of the patent in its entirety on the grounds of lack of novelty and inventive step (Article 100(a) EPC), and additionally objected to the subject-matter of the patent in suit as extending beyond the content of the application as filed (Article 100(c) EPC). In support for his argumentation he filed *inter alia* document

(15) WO-A-96/08456.

III. In the decision under appeal the Opposition Division held that claim 1 as granted complied with the requirements of Article 123(2) EPC. Further, it was stated that the amendments made during the opposition procedure fulfilled the requirements of Article 123(2) and (3) EPC and that the subject-matter of the then pending request was regarded as being novel over the cited prior art. Starting from document (15) as closest prior art the decision under appeal did not accept that all embodiments falling within the claims solved the technical problem. Since the skilled person had an incentive from document (15) to combine particular polymers or copolymers with ethoxylated alcohols or with glycols it would have been obvious to arrive at the subject-matter according to the then

pending request, which did, therefore, not involve an inventive step.

IV. The Appellant, annexed to his letter of 13 August 2009, submitted 27 requests, of which he no longer maintained 25 requests during the oral proceedings held on 15 September 2009 before the Board. The auxiliary requests "B" and "D" were the only ones to be maintained and were renamed as main and auxiliary request, respectively. Independent claim 1 of the main and the auxiliary request, which both are identical in wording, read as follows:

"1. A composition for preventing or retarding the formation of gas hydrates or for reducing the tendency of gas hydrates to agglomerate, during the transport of a fluid comprising water and a hydrocarbon, through a conduit, consisting of (a) a polymer or copolymer which is (1) a terpolymer of vinyl pyrrolidone, vinyl caprolactam and an ammonium derivative monomer having from 6 to 12 carbon atoms, selected from the group consisting of dialkyl aminoalkyl methacrylamide, dialkyl dialkenyl ammonium halide and a dialkylamino alkyl acrylate or methacrylate, (2) a copolymer of vinyl pyrrolidone and vinyl caprolactam, or (3) a homopolymer of vinyl caprolactam; and (b) a glycol ether selected from ethylene glycol monobutyl ether, di(ethylene glycol) monobutyl ether, 2-isopropoxyethanol, propylene glycol butyl ether, propylene glycol propyl ether, or ethylene glycol monopropyl ether."

V. With his statement of the Grounds for appeal the Appellant submitted that starting from document (15) as closest state of the art the problem of the patent in suit was to provide further compositions for inhibiting the formation or the agglomeration of gas hydrates. According to the patent in suit this was achieved by a combination of particular polymers or copolymers with specific glycol ethers. In order to demonstrate that the problem was solved over the whole range claimed he submitted additional experimental data (Appendix 1 submitted with letters of 29 April 2007 and 13 August 2009). Since document (15) was directed to achieving a synergistic inhibition effect by combining particular polymers or copolymers with a second additive, which was different from the claimed glycol ethers, a skilled person would not have expected other combinations than those specifically disclosed in document (15) to be also capable of achieving a synergistic inhibition effect. Thus, in the absence of any expectation of success a skilled person would not have modified the particular combinations of polymers and additives as disclosed in Table 1 of document (15) and would, therefore, not have arrived at the particular combinations of specific polymers or copolymers with specific glycol ethers according to claim 1 of the patent in suit. Consequently, the subject-matter according to the claims involved an inventive step.

VI. The Respondent did no longer contest novelty of the claimed subject-matter. He brought forward that the subject-matter according to the claims did not involve an inventive step over document (15). The claimed compositions were regarded as representing merely an

arbitrary selection within the disclosure of document (15). The list of polymers used in Table 1 of document (15) disclosed polyvinyl caprolactam, which represented one of the polymers used according to claim 1 of the patent in suit. In document (15), however, polyvinyl caprolactam was used only in combination with sodium butyl sulfonate. Further, document (15) suggested that synergistic effects may also be achieved with other additives, such as glycols or ethoxylated glycols, whereby the exemplified component "2-butoxy ethanol" corresponded to one of the glycol ethers claimed. Therefore, the skilled person had from document (15) alone a clear and direct teaching to use a combination of polyvinyl caprolactam and this particular glycol ether and would, thus, have arrived at the subject-matter of claim 1 of the patent in suit without having to exercise any inventive ingenuity.

VII. In a written communication dated 30 June 2009 the Board informed the Parties of further issues that may be addressed at the oral proceedings, which were in particular the discussion of the objections under Article 100(c) EPC, the requirements of Articles 123(2) and 84 EPC, Rule 80 EPC, as well as the matter of inventive step.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of claims 1 to 6 of the main request or, subsidiarily, on the basis of claims 1 to 6 of the auxiliary request, respectively, corresponding to former auxiliary requests B and D submitted with letter dated 13 August 2009.

