Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 16 January 2014

Case Number: T 1191/11 - 3.3.10

Application Number: 05814842.0

Publication Number: 1751395

IPC: C09K8/524

Language of the proceedings: EN

Title of invention:
LOW DOSAGE NAPHTHENATE INHIBITORS

Patent Proprietor:
Champion Technologies, Inc.

Opponent:
Clariant Produkte (Deutschland) GmbH

Headword:

Relevant legal provisions:
EPC Art. 54(2), 56, 84, 83, 123(2), 123(3)

Keyword:
Novelty - (no) - main request
Amendments - added subject-matter (no)
- first auxiliary request
Claims - clarity (yes) - first auxiliary request
Sufficiency of disclosure - (yes) - first auxiliary request
Inventive step - (yes) - first auxiliary request

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1191/11 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 16 January 2014

Appellant: (Opponent)	Clariant Produkte (Deutschland) GmbH Group Intellectual Property Am Unisys-Park 1 65843 Sulzbach (DE)
Representative:	von Kreisler Selting Werner Deichmannhaus am Dom Bahnhofsvorplatz 1 50667 Köln (DE)
Respondent: (Patent Proprietor)	Champion Technologies, Inc. 3200 Southwest Freeway Suite 2700 Houston, Texas 77027 (US)
Representative:	Barton, Matthew Thomas Forresters Skygarden Erika-Mann-Strasse 11 80636 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 17 May 2011 concerning maintenance of the European Patent No. 1751395 in amended form.**

Composition of the Board:

Chairman: P. Gryczka
Members: R. Pérez Carlón
D. Rogers

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the opposition division to maintain European patent No. 1 751 395 in the form of the then pending main request.

II. An opposition was filed on the ground that the subject-matter of the patent as granted was not novel and did not involve an inventive step (Article 100(a) EPC).

III. *Inter alia*, the following documents were cited:

D1: T. E. Havre, Thesis submitted in partial fulfilment of the requirements for the degree of doktor ingeniør, Trondheim, October 2002

D2: G. Pogessi *et al.* Paper for presentation at the Society of Petroleum Engineers, Oilfield Scale Symposium, Aberdeen 30-31 January 2002, SPE 74649

D9: P.H. Ogden, Chemicals in the Oil Industry, Developments and Applications, 1991, p. 22

D10: US 5213691

IV. Claim 1 of the main request in appeal proceedings, which is identical to the main request pending in opposition proceedings upon which the patent was maintained, reads as follows:

"A method for use in oil production, the method comprising:

supplying at least one surface active compound into a mixture of divalent cation-containing water and organic acid-containing oil at a dosage rate that is effective to self-associate at interfaces between the water and

oil and inhibit formation of divalent cation salts of the organic acid,

characterised by after adding the compound, reducing the pressure to release carbon dioxide gas from the oil".

V. The opposition division decided that none of the documents opposed to the patent in suit disclosed the characterising feature of claim 1 of the main request, whose subject-matter was, thus, novel. Document D1 was comprised in the state of the art and represented the closest prior art, the problem underlying the claimed invention was the provision of a method which allowed an efficient separation of the oil and water phases, the solution was reducing the pressure to release carbon dioxide gas from the oil after adding a surface active compound, and no indication was found in the art towards such a solution, with the consequence that the claimed subject-matter was inventive.

VI. During the oral proceedings before the board, the respondent (patent proprietor) filed a first auxiliary request which was identical to the third auxiliary request filed with the response to the notice of appeal.

Claim 1 of the first auxiliary request reads as follows:

"A method for use in oil production, the method comprising:

supplying at least one surface active compound into a mixture of divalent cation-containing water and organic acid-containing oil at a dosage rate that is effective

to self-associate at interfaces between the water and oil and inhibit formation of divalent cation salts of the organic acid, wherein the surface active compound is at least one hydrotrope selected from

a monophosphate ester, a diphosphate ester, or a combination thereof,

and characterised by after adding the compound, reducing the pressure to release carbon dioxide gas from the oil."

VII. The arguments of the appellant (opponent) relevant for the present decision were the following:

Document D2 described a method for use in oil production which avoided the formation of calcium naphthenate in mixtures of oil containing naphthenic acids and water containing calcium, by adding at the bottom of an oil well a demulsifier and a naphthenate dispersant. Since these compounds were surface active, and such addition at the bottom of the oil well necessarily took place before any pressure reduction, the subject-matter of claim 1 was not novel.

