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Datasheet for the decision of 21 May 2025

Case Number: T 0509/24 - 3.3.06

Application Number: 18709943.7

Publication Number: 3583189

IPC: C10G7/06

Language of the proceedings: EN

Title of invention:
METHOD FOR CONTINUOUSLY TREATING VACUUM RESIDUALS ORIGINATING FROM THE REFINERY OF CRUDE OIL

Patent Proprietor:
LIST Technology AG

Opponent:
Buss-SMS-Canzler GmbH

Headword:
METHOD FOR CONTINUOUSLY TREATING VACUUM RESIDUALS ORIGINATING FROM THE REFINERY OF CRUDE OIL / List Technology AG

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

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Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 0509/24 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 21 May 2025

Appellant: (Opponent)	Buss-SMS-Canzler GmbH Kaiserstrasse 13-15 35510 Butzbach (DE)
Representative:	Schaad, Balass, Menzl & Partner AG Bellerivestrasse 20 Postfach 8034 Zürich (CH)
Respondent: (Patent Proprietor)	LIST Technology AG Berstelstrasse 23 4422 Arisdorf (CH)
Representative:	Patentanwälte und Rechtsanwalt Weiß, Arat & Partner mbB Zeppelinstraße 4 78234 Engen (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 22 March 2024 rejecting the opposition filed against European patent No. 3583189 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	S. Arrojo
Members:	R. Elsässer
	C. Heath

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division to reject the opposition.

II. Granted claim 1 reads as follows (feature labelling as proposed by the appellant):

1.1 Method for continuously treating vacuum residuals originating from the refinery of crude oil,
1.2 wherein the crude oil is subjected to a first and a second distillation step,
1.3 wherein the second distillation step is performed under vacuum conditions,
1.4 wherein the vacuum residuals are obtained after the second distillation step, characterized in that
1.5 the vacuum residuals are continuously fed into an agitated vessel,
1.6 wherein the agitated vessel is a single-shaft mixer kneader,
1.7 wherein the vacuum residuals are continuously fed into the single-shaft mixer kneader through at least one feed point of that single-shaft mixer kneader,
1.8 wherein the shaft of the single-shaft mixer kneader is equipped with kneading elements
1.9 and wherein the single-shaft mixer kneader comprises a housing which is equipped with kneading counter-elements,
1.10 wherein the kneading elements and the kneading counter-elements are arranged in a co-operating fashion,
1.11 wherein the housing comprises at least one vapour connection,

1.12 wherein the vacuum residuals are conveyed alongside the single-shaft mixer kneader to a discharge device of the single-shaft mixer kneader,
1.13 wherein the vacuum residuals in the single-shaft mixer kneader are subjected to a vacuum of 10 mbar or lower
1.14 and to a temperature of at least between 300°C
1.15 to remove volatiles which could not be removed by the distillation steps through the at least one vapour connection,
1.16 and wherein the remaining non-volatile matter is discharged through the discharge device.

III. With the grounds of appeal, the opponent and appellant filed an extract from Wikipedia (**D13**) and argued that the subject-matter of granted claim 1 was not inventive *inter alia* over **D1** (WO 2016/078994 Al), when taking into account the teachings of **D4** (WO 88/00493), **D5** (DE 3122650), **D11** (excerpt from Römpp Chemie Lexikon) and / or **D13**. The same objection applied to claim 1 of the auxiliary request filed during first instance proceedings.

IV. With the reply to the appeal, the patent proprietor and respondent filed auxiliary request 1, which corresponds to the auxiliary request already filed during first instance proceedings and a new auxiliary request 2. The respondent also contested the appellant's objections.

V. In a further submission, the appellant argued *inter alia* that claim 1 of auxiliary request 2 did not involve an inventive step.

VI. In the communication pursuant to Article 15(1) RPBA, the board set out that, according to its preliminary

opinion, none of the requests on file involved an inventive step over the prior art document **D1** alone.

VII. With a submission of 12 May 2025, the respondent confirmed the requests previously filed, but withdrew its request for oral proceedings. As a result, the oral proceedings were cancelled.

VIII. The parties requests are as follows:

The appellant requests that the impugned decision be set aside and the patent be revoked.

The respondent requests that the appeal be dismissed or, alternatively, that the patent be maintained in amended form, based on one of auxiliary requests 1 or 2, filed with the reply to the grounds of appeal.

Reasons for the Decision

1. Since the respondent withdrew its request for oral proceedings and the main request of the appellant, namely the full revocation of the patent, could be granted, the board was in a position to take a decision without holding oral proceedings.

2. In the communication pursuant to Article 15(1) RPBA, the board had set out that the subject matter of claim 1 of each of the requests on file appeared to be obvious in the light of **D1**. Since the respondent has not filed a substantive response thereto, the board sees no reason to depart from its preliminary opinion, namely that none of the requests on file is allowable.

3. Main request - Inventive Step

3.1 The invention is directed to a method for continuously treating vacuum residuals originating from the refinery of crude oil.

3.2 It is undisputed that **D1** is directed to a very similar subject-matter (page 1, line 20 - page 2, line 9) and that, consequently, this document represents a suitable starting point for the assessment of inventive step.

3.3 This document discloses all but two features (1.13 and 1.14) of claim 1. In particular, **D1** teaches a process where various residuals originating from the refinery of crude oil, including residuals originating from vacuum distillation (page 2, line 3), are treated in two mix kneaders arranged in line. The mix kneaders can be single or two-shaft kneaders but the latter are disclosed as being non-preferred (page 4, line 22). While it is disclosed in general terms that the residuals may be treated under vacuum (claims 7, 10; page 11, line 10), no corresponding values or ranges are indicated. Likewise, the document teaches in general terms that the residuals in the mix kneader(s) are heated, but does not disclose a corresponding temperature range. In one of the examples provided (page 11, lines 7-20), the temperatures in the first and second mix kneader are set at 195°C and 210°C, respectively. Thus, **D1** does not disclose the claimed process conditions (vacuum and temperature), at least not in connection with the remaining features of the claim.

