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**Datasheet for the decision
of 10 January 2007**

Case Number: T 0234/04 - 3.2.07

Application Number: 95111857.9

Publication Number: 0756014

IPC: C22B 21/00

Language of the proceedings: EN

Title of invention:

Method for smelting aluminum, scrap and remainders containing aluminum

Patentee:

AIR PRODUCTS AND CHEMICALS, INC., et al

Opponents:

- I. Air Liquide Deutschland GmbH
II. Linde Aktiengesellschaft, Wiesbaden

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

Keyword:

"Extension beyond content of the application as originally filed (main request to second auxiliary request - yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0234/04 - 3.2.07

DECISION
of the Technical Board of Appeal 3.2.07
of 10 January 2007

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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
9 December 2003 concerning maintenance of
European patent No. 0756014 in amended form.

Composition of the Board:

Chairman: H. Meinders
Members: H. Hahn
E. Lachacinski

Summary of Facts and Submissions

- I. The Patent Proprietors lodged an appeal against the interlocutory decision of the Opposition Division to maintain European patent No. 0 756 014 in amended form on the basis of claims 1 and 2 according to the auxiliary request filed during the oral proceedings of 13 November 2003 and claims 3 to 9 as filed with letter dated 10 July 2003.
- II. Two oppositions had been filed against the patent as a whole and were based on Article 100(a) EPC. Opponent I argued with respect to lack of novelty and lack of inventive step of the subject-matter of claim 1 while Opponent II argued only with respect to lack of inventive step of that subject-matter.

The Opposition Division held that the subject-matter of claim 1 according to the main request as filed during oral proceedings on 13 November 2003 was novel but lacked an inventive step. Claim 1 of the auxiliary request also filed during said oral proceedings was considered to meet the requirements of Article 123(2) and (3) and of Article 84 EPC. Furthermore, the subject-matter of claim 1 of the auxiliary request was considered to involve an inventive step.

- III. On appeal the appellants filed a modified main request and two modified auxiliary requests. Claim 1 of this main request reads as follows:

"1. A method of smelting aluminum and aluminum containing scrap and remainders, in a rotary drum

furnace (1) having only one burner, said method comprising the following features:

- a) at one end of said rotary drum furnace (1) charging stock (6) is introduced into said rotary drum furnace (1) through a charging door (2);
- b) the charging stock (6) is taken from said rotary drum furnace (1);
- c) fuel and gas containing oxygen are introduced into said rotary drum furnace (1) through the burner (3) disposed at one end of said rotary drum furnace (1), and are combusted in said furnace (1); and
- d) waste gas (4) is exhausted from one end of said rotary drum furnace (1); wherein
- e) the charging door (2) is used for taking said charging stock (6) from said rotary drum furnace (1);
- f) said burner (3) is disposed at the exhaust end of the rotary drum furnace (1) and
- g) said exhaust end is opposite said charging door (2); characterized by the following features:
- h) organic components are present in the charging stock (6) and result in noxious substances, such as e.g. hydrocarbons, from pyrolysis during smelting said charging stock (6);
- i) the concentration of said noxious substances contained in the waste gas is measured by an optical method in an exhaust duct (4); and
- j) the volume of the combustion air and combustion oxygen respectively and/or the volume of the fuel for said burner is set as a function of the measured concentration of said noxious substances."

IV. With a communication annexed to the summons to oral proceedings the Board presented its non-binding preliminary opinion on the claim sets presented with these requests.

The Board stated that claim 1 of the main request (which contained the definition "the concentration of **said noxious substances** ... is established by an optical method in an exhaust duct" emphasis added by the Board) seemed to contravene Article 123(2) EPC since the application as originally filed did not seem to provide a basis for the amendment that **only** the noxious substances are measured by an optical method in an exhaust duct. Taking account of the whole specification as originally filed and particularly of the passages at page 7, first full paragraph and the last paragraph bridging over to page 8, the Board considered that either the concentrations of **all substances** of the waste gas had to be measured or that **only** the concentration of the **hydrocarbons** in the waste gas had to be measured.