The Respondent requested that the appeal be dismissed.

IX. At the end of the oral proceedings before the Board the decision was announced.

Reasons for the Decision

1. The appeal is admissible.

Main and auxiliary request

2. *Amendments*

Claim 1 of the main request and of auxiliary request, which both are identical in wording, have been amended with respect to feature (b), which has been restricted *vis-à-vis* the granted glycol ethers in general to a list of six individual glycol ethers only. A basis for this amendment is to be found in original claim 5, which referred back to claim 1. Thus, this amendment fulfils the requirements of Article 123(2) EPC.

A further amendment made to claim 1 resides in that claim 1 is now directed to a composition "consisting of" the combination of a specific homo-, co- or terpolymer with a glycol ether to be selected from a list of six specific glycol ethers, whereas claim 1 as originally filed referred to a composition "comprising" the combination of those polymers and glycol ethers. A basis for this amendment is to be found in all the examples of the application as filed, which in Table 2 disclose exclusively compositions according to claim 1 consisting of one homo-, co- or terpolymer in

combination with one glycol ether. Since the application as filed does not contain any indication of a composition containing further ingredients, in this particular case the examples may serve as a basis for this amendment.

Therefore, the amendments made to claim 1 fulfil the requirements of Article 123(2) EPC.

As none of the glycol ethers now claimed has a molecular weight exceeding that of di(ethylene glycol) monobutyl ether, all the amendments made result in a restriction of the scope of granted claim 1 and, consequently, the requirements of Article 123(3) EPC are fulfilled.

3. *Novelty*

Novelty of the claimed subject-matter was not objected to in the decision under appeal and was not objected to with regard to the subject-matter of claim 1 by the Respondent. The Board on its own sees no reason to take a different view, since document (15) does not disclose a composition as claimed.

4. *Inventive step*

4.1 The patent in suit is directed to a composition for preventing or retarding the formation of gas hydrates. Such compositions already belong to the state of the art as illustrated by document (15), which uses these compositions in order to prevent the formation of gas hydrates. This document was considered in the decision under appeal and by both parties in the appeal

proceedings as representing the closest prior art document for the assessment of inventive step. The Board sees no reason to depart from this finding.

4.2 Document (15) relates to a method for inhibiting the formation of gas hydrates, which consists in treating a fluid containing water and gas hydrate forming components simultaneously with a first and a second additive (cf. claims 1 and 3). The first additive is a water soluble polymer, such as polyvinyllactams, and the second additive is an organic compound, such as ethers (cf. claims 6 and 8; page 7, lines 1 to 5). Table 1 specifically discloses the combination of a polyvinyl caprolactam homopolymer as first additive with sodium butyl sulfonate as second additive, no further components being present. Further, document (15) contains an indication of further alternative organic compounds to be used as second additive (page 12, paragraph 3).

4.3 Having regard to this prior art document, the Appellant submitted that the technical problem underlying the patent in suit was to provide further compositions inhibiting the formation of gas hydrates.

4.4 As solution to this problem the patent in suit proposes the compositions according to claim 1, which are characterized by the fact that the ether as second additive is one of the listed six individual glycol ethers.

4.5 The examples listed in Table 2 of the patent in suit, as well as the additional examples submitted as Appendix 1 together with the statement of the grounds

for appeal demonstrate that the compositions according to claim 1 are effective in inhibiting the formation of gas hydrates. Therefore, the Board is satisfied that the problem underlying the invention has been successfully solved.

The Respondent argued that the scope of claim 1 was to broad, since not all of the claimed compositions inhibited the formation of gas hydrates, which appeared to depend also on the concentration of the components in the composition, as well as on the testing methods used. Therefore, the technical problem underlying the invention was not solved successfully over the whole range claimed. However, in view of the negative conclusion taken by the Board in respect of obviousness, it may be left open, whether or not the Respondent's objection relating to the breadth of claim 1 is justified (see paragraph 4.7 below). Thus, no further investigation of this issue is necessary.

4.6 Finally, it remains to be decided whether or not the proposed solution to the technical problem, namely the compositions according to claim 1, is obvious in view of the state of the art.

4.7 In document (15) the formation of gas hydrates is inhibited by adding a combination of a first and a second additive, wherein the first additive is a water soluble polymer, such as a polyvinyl caprolactam homopolymer and the second additive is an organic compound, such as ethers (see paragraph 4.2 *supra*). Thus, any composition including those, which contain one of the six individual ethers of the patent in suit, is within the ambit envisaged by the general disclosure

of document (15) and is taught to be suitable for inhibiting the formation of gas hydrates.