There was no basis in the application as originally filed for the features of claim 1 of the first auxiliary request, with the consequence that it contained added subject-matter.

It was not clear how claim 41, which read "wherein the compound is an ; acid", should be understood. If it should be interpreted as "wherein the compound is an acid", claims 1 and 41 were contradictory and thus lacked clarity, since a compound could not be at the same time a phosphate ester and an acid.

Claim 1 of the first auxiliary request did not define the alcohol residue of the mono and diphosphate esters required for the claimed method, with the consequence that the subject-matter claimed could not be reproduced and was, thus, not sufficiently disclosed.

Document D2 was the closest prior art for the subject-matter of the first auxiliary request. The problem underlying the claimed invention was merely providing a further method for inhibiting the formation of salts of organic acids such as calcium naphthenate and the solution proposed by claim 1 of the main request, namely using a mono- and/or a diphosphate ester, was obvious since phosphate esters were known scale inhibitors (D9, D10), and scale formation followed an analogous mechanism to that of calcium naphthenate since it was also due to the presence of calcium ions. The subject-matter of the first auxiliary request was, thus, not inventive.

VIII. The arguments of the respondent relevant for the present decision were the following:

The respondent argued that document D2 failed to disclose inhibiting the formation of salts of organic acids, and the step of pressure reduction required by claim 1, so that the subject-matter of claim 1 of the main request was novel over D2.

Claim 1 of the first auxiliary request resulted from combining subject-matter already present in claims 1, 27 and 46 as granted, so that it did not contain added subject-matter.

It was obvious that claim 41 should be read "wherein

the compound is an acid", the ";" between "is" and "and" in claim 41 of the patent specification being superfluous. There was no contradiction between claim 41 and claim 1 of the first auxiliary request, since mono and diphosphate esters still could have acidic protons. For this reason, these claims were clear.

The description disclosed one way to carry out the invention, the skilled person understood the terms monophosphate esters and diphosphate esters, and could obtain such compounds following the instructions in paragraph [21] of the patent in suit and in the examples, so that the claimed invention was sufficiently disclosed.

Document D2 was the closest prior art for the subject-matter of claim 1 of the first auxiliary request. Although the respondent submitted that the claimed method was superior to that disclosed in D2, even if the problem underlying the claimed invention was merely providing a further method for inhibiting calcium naphthenate formation during oil production, the proposed solution, namely using a surface active compound which consisted of at least one hydrotrope selected from a monophosphate ester, a diphosphate ester, or combinations thereof, was not obvious having regard to the prior art opposed to the patent in suit. The subject-matter of the first auxiliary request was, therefore, inventive.

IX. Oral proceedings before the board took place on 16 January 2014.

X. The final requests of the parties were the following:

- The appellant requested that the decision under appeal be set aside and that the European patent No. 1 751 395 be revoked.
- The respondent requested that the appeal be dismissed, or alternatively that the patent be maintained upon the basis of any of the first to third auxiliary requests filed at the oral proceedings before the board on 16 January 2014.

XI. At the end of the oral proceedings, the decision was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request: novelty.

2. Document D2 describes a method for use in oil production, namely in a deep off-shore field (abstract; first two paragraphs), according to which a demulsifier and a naphthenate dispersant (page 2, left column, lines 44-49) are supplied at the bottom of a producing well (page 2, left column, line 29) whose product is an oil which contains naphthenic acid (page 1, right column, lines 14-15) and water (page 2, left column, lines 34 and 44), whereby said water fraction necessarily contains calcium ions which can lead to the formation of calcium naphthenates (page 2, left column, line 46).

3. It remains to be examined whether D2 discloses a step of reducing the pressure to release carbon dioxide from the oil, whether the compounds mentioned in document D2 are surface active, and whether the dosage rate of D2 is sufficient to allow said compounds to self-associate

at interfaces between the water and oil and inhibit formation of divalent cation salts of the organic acids, as required by claim 1.

3.1 The respondent argued that document D2 failed to disclose a step of pressure reduction so that carbon dioxide was released, as required by claim 1.

However, document D2 discloses injecting surface active compounds at the bottom of producing wells, i.e. at the point at which the pressure is highest. Carbon dioxide which, as acknowledged by the respondent, is always present in oil and is always released upon pressure reduction, is necessarily released at a later point of time than said injection. Although D2 fails to explicitly disclose said pressure reduction, such a step is implicitly disclosed by the step of adding the compounds to the bottom of the well. This argument of the respondent is, thus, dismissed.

