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# Datasheet for the decision of 27 September 2007

**Case Number:** T 0517/03 - 3.2.07

**Application Number:** 94200075.3

**Publication Number:** 0606957

**IPC:** C22B 34/22

**Language of the proceedings:** EN

**Title of invention:**
Carbon burn-off process

**Patentee:**
SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

**Opponent:**
-

**Headword:**
-

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

**Keyword:**
"Inventive step features essential to solve problem missing in claim 1 - no"

**Decisions cited:**
-

**Catchword:**
-

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**Case Number:** T 0517/03 **-** 3.2.07

# D E C I S I O N
**of the Technical Board of Appeal 3.2.07**
**of 27 September 2007**

**Appellant:** (Patent Proprietor)
SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
Carel van Bylandtlaan 30
NL-2596 HR Den Haag (NL)

**Representative:**
-

**Decision under appeal:**
**Decision of the Opposition Division of the European Patent Office posted 6 March 2003 revoking European patent No. 0606957 pursuant to Article 102(1) EPC.**

**Composition of the Board:**

**Chairman:** H. Meinders
**Members:** H.-P. Felgenhauer
I. Beckedorf

## Summary of Facts and Submissions

I. This appeal concerns the decision of the opposition division revoking European patent No. 0 606 957.

II. According to the impugned decision the subject-matter of claim 1 of the then main request and of the first auxiliary request does not involve an inventive step. The subject-matter of claim 1 of the then second auxiliary request has been considered as being unclear and as likewise lacking inventive step.

III. The appellant (proprietor) requested that the decision of the opposition division be set aside and the patent be maintained in amended form on the basis of claims 1 to 4, 5 (in part) filed with letter dated 15 May 2007 and claims 5 (in part), 6 to 10 and description, columns 1 to 4 attached to the telefax communication of the board dated 3 September 2007 agreed upon by the appellant with letter dated 4 September 2007.

The respondent (opponent) had withdrawn its opposition with submission dated 9 December 2003.

IV. Claim 1 of the patent in suit according to the main request reads as follows:

"1. Process for the conversion, substantially into carbon monoxide and carbon dioxide of soot containing relatively large amounts of partially oxidized vanadium, obtainable by a gasification process, comprising subjecting such soot to an oxidizing treatment in a multiple hearth furnace at a temperature of the reacting layer between 700 and 900 °C, and in which the

gaseous effluent emanating from the first or from the upper most hearth of the reactor contains at least 12% by volume of oxygen calculated on air under standard conditions of temperature and pressure and the amount of vanadium pentoxide in the final product is at most 30% by weight, calculated on partially oxidized vanadium present in the soot.".

V. The following prior art, already discussed in the decision under appeal, has been considered relevant for the appeal proceedings

D1: DE-A-41 37 320
D2: DE-A-42 13 328
D4: EP-A-0 542 322.

VI. According to the impugned decision the claimed priority is not valid such that documents D1, D2 and D4 are prior art in the sense of Article 54(2) EPC. Claim 1 of the then main request has been considered as being novel. The process according to claim 1 has been considered as being distinguished from the one according to D1, D2 or D4 by the feature defining that "the gaseous effluent emanating from the first or from the uppermost hearth of the reactor contains at least 12% by volume of oxygen". The problem to be solved by the process of claim 1 has been considered to aim at an increase of the efficiency of the conversion process. Based on the consideration that by the features of claim 1 a particular flow rate, under which the oxidizing treatment takes place, is not defined, according to the impugned decision claim 1 does not comprise the features necessary to solve the problem and consequently does not involve an inventive step.

VII. The facts, evidence and arguments relied upon by the appellant may be summarised as follows:

The priority for claim 1 is valid since in the priority document it is disclosed that during the process a reacting layer, for which a temperature range is disclosed, is formed.

In case the priority is considered as not being valid the subject matter of claim 1 needs to be considered as being novel and as involving an inventive step.