3.4 Regarding the problem to be solved, it is stated in paragraph [0007] of the patent that the invention provides methods for efficiently extracting remaining

valuable substances from the residual of crude oil.

3.4.1 The appellant argued that the problem had to be reformulated, since it could be derived from paragraph [0015] of the patent that the open-ended temperature range of claim 1 included embodiments in which valuable components were destroyed. Consequently, even a broadly defined problem, such as providing an alternative process, was too ambitious. Rather, the appellant argued that the high temperatures encompassed by the claimed invention actually led to a worsening of the state of the art, so that the problem to be solved should be reformulated as the provision of a process where valuable components were destroyed.

3.4.2 The board does not agree with the appellant and considers that, where an open-ended range implicitly covers extreme values, but these are not explicitly claimed, the formulation of the problem being solved should not be based on an effect that would only occur in such remote areas of the open range. Moreover, even if the appellant's formulation were adopted, it would appear that, while the selection of a temperature in the claimed range (1.14) would be obvious in view of the problem to be solved, the selection of a pressure of less than 10 mbar (1.13) would not, because this measure would allow volatile substances to "escape", thereby working against the stated goal.

3.4.3 Alternatively, both parties argued that the problem could be formulated as the provision of an alternative to the method of **D1**. This was also the problem on which the opposition division based their decision.

3.4.4 However, the board sees no reason why the problem stated in paragraph [0007] of the patent, namely the

provision of a method to efficiently extract remaining valuable substances from the residual of crude oil, should be reformulated. As set out above, while **D1** discloses a generally applicable method to remove or recover volatiles from a wide range of materials, such as residuals from vacuum distillation of crude oil (page 2, line 3), it does not disclose the concrete process conditions necessary for doing so efficiently. It should be noted that, while temperatures are indicated for example 1, the materials treated are not residuals from vacuum distillation of crude oil. Therefore, when starting from **D1**, the problem formulated in the patent, namely the provision of a method to efficiently extract remaining valuable substances from the residual of crude oil, still stands and does not need to be reformulated.

3.5 As a solution to this problem, the patent proposes a process where the temperature is set at 300°C or higher and the pressure is set at 10 mbar or lower.

3.5.1 The board has no doubt that the skilled person is well aware that the volatility of (potentially) volatile substances depends on prevailing temperature and pressure conditions. The skilled person also knows that the type and amount of volatiles in a material varies, depending on the material. This is basic common knowledge in the field, and is particularly relevant for **D1** where the material to be treated might contain various solvents or other volatile components previously added (see for example page 6, third paragraph and page 3, first paragraph). It is therefore obvious that the conditions used in the process need to be adapted to the material being treated.

3.5.2 The skilled person also knows that residuals of the vacuum distillation of crude oil are obtained after most of the volatiles contained in the crude oil have been removed, using heat and vacuum. It is therefore immediately evident that rather drastic measures need to be taken if further volatiles are to be extracted from this material. Therefore, the skilled person would select high temperatures and low pressures, whereby exact values would be determined through routine experimentation. In doing so, the skilled person would arrive at the subject-matter of claim 1 without having to exercise any inventive skills. It needs to be noted that, according to paragraph [0014] and [0015] of the patent, the temperature and pressure ranges merely define the conditions necessary to extract valuable volatiles from vacuum residuals in an efficient way, without destroying them. If the skilled person pursues the same goal starting from **D1**, where the same equipment and the same starting material is used, they would arrive at the same process conditions or at least to process conditions falling within the claimed ranges without exercising inventive skills.

3.5.3 It follows from the above that the subject-matter of claim 1 is rendered obvious by the content of document **D1** alone.

4. Auxiliary requests 1 and 2 - Inventive Step

4.1 In these requests, the temperature ranges of claim 1 have been limited to 300°C - 500°C and 300°C - 450°C, respectively.

4.2 In its reply to the appeal, the respondent argued that the requests addressed the objection that at temperatures above 500°C or 450°C, respectively, an

undesired cracking of the volatile components took place. This is in line with the teaching of paragraph [0015] of the patent, where it is disclosed that these upper limits have the effect of preventing destruction of the substances to be removed by the heat. As **D1** does not disclose upper limits for the temperature treatment of the residues, the amendment constitutes a further distinguishing feature in both requests.

4.3 In essence, these amendments would be relevant for the objection based on the problem to be solved discussed under point 3.4.1 above. However, the board based its objection to the main request on a different problem, namely the provision of a method to efficiently extract remaining valuable substances from the residual of crude oil (see points 3.4.4). Faced with this problem, the subject-matter of claim 1 of both claims is obvious when starting from **D1**, because aiming at an efficient process, the skilled person would set the temperatures high enough so that a removal of the volatile substances takes place at a reasonable rate for the reasons set out in the main request. On the other hand, the skilled person would avoid unnecessarily high temperatures, both for economic and for efficacy reasons, since it would be evident that excessively high temperatures could degrade not only the volatile components but also the residue.

4.4 Therefore, the selection of the temperature and pressure ranges defined in auxiliary requests 1 and 2 does not involve an inventive step.

5. As document **D13** is not used in the argumentation set out above, there is no need to decide on the respondent's request not to admit it.

6. As none of the respondent's requests is allowable, the patent has to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

D. Hampe S. Arrojo

Decision electronically authenticated