3.2 On page 2, left column, lines 22 to 37, document D2 describes a "basic formulation" comprising a corrosion inhibitor and a scale inhibitor. It also refers to the technical difficulties related to the injection of substances in deep water wells, which led to limiting the number of injection lines.

On page 2, left column, lines 44-49, it further describes that, in order to limit pressure loss and formation of calcium naphthenates, it might become necessary to add to said basic formulation a demulsifier and a naphthenate dispersant. From this sentence, it is concluded that at least one of the demulsifier and the naphthenate dispersant is capable of preventing the formation of calcium naphthenate, which is a divalent cation salt of an organic acid, and

is added at an effective dosage rate, as required by claim 1.

The respondent argued that document D2 did not disclose a method for inhibiting naphthenate formation, but a method for dispersing emulsions stabilised by calcium naphthenate, already formed.

However, as mentioned above, document D2 explicitly mentions (page 2, left column, line 48) that a demulsifier and a naphthenate dispersant are added in order to limit the formation of calcium naphthenate. This argument of the respondent is, thus, dismissed.

3.3 A demulsifier is a compound which affects the surface behaviour of the components of an emulsion and, hence, is necessarily surface active, as required by claim 1.

A naphthenate dispersant is further defined in D2, page 3, line 27 as an organic sulfonate, and the description of the patent in suit acknowledges that sulfonates are surface active compounds as required by present claim 1 (see [19], line 52 of the patent as granted).

For these reasons, it is concluded that both the demulsifier and the naphthenate dispersant of document D2 are surface active compounds as required by claim 1 of the main request.

3.4 Finally, claim 1 requires that the dosage rate of the surface active component is effective to self-associate at interfaces between water and oil. Taking into account the role of the demulsifier and the calcium naphthenate dispersant in the process of D2 (inhibit calcium naphthenate formation) and that they are surface active, they must necessarily self-associate at

the water oil interface as required by claim 1. This finding has not been challenged by the respondent.

3.5 For these reasons, it is concluded that D2 discloses all the features of claim 1 of the main request, with the consequence that the subject-matter of said claim is not novel (Article 54(2) EPC).

First auxiliary request:

4. Amendments:

Claim 1 of the first auxiliary request restricts the subject-matter of claim 1 as granted by closer defining the surface active components as "an hydrotrope selected from a monophosphate ester, a diphosphate ester and mixtures thereof" and by including, as in claim 1 of the main request, the step "after adding the compound, reducing the pressure to release carbon dioxide gas from the oil".

Claim 1 of the first auxiliary request finds a basis on the combination of claim 176 as originally filed and the preferred compounds for carrying out the invention disclosed on page 5, lines 8-9 of the application as originally filed (Article 123(2) EPC).

The appellant challenged the basis provided by the respondent for claim 1, which was the combination of claims 1, 27 and 46 as granted. However, since a basis thereof can be found in the application as originally filed, it is irrelevant whether claim 1 results from a combination of granted claims. This argument of the appellant is, thus, dismissed.

No further objections under Article 123(2) or (3) EPC

had been raised by the appellant, and the board does not see any reason to raise such an objection on its own motion.

5. Clarity:

5.1 The appellant argued that claim 1 required that the surface active compound was at least one hydrotrope selected from a monophosphate ester, a diphosphate ester, or a combination thereof, whereas dependent claim 41 further defined such phosphate esters as "an acid". Since both conditions could not be fulfilled at the same time, claims 1 and 41 were contradictory and the later had to be regarded as a further independent claim.

However, mono and diphosphate esters still contain acidic P-OH groups that can be in its acid form, or in the form of any of its salts, in agreement with the description of the patent in suit (paragraph [14], column 4, lines 11-12). For this reason, there is no contradiction between claims 1 and 41.

This argument of the appellant is, hence, dismissed.

5.2 The appellant further argued that claim 41, which read "wherein the compound is an ; acid" was unclear due to the semicolon between the words "an" and "acid".

However, the skilled reader immediately identifies the error (a superfluous semicolon) and its meaning ("an acid"), which is, furthermore, in line with the teaching of the patent in suit (paragraph [14], column 4, lines 11-12), with the consequence that said claim is clear.

This argument of the appellant is also dismissed.

6. Sufficiency of disclosure:

The appellant argued that claim 1 left open the definition of the alcohol residue of the mono- and di-phosphate esters required by claim 1, with the consequence that the subject-matter of claim 1 could not be reproduced.