V. With letter dated 5 December 2006 the appellant submitted a new main request and a new auxiliary request to replace the previous requests in combination with arguments concerning the allowability of the amendments and on novelty and inventive step, which were, however, further clarified in the oral proceedings before the Board on 10 January 2007, in which:

(a) The appellants requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request, alternatively on

the basis of the first or the second auxiliary request, all requests as filed during the oral proceedings.

- (b) Respondents I and II (opponent I and opponent II, respectively) requested that the appeal be dismissed.

VI. Claim 1 according to the present main request reads as follows (additions in respect of claim 1 as granted are in bold, deletions have been struck through):

"1. A method of smelting aluminium, and aluminum containing scrap and remainders, in a rotary drum furnace (1) having only one burner, said method comprising the following features:

- a) at one end of said rotary drum furnace (1) charging stock (6) is introduced into said rotary drum furnace (1) through a charging door (2);
- b) the charging stock (6) is taken from said rotary drum furnace (1);
- c) fuel and gas containing oxygen are introduced into said rotary drum furnace (1) through the burner (3) disposed at one end of said rotary drum furnace (1); and are combusted in said **drum** furnace (1); ~~and~~
- d) waste gas (4) is exhausted from one end of said rotary drum furnace (1); wherein
- e) the charging door (2) is used for taking said charging stock (6) from said rotary drum furnace (1);
- f) said burner (3) is disposed at the exhaust end of the rotary drum furnace (1) **and**
- g) said exhaust end is opposite said charging door (2);

characterized by the following features:

h) organic components are present in the charging stock (6) and result in noxious substances, such as e.g. hydrocarbons, from pyrolysis during smelting said charging stock;

i) the concentration of the substances such as e.g. hydrocarbons contained in the waste gas, is established by an optical method in an exhaust duct (4); and

j) the rotary movement (speed and direction of rotation) of said furnace is set as a function of the measured concentration of substances."

VII. Claim 1 according to the first auxiliary request differs from claim 1 of the main request in that the term "**the**" of the definition "the concentration of **the** substances ... is established by an optical method" of feature i) has been deleted (emphasis added by the Board).

VIII. Claim 1 according to the second auxiliary request differs from claim 1 of the main request in that the term "**noxious**" has been inserted in its feature i) between the words "the" and "substances" to result in the wording "the concentration of the **noxious** substances ... is established by an optical method" (emphasis added by the Board).

IX. The appellants argued essentially as follows:

Claim 1 of the main request is based on claim 1 as granted in combination with claims 3, 8 and 10. This corresponds to claims 1, 3, 8 and 10 in combination with page 7, penultimate paragraph to page 8, first paragraph and page 8, second and fourth paragraph of the application as originally filed.

From the whole disclosure of the application as originally filed, particularly from the paragraph bridging pages 7 and 8 and from claim 3 specifying that the concentration of certain substances is measured, it is derivable that the concentration of the noxious substances is measured. These noxious substances originate from the pyrolysis of the organic components present in the material to be smelted and can for example be uncombusted hydrocarbons which then can be incinerated by the burner whereby the noxious content of the waste gases is reduced. Thus the hydrocarbons are a part of the noxious content of the waste gases. Furthermore, said bridging paragraph has to be seen in combination with the preceding paragraph of page 7 wherein the noxious substances contained in the waste gas are mentioned. The last argument also holds true with respect to the last paragraph of page 8 of the application as originally filed wherein the concentration of the noxious substances is mentioned in combination with the rotary movement of the furnace as mentioned in feature j) of claim 1. Claim 1 as granted has been further limited by the incorporation of the features h), i) and j) according to all three requests. Thus the amendments made to claims 1 of the main, first auxiliary and second auxiliary request meet the requirements of Article 123(2) and (3) EPC.

Since feature j) of claim 1 is taken from claim 8 as granted no clarity objection can be raised. If there is a clarity problem this feature j) will have to be interpreted appropriately.

X. Respondent I argued essentially as follows:

The definition in brackets "speed and direction of rotation" and the definition "as a function of the measured concentration of substances" of feature j) of claim 1 of the three requests renders these claims unclear. It is unclear what is meant by the said "function" and whether the expression in the brackets is limiting the feature of the rotary movement mentioned in feature j).