The process according to claim 1 is distinguished from the one disclosed in D4, which is considered as constituting the closest prior art, as it is performed in a multiple hearth furnace, the gaseous effluent containing at least 12% by volume of oxygen in combination with the temperature of the reacting lying between 700° and 900° C.

Since the process according to D4 is performed with a low oxygen content in the effluent, this document could not have led to the process according to claim 1 according to which the effluent contains at least 12% by volume of oxygen.

## Reasons for the decision

1. *Withdrawal of the opposition*

The respondent withdrew its opposition with letter dated 9 December 2003.

Since according to the impugned decision the patent has been revoked, withdrawal of the opposition is of no direct significance. Presently the board has to examine the substance of the impugned decision of its own motion (Case Law of the Boards of Appeal of the European Patent Office, Fifth Edition, December 2006, VII.C.3.2).

2. *Prior art*

In its communication attached to the summons for oral proceedings dated 2 May 2007 the board expressed its provisional opinion according to which the priority for claim 1 is not valid (cf. paragraphs 4.2, 4.3).

Since, as indicated in the following (cf. paragraphs 5 and 6), considering documents D1, D2 and D4 as prior art under Article 54(2) EPC the subject matter of claim 1 is novel and involves an inventive step the issue of the validity of the claimed priority need not be pursued any further.

3. *Amended claim 1*

Responding to objections raised in the above mentioned communication of the board with respect to claim 1 filed with the grounds of appeal, a new claim 1 was filed with letter dated 15 May 2007, forming the basis of the present decision.

3.1 That claim differs from claim 1 as granted in that reference is made to a "multiple hearth surface" instead of a "hearth surface" and in that the temperature range of the reacting layer is limited to "between 700 and

900°C", as opposed to "between 700 and 1200°C" in claim 1 as granted.

These amendments were already present in claim 1 according to the main request underlying the impugned decision from which present claim 1 differs only by referring to "soot containing relatively large amounts of partially oxidized vanadium" in line with claim 1 as granted instead of "soot containing **a** relatively large amounts of partially oxidized vanadium". Present claim 1 differs from the one according to the main request underlying the decision under appeal thus only in that a clerical error has been removed.

3.2 According to the impugned decision the amendments of claim 1 - corresponding to the amendments of present claim 1 - comply with the requirements of Article 123(2) and (3) EPC (reasons no. 4.1). The board sees no reason to deviate from this finding.

3.3 Since clarity is not a ground of opposition and may in opposition proceedings only be examined with respect to amendments based on subject-matter lying outside the subject-matter defined by the claims as granted, the board considers the reasons given in this respect in the impugned decision (reasons no. 4.2) as relating to the interpretation of claim 1 with respect to the feature defining the volume of oxygen. The board sees no reason to deviate from the interpretation according to the impugned decision.

4. *Subject-matter of claim 1*

Claim 1 defines a process for the conversion of soot, in which **soot containing relatively large amounts of partially oxidized vanadium**, obtainable by a gasification process, is converted into a **final product** within which the amount of vanadium pentoxide is at most 30% by weight.

The **process** is defined as

a) an oxidizing treatment in a multiple hearth furnace

b) at a temperature of the reacting layer between 700 and 900° C and

c) in which the gaseous effluent emanating from the first or from the upper most hearth of the reactor contains at least 12% by volume of oxygen.

5. *Novelty*

According to the impugned decision claim 1 according to the then main request has been considered as being novel over D1, D2 or D4. Since as indicated above present claim 1 and claim 1 underlying the impugned decision differ only by a clerical error having been removed (cf. section 3.1 above) the considerations of the impugned decision apply directly to claim 1 underlying the present decision. The board sees no reason to deviate from the conclusion of the impugned decision with respect to novelty (cf. also section 6.1 below).

6. *Inventive step*

Contrary to the impugned decision the board is of the opinion that the subject-matter of claim 1 involves an inventive step.

6.1 In the decision under appeal, as also suggested in the grounds of appeal in case the priority of the patent in suit is considered as not being valid, D4 is considered as closest prior art.