However, the description discloses a way to carry out the invention, the person skilled in the art understands the terms mono- and diphosphate ester in claim 1 and can obtain these compounds by reacting P_2O_5 with the corresponding alcohols following the teaching in paragraph [21] and examples 5 to 8 of the patent in suit. For these reasons, the claimed invention is considered sufficiently disclosed.

This argument of the appellant is, thus, dismissed.

7. Novelty:

The appellant did not have any objection with regard to the novelty of the subject-matter of the first auxiliary request, and the board sees no reason to depart from this view in the light of the available prior art, as D2 fails to disclose the specific surface active compounds required by claim 1.

8. Inventive step:

Claim 1 of the first auxiliary request is directed to a method for use in oil production comprising supplying to a mixture of water and oil a surface active compound wherein the surface active compound is at least one

hydrotrope selected from a monophosphate ester, a diphosphate ester or a combination thereof and, after adding the compound, reducing the pressure to release carbon dioxide from the oil.

8.1 Closest prior art:

Both parties considered that document D2 represented the closest prior art, and the board sees no reason to depart from this view.

The opposition division considered that document D1 was closer to the claimed invention. The parties were, however, divided as to whether document D1 represented state of the art in the sense of Article 54(2) EPC.

During the oral proceedings before the board, the appellant acknowledged that document D1 was not closer than D2 to the claimed invention and the board agrees with this finding, since D1 merely refers back to D2 without adding any further technical information to the later. For this reason, it is not necessary to decide whether D1 belongs to the state of the art.

As explained in point 2. above, document D2 discloses a process for use in oil production which inhibits formation of calcium naphthenate, comprising supplying a surface active compound to a mixture of water and oil at the bottom of an oil well prior to any pressure drop.

Document D2 fails to disclose a method which uses a monophosphate ester, a diphosphate ester, or a combination thereof as such surface active compound.

8.2 Technical problem underlying the invention:

The respondent considered that the claimed process was more efficient than the process disclosed in D2, whereas this was contested by the appellant.

In favour of the appellant, it will be considered that the problem underlying the claimed invention is merely providing a further process for inhibiting the formation of calcium naphthenate in mixtures of oil and water during oil production.

8.3 Solution:

The solution proposed by claim 1 of the first auxiliary request is a method comprising supplying a surface active compound into a mixture of divalent cation-containing water and organic acid-containing oil before a pressure reduction step which releases carbon dioxide from the oil, characterised in that the surface active compound is at least one hydrotrope selected from a monophosphate ester, a diphosphate ester, or combinations thereof.

8.4 Success:

It has not been challenged that the problem of providing a further process to that disclosed in D2 is credibly solved by the method subject-matter of claim 1.

The data provided in examples 2 to 6 of the patent in suit show that adding mono- and/or diphosphate esters to mixtures of oil containing naphthenic acids and water containing calcium prevents the formation of calcium naphthenate, so that the board is satisfied

that this technical problem is effectively solved by the claimed process.

8.5 Finally, it remains to be examined whether the claimed solution was obvious for the person skilled in the art:

Document D2 discloses (page 3, left column, first full paragraph) that *"naphthenic crudes were incompatible with most scale inhibitors, resulting in an increase in the formation of calcium naphthenate deposits"*; phosphonates were found particularly unsuitable. The skilled person, thus, would not use a scale inhibitor such as those disclosed in D9 or D10 for inhibiting the formation of calcium naphthenate in the light of D2.

For these reasons, the board concludes that the method according to claim 1 of the first auxiliary request, and by the same token the subject-matter of dependent claims 2 to 47, involves an inventive step within the meaning of Article 56 EPC.

8.6 The appellant argued that scale formation, as calcium naphthenate formation, involved calcium ions. It was, hence, obvious for the skilled person that both process followed similar mechanisms. Knowing from D2 that some scale inhibitors such as phosphonates were incompatible with naphthenic crudes, the skilled person would consider other scale inhibitors, such as the phosphates of documents D9 and D10.

However, as mentioned above, document D2 explicitly teaches away from using scale inhibitors, and although calcium ions are both involved in the formation of scale and of naphthenate salts, the mechanism of scale inhibition is not explained in any of the documents on file.

This argument of the appellant is, thus, dismissed.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent with the following claims and a description to be adapted:

   Claims 1-47 of the first auxiliary request filed at the oral proceedings before the board on 16 January 2014.

The Registrar: The Chairman:

C. Rodríguez Rodríguez P. Gryczka

Decision electronically authenticated