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**Datasheet for the decision
of 13 June 2018**

Case Number: T 2237/15 - 3.3.06
Application Number: 04778127.3
Publication Number: 1660615
IPC: C10G45/02, C10G7/00, B01D3/00
Language of the proceedings: EN

Title of invention:

Desulfurization of a naphtha gasoline stream derived from a fluid catalytic cracking unit

Applicant:

Saudi Arabian Oil Company

Headword:

Desulfurization of naphtha / SAUDI ARABIAN OIL

Relevant legal provisions:

EPC Art. 123(2)

Keyword:

Amendments - added subject-matter (yes) - main Request and First Auxiliary Request

Decisions cited:

Catchword:



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Case Number: T 2237/15 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 13 June 2018

Appellant: Saudi Arabian Oil Company
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Dhahran 31311 (SA)

Representative: Gervasi, Gemma
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 22 June 2015
refusing European patent application No.
04778127.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman G. Santavicca

Members: L. Li Voti

J. Hoppe

Summary of Facts and Submissions

I. The appeal lies from the decision of the Examining Division to refuse European patent application no. 04 778 127.3.

II. In its decision, the Examining Division found that the claims as amended did not comply with the requirements of Article 123(2) EPC.

In particular, the Division found (reasons, 10.3) that "The subject-matter of claim 1 includes...embodiments, which were not originally disclosed by the present application and such embodiments find no basis in the application documents as originally filed."

III. With its statement setting out the grounds of appeal (dated 2 November 2015), the Appellant contested the findings in the decision under appeal and filed eight sets of amended claims to be considered as main request and first to seventh auxiliary requests, respectively.

In particular, as regards the basis in the original application for the amendments to the claims in the newly filed claim requests, it submitted that they were based on dependent claims 13 and 14, on selected passages taken from the "Detailed Description of Preferred Embodiments" and/or from Example I as well as from the drawing.

IV. The Appellant was summoned to oral proceedings according to its request to this end.

V. In its communication, dated 22 March 2018, issued in preparation for oral proceedings, the Board expressed its provisional opinion that the amended claims

presented deficiencies under Articles 84 and 123(2) EPC. Therefore, none of the pending requests appeared to be allowable.

VI. By letter of 18 May 2018 the Appellant filed two new sets of amended claims to be considered as main request and first auxiliary request, respectively, and withdrew all previously filed requests. Moreover, it requested rectification of particulars shown in the drawing as originally filed.

The Appellant maintained that the claims were clear and complied with the requirements of Article 123(2) EPC, and argued that the rectification was allowable.

VII. Claim 1 according to the new main request reads as follows (amendments with respect to claim 1 of the main request filed with the statement of grounds made apparent by the Board):

*"1. A process for reducing the sulfur content of naphtha in the effluent (11) from a fluid catalytic cracking reactor during treatment in a **main** catalytic distillation fractionation column (10), comprising:*

*a. withdrawing from the **main** fractionation column (10) a high-sulfur catalytic naphtha stream (20) including*

*a full-range catalytic cracked naphtha fraction **boiling in the range C₅ to 430°F (221°C)** and a **that** portion of a light cycle oil fraction having an end boiling point in the range ~~221°C (430°F)~~ **430°F (221°C)** to ~~260°C (500°F)~~ **500°F (260°C)**,*

or

a ~~naphtha fraction boiling greater than 121°C (250°F)~~ and a ~~portion of a light cycle oil fraction~~

~~having an end boiling point in the range 221°C (430 °F) to 260°C (500°F);~~

b. introducing the high-sulfur catalytic-naphtha stream (20) into an inlet of a reactive distillation side column (30) ~~in which the high-sulfur catalytic naphtha is distilled into a lighter fraction (44) and a heavier fraction (42)~~, wherein said inlet is located between a rectifying section (30A), containing a first hydrodesulfurization catalyst bed (31A), and a stripping section (30B), containing a second hydrodesulfurization catalyst bed (31B);

c. introducing hydrogen (32) into the side column (30) in

an inlet located above the position of the introduction of the high-sulfur catalytic naphtha stream (20) and below said first hydrodesulfurization catalyst bed (31A) and

an inlet located below said second hydrodesulfurization catalyst bed (31B);

d. processing the lighter fraction in the rectifying section (30A) and processing the heavier fraction in the stripping section (30B);

e. withdrawing from the side column (30) **separate** desulfurized streams including an **overhead** stream of gases and light hydrocarbons (40) **including H₂S, H₂ and desulfurized light and mid-cut naphtha produced by reactive distillation in step (d), a liquid reflux stream (60)**, a light and medium catalytic naphtha fraction (44) boiling in the range of from C₅ to ~~121°C (250°F)~~ **250°F (121°C)**, a heavy catalytic naphtha fraction ~~(42-34)~~ boiling in the range of from ~~121°C (250°F)~~ **250°F (121°C)** to ~~221°C (430°F)~~ **430°F (221°C)**, and a heavier fraction (38) boiling above ~~221°C (430°F)~~ **430°F (221°C)**;

*f. returning ~~the~~ **said overhead, liquid reflux, light and medium catalytic naphtha fraction and heavier fraction** desulfurized streams (38; 40; ~~42;~~ 44; 60), and a portion (42) of said heavy catalytic naphtha fraction desulfurized stream (34), to the main fractionation column (10), the heavier fraction stream (38) being returned to **the main** fractionation column (10) at a position above ~~the~~ **an** inlet of FCC reactor ~~vapors~~ **effluent** (11); and*

*g. recovering a low-sulfur content **heavy** naphtha **product (34) boiling below 430 °F (221 °C)** from the ~~fractionation side~~ column ~~(10)~~ (30)."*

Claim 1 according to the first auxiliary request differs from claim 1 according to the main request insofar as the claimed process requires the following additional steps:

"h. recovering light gases (18) from fractionating column (10);

i. returning a portion of the heavy cat naphtha (34) to side column (30)."