XI. Respondent II argued essentially as follows:

The original application as published discloses the term "concentration" eight times. Seven times the concentration of the hydrocarbons is meant, once oxygen. Of these eight occasions only once the concentration of the hydrocarbons in the waste gas **in the exhaust duct** is specified (see column 3, lines 51 to 52; column 4, line 29, lines 47 and 48 and line 51; column 5, lines 1 and 7 and line 20; claim 3). Hence there exists no basis for an amendment in feature i) of claim 1 of the main request according to which it is possible that the concentration of the **noxious** substances is established by an **optical method**. This argument is all the more valid for claim 1 of the second auxiliary request which explicitly states this. Furthermore, due to the deletion of the term "the" from the phrase "the concentration of **the** substances ... is established by an optical method" in feature i) of claim 1 of the first auxiliary request the specific disclosure of column 5, lines 46 to 57 of the application as published has been broadened. The skilled person cannot derive a specific selection of gases from the application as originally

filed since either only hydrocarbons or all gases of the waste gas are meant. Hence the claims 1 of all requests 1 contravene Article 123(2) EPC.

Reasons for the Decision

1. Admissibility of amendments (Article 123(2)EPC)

Main request

1.1 Features a) to g) and feature j) of claim 1 of the main request are based on claims 1 and 8 as granted, respectively; the further feature h) is derivable from page 2, third full paragraph and page 5, first paragraph of the application as originally filed, while feature i) is taken from the paragraph bridging pages 7 and 8 thereof. The corresponding basis of claim 1 as granted in the specification as originally filed is claim 1 in combination with the technical problem underlying the application (as derivable from page 1, second paragraph to page 3, fourth paragraph) and page 4, fourth and fifth paragraph together with figure 1. Claim 8 as granted corresponds to claim 8 as originally filed.

1.1.1 Claim 1 of the main request comprises the term "substances" only three times. The first time is in feature h) as "noxious substances" and the second time is in feature i) in the context of "the concentration of the substances ... contained in the waste gas, is established by an optical method in an exhaust duct (4)". The third time is in feature j), continuing the mention of: "... measured concentration of substances."

Consequently, the claimed combination of the feature h) "organic components are present in the charging stock (6) and result in noxious substances, such as e.g. hydrocarbons, from pyrolysis during smelting said charging stock;" and of feature i) "the concentration of the substances such as e.g. hydrocarbons contained in the waste gas, is established by an optical method in an exhaust duct (4)" of claim 1 of the main request allows the interpretation that **only the noxious substances** are measured by an optical method since the term "the" in said phrase "the substances" of feature i) can be considered as referring back to the "noxious substances" defined previously in feature h) of claim 1 which is the only earlier mention of "substances". This objection was already made by the Board in its communication accompanying the summons, in respect of the then valid main request. Feature i), although being literally taken from the description, thus gets a different meaning than it has in the description (compare point 1.1.3 below).

The appellant's argument that it would be clear to the skilled person when reading the whole specification of the application as originally filed that only "noxious substances" could have been meant cannot be accepted for the following reasons.

- 1.1.2 The application as originally filed discloses that the hydrocarbons formed during smelting can be subsequently incinerated by the burner whereby the noxious content of the waste gases is reduced (see page 5, first paragraph).

It discloses a particularly preferred embodiment wherein "a waste gas measuring device is provided in the exhaust duct permitting control of the volume of fuel and combustion air or combustion oxygen as a function of the gases flowing through the exhaust pipe of the furnace, particularly as a function of the concentration of hydrocarbons. Particularly preferred is an optical means of waste gas measurement" (see page 6, second paragraph).