In the impugned decision (reasons no. 4.4.2) it is correctly referred to feature c) as distinguishing the process according to claim 1 from the one according to D4.

6.2 With respect to the problem underlying claim 1 the impugned decision states that it is already known from D1, D2 or D4 to provide a method for the conversion of soot comprising vanadium into a final product free of $V_2O_5$ and that the problem solved in view of this prior art lies in the increase in efficiency of such a process.

The board follows the appellant in that the problem underlying the process according to claim 1 is more specific, in that it relates to increasing the capacity of the process, in terms of kilograms of filter cake per effective area of multiple hearth furnace disk space (in $m^2$) per hour (grounds of appeal, page 4).

6.3 According to the impugned decision feature c) as mentioned above cannot be considered as being indicative for a certain flow rate, since the flow rate is not the only possibility to control the oxygen content in the

effluent. Accordingly a definition of the measure to arrive at the result according to feature c) (i.e. the application of a high flow rate) has been considered as being indispensable. This consideration led to the conclusion that the subject-matter of claim 1 does not contain the essential features necessary to solve the technical problem, such that claim 1 lacks inventive step (reasons no. 4.4.6.3).

6.4 Following the comparison given in the grounds of appeal (page 4, cf. Tables 1 and 2) with respect to the capacity of a process based on claim 1 of the patent in suit and the one according to example 2 of D4, the board finds it plausible that the problem as established above is solved by a process according to claim 1.

The board furthermore is of the opinion that in the evaluation of whether claim 1 comprises all features necessary to solve the problem it needs to be taken into account that, as pointed out by the appellant and, earlier, the opponent (cf. decision under appeal, reasons no. 4.4.4.2 and grounds of appeal, page 5) this feature c) needs to considered not only by itself as being indicative for the process performed in the furnace, i.e. the flow rate of gas leading to the effluent, but in combination with feature b) defining the temperature of the reacting layer. Considering features b) and c) in combination the board agrees with the appellant (grounds of appeal, page 5, last two paragraphs) that by these features a certain flow rate for the gas leading to the effluent defined by feature c) is specified.

6.5 Since the problem underlying the process according to claim 1 (cf. section 6.2 above) has to be considered as being solved by the process according to claim 1 (cf. section 6.4 above) the question remains whether the solution according to claim 1 is obvious in view of the prior art.

As mentioned by the appellant (grounds of appeal, page 5, paragraph 1) D4 does not give an indication leading to an oxygen content in the gaseous effluent as defined by feature c), since it is directed to a conversion process performed in such a manner that the gaseous effluent has a relatively low oxygen content (D4, page 4, lines 43 to 51) leading to a lack of oxygen in the furnaces (page 4, line 54 to page 5, line 2).

The board finds this argument convincing. The process according to D4 could not have led the person skilled in the art in an attempt to increase the capacity of the known conversion process to the process according to claim 1, since the conditions of this process as determined by features b) and c) lead to a different result, namely one in which the oxygen content of the gaseous effluent is considerably higher.

7. The above considerations apply equally with respect to documents D1 and D2, since both documents define a process corresponding to the one according to D4 and thus one with conditions resulting in a low oxygen content of the effluent (D1, column 4, line 58 to column 5, line 3; D2, page 4, lines 57 to 63).

8. The process according to claim 1 thus involves an inventive step (Article 56 EPC).

## 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 as amended in the following version:

- claims 1 to 4, 5 (part) filed with letter dated 15 May 2007
- claims 5 (part), 6 to 10 as attached to the telefax of the board dated 3 September 2007

- description columns 1 to 4 as attached to the telefax of the board dated 3 September 2007
- description columns 5 to 7 of the patent specification, with column 5, line 50 to be amended from "EXAMPLE 1" to "EXAMPLE 1 (not according to the invention)" according to the appellant's submission dated 4 September 2007

- figures of the patent specification

The Registrar: The Chairman:

G. Nachtigall H. Meinders