The choice of a specific combination of a particular water soluble polymer and a particular ether, i.e. a polyvinyl caprolactam homopolymer and one of the individual six glycol ethers as indicated in present claim 1, has not been shown to result in any technical benefit *vis-à-vis* the closest state of the art. Therefore, this choice can neither be treated as critical nor as purposive for solving the technical problem underlying the patent in suit, but merely as an arbitrary restriction of no particular technical significance.

A list of further compounds, which according to document (15) are also suitable as second additive for inhibiting the formation of gas hydrates and providing a synergistic inhibition effect, explicitly discloses the compound "2-butoxy ethanol" (cf. page 12, line 31). This name is another expression for the identical ether compound named "ethylene glycol monobutyl ether" in claim 1 of the patent in suit.

Thus, the skilled person had a clear and direct teaching in the closest prior art document (15) itself on how to solve the technical problem of providing an alternative, namely to use 2-butoxy ethanol (ethylene glycol monobutyl ether) as second additive, thereby arriving at the solution proposed by the patent in suit.

For these reasons the subject-matter of claim 1 of the patent in suit turns out to be merely the result of an

arbitrary choice made within the ambit of document (15) and thus is obvious from the closest prior art alone.

4.7.1 The Appellant, however, brought forward that document (15) clearly focussed on achieving a synergistic inhibition effect, which could not be obtained with other than the specific combinations of polymers and organic compounds exemplified in Table 1. Therefore, a skilled person would not have dismantled or modified these particular synergistically effective combinations described in that document.

However, since the objective technical problem consists merely in providing alternative compositions inhibiting the formation of gas hydrates (see paragraph 4.3 *supra*) the presence of a synergistic effect or not is not part of the technical problem to be solved, and therefore is irrelevant for the assessment of inventive step. Furthermore, document (15) specifies on page 12, paragraph 3, that "the synergistic inhibition effect will be observed with other organic compounds including (...) ethoxylated alcohols such as 2-butoxy ethanol", thus indicating a clear and direct teaching to the use of this organic compound in - even synergistic - compositions inhibiting the formation of gas hydrates.

4.7.2 Further, the Appellant argued that the passage on page 12, lines 27 and 28 indicated that the authors of document (15) only "believe[d]" that the synergistic inhibition effect will be observed when using 2-butoxy ethanol implying that they have not been certain thereon. Therefore, in the absence of any expectation of success the skilled man would not have seriously taken these alternatives into consideration.

However, when assessing inventive step it is not necessary to establish that the success of an envisaged solution of a technical problem was certain. In order to render a solution obvious it is sufficient to establish that the skilled person would have followed the teaching of the prior art with a reasonable expectation of success (see decisions T 249/88, point 8 of the reasons; T 1053/93, point 5.14 of the reasons; and T 318/02, point 2.7.2 of the reasons, neither published in OJ EPO). In the present case the passage referred to rather indicates that the proposed alternatives have simply not yet been realized, but gives a clear and direct pointer to the skilled person, which makes it obvious to try the proposed alternatives in order to provide a solution to the technical problem underlying the patent in suit (see paragraph 4.3 *supra*). Therefore, this argument of the Appellant cannot succeed.

4.7.3 Further, the Appellant brought forward that due to the length of the list of possible alternatives indicated on page 12, paragraph 3 of document (15), a skilled person would have had no incentive to specifically select 2-butoxy ethanol.

However, the simple number of alternatives which a skilled person had at his disposition when looking for alternative compositions has no impact on the assessment of obviousness, since a mere arbitrary choice from a host of possible solutions does not in itself involve inventive ingenuity (see decision T 939/92, OJ EPO 1996, 309, points 2.5.2 and 2.5.3 of the reasons).

4.7.4 The Appellant stated further that document (15) did not contain any indication of particularly combining the polyvinyl caprolactam homopolymer disclosed in Table 1 of document (15) with 2-butoxy ethanol listed on page 12, line 31.

However, a disclosure of that particular combination would amount to a disclosure anticipating the subject-matter of claim 1, which is not a prerequisite for successfully attacking inventive step. The Respondent's objection that there is no pointer to this specific combination cannot convince the Board because this is asking for a condition to be met which is meaningless in a situation where the claimed solution merely consists in selecting components at random within the ambit of document (15), as no improvement is attributable to the use of the claimed ethers of claim 1 over those defined in document (15).

5. For these reasons, the Board concludes that the subject-matter of claim 1 of the main request and, due to its identical wording, also the subject-matter of claim 1 of the auxiliary request do not involve an inventive step as required in Article 56 EPC. Consequently, the main request and the auxiliary request are not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar | The Chairman

C. Rodríguez Rodríguez | R. Freimuth