- 1.1.3 In the context of another preferred embodiment with reference to the sole figure 1 it is disclosed that "a waste gas measuring device 5 is disposed with which the concentration of hydrocarbons in the waste gas can be measured" (see page 7, first full paragraph) and that "The waste gas measuring device 5 disposed in the exhaust duct 4 establishes the concentration of the substances such as e.g. hydrocarbons contained in the waste gas for adjusting the volume of fuel and/or combustion air or oxygen required for combustion applied to the burner 3 as a function of the sensed concentration so that the energy offered in the furnace, resulting from the combustion of fuel and the incineration of the hydrocarbons, is maintained constant, to ensure an homogenous sequence in the smelting procedure and to minimize the noxious substances in the waste gas resulting from the smelting process" (see the paragraph bridging pages 7 and 8,).

Thus the first passage specifies that the concentration of the hydrocarbons is measured whereas the second one, due to the definition "the substances ... contained in the waste gas" has to be interpreted as meaning that

the concentration of all substances contained in the waste gas is measured.

- 1.1.4 The preceding paragraph at page 7 (fourth full paragraph) of the application discloses that "the waste gas materializing from this smelting procedure is introduced through the waste gas port 7 into the exhaust duct 4, it thereby flowing past the flame of smelting burner 3 so that noxious substances contained in the waste gas such as e.g. hydrocarbons can be incinerated". This paragraph thus only teaches that the waste gas contains noxious substances - which can be hydrocarbons - which can be incinerated by the burner 3.
- 1.1.5 The application further discloses that "The concentration of volume of the noxious substances resulting from pyrolysis during smelting such as e.g. hydrocarbons depends, among other things, on the rotative speed of the furnace 1, thus by means of the waste gas measuring device 5 the rotary movement of the furnace 1 may be adjusted so that the volume of noxious substances is further minimized" (see page 8, fourth paragraph).

However, this passage actually does not disclose which substances should be measured by said waste gas measuring device 5. It only teaches the skilled person that the rotary movement of the drum furnace can be controlled taking account of the measured values whereby the volume of noxious substances can be further reduced.

1.1.6 Furthermore, the Board considers it to be clear that the noxious substances of the waste gas leaving the furnace originate from organic components comprised in the aluminium containing starting material - which are pyrolysed and result in hydrocarbons - and from the fuel material. Thus the noxious substances in any case include carbon monoxide (CO) which originates from an incomplete combustion of the fuel material and which will also originate from the incineration of the hydrocarbons formed by said pyrolysis process. However, it is not possible to distinguish between the CO formed from the fuel material and the CO formed from said hydrocarbons.

1.1.7 Consequently, considering the points 1.1.2 to 1.1.6 above it is evident from the description that either the concentrations of all substances of the waste gas are measured (taking account of the page bridging paragraph of pages 7 and 8) or that only the concentrations of the hydrocarbons in the waste gas are measured by an optical method.

As a consequence there does not exist any clear and unambiguous basis for the amendment of the claims so that - only - the noxious substances obtained by the pyrolysis of said organic components are to be measured, let alone by an optical method.

1.1.8 The Board remarks that claims 3, 8 to 10, and 16 to 17 as originally filed support the above interpretation. With respect to claim 3 it is pointed out that the specification as originally filed does not contain any passage (compare points 1.1.2 to 1.1.6 above) which would clearly and unambiguously allow to derive that

the feature of claim 3: "the concentration of certain substances in said exhaust duct (4) is measured" should mean anything else than "hydrocarbons", which plural form perfectly fits to the plural of the feature "certain substances".

- 1.1.9 The Board therefore concludes that claim 1 of the main request contravenes Article 123(2) EPC. The main request is thus not allowable.

First auxiliary request

- 1.2 Feature i) of claim 1 of the first auxiliary request contains the amended definition "the concentration of substances ... contained in the waste gas, is established by an optical method in an exhaust duct (4)".

Thus the term "**the**" of feature i) according to the main request, which was comprised between the words "concentration of" and "substances" has been deleted.

- 1.2.1 As feature i) was taken literally from the paragraph bridging pages 7 and 8 of the description as originally filed, which teaches that the concentration of all substances contained in the waste gas is measured (see point 1.1.3 above) it is evident that the deletion of said term "the" from the feature "the substances ... contained in the waste gas" represents an extension of the subject-matter as originally filed. According to this amended definition of feature i) the substances measured could