VIII. In a communication dated 24 May 2018, the Board informed the Appellant of its provisional opinion that the pending requests still presented deficiencies under Articles 84 and 123(2) EPC, that the admissibility of these late filed requests under Article 13(1) RPBA was at stake, and that the requested rectification did not appear to be allowable under Rule 139 EPC.

IX. With a letter dated 29 May 2018 the Appellant informed the Board that it would not participate in the oral proceedings and withdrew its request for oral proceedings.

- X. Oral proceedings were held on 13 June 2018 in the absence of the Appellant.

Requests

- XI. The Appellant requested in writing that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request or, subordinately, on the basis of the claims of the first auxiliary request, both requests submitted with letter dated 18 May 2018.

Reasons for the Decision

Main request

1. Amendments - Claim 1 - Compliance with the requirements of Article 123(2) EPC
 - 1.1 Step (e) of claim 1 of the main request (full wording of claim 1 under VII, *supra*) requires the withdrawal from the side column (30) of separate desulfurized streams including a light and medium catalytic naphtha fraction (44) boiling in the range of from C₅ to 250°F (121°C).

In its communication of 22 March 2018 the Board, referring to claim 1 of the then pending main request, which contained the same feature of step (e) identified above, had already expressed its opinion that claim 1 did not appear to comply with the requirements of Article 123(2) EPC. In particular, the Board had stated that

"6.2.5...Step (e)...this step defines "a light and medium catalytic naphtha fraction (44) **boiling in the range of from C5 to 121°C (250°F)**", the basis for which is not clear. In fact, the drawing simply mentions Light/Medium Cat Naphtha to Main Column; and the description discloses (page 14, line 6) only the boiling limits for LCN retained in the main column and not for that withdrawn from side column (30). Moreover, boiling limits for MCN do not appear to be disclosed."

1.2 As regards this Board's objection, the Appellant, in its letter of 18 May 2018, argues as follows:

"6.2.5, fifth paragraph - The response to this point is provided in the discussion of point 5.4.1 above."

"5.4.1 - This section addresses what is apparently a contradiction in definitions of naphtha fractions. However, the Applicant notes that the passage referred to by the Board at page 14, line 6, refers to stream 20, namely, a stream drawn from column 10 and still containing relevant amounts of sulfur compounds; in contrast, fraction 44 mentioned in claim 1, step (e), is drawn from column 30 and has been desulfurized. It is known in the field that sulfur-containing compounds are heavy compounds and the presence of sulfur generally raises the boiling point of corresponding, non-sulfurized, compounds. As a consequence, there is no contradiction in indicating that a light cat naphtha (LCN) containing sulfur compounds, and a mix of desulfurized LCN and medium cat naphtha (MCN) boil in the same temperature range. The situation is better explained by reference to how the process is carried out in practice. The plant is operated by setting T limits for the various fractions, that is, by predetermining the extraction points from columns 10

and 30, that correspond to the equilibrium T at that height or tray in the fractionating tower. With the same max cutting T, 250 °F, one draws off a sulfur-containing LCN fraction from column 10, and a sulfur-free blend of LCN and MCN (obviously boiling higher than LCN) from column 30."

- 1.3 The Appellant thus confirms in its reply that the passage referred to at page 14, line 6 of the application as originally filed refers to the LCN stream drawn from column (10) and still containing relevant amounts of sulfur compounds whilst fraction (44) is a different desulfurized stream drawn from column (30) containing LCN and, additionally, MCN. A basis for the boiling range of this desulfurized stream specified in claim 1 at issue has not been indicated in the Appellant's reply.
- 1.4 With reference in particular to point 6.2.5 of its communication of 22 March 2018, the Board reiterated in its fax of 24 May 2018 its opinion that *inter alia* the discussed boiling range was not disclosed in the application as originally filed. Therefore, that the Article 123(2) EPC deficiencies indicated in this respect in the Board's communication did not appear to have been overcome.
- 1.5 The Appellant did not reply to these Board's comments and did not attend the oral proceedings before the Board which were held on 13 June 2018, as scheduled.
- 1.6 Therefore, even considering *arguendo* in the Appellant's favour that the main request would be admissible under Article 13(1) RPBA, the Board has no reason to depart from its preliminary opinion expressed in the communication of 22 March 2018 and reiterated in the

communication of 24 May 2018 that claim 1 of the main request does not comply with the requirements of Article 123(2) EPC.

- 1.7 The main request is thus not allowable.
2. In view of this finding, the Board needs not to detail why the requested rectification of the drawing (VI, *supra*) does not comply with Rule 139 EPC.

First Auxiliary Request

3. Amendment - Claim 1 - Compliance with the requirements of Article 123(2) EPC
 - 3.1 As the features of step (e) of the process of claim 1 at issue are the same as those of the process of claim 1 according to the main request, the Board likewise finds that claim 1 of the First Auxiliary Request does not comply with the requirements of Article 123(2) EPC, for the same reasons given in respect of the claims of the Main Request.
 - 3.2 The First Auxiliary Request too is thus not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D. Magliano

G. Santavicca

Decision electronically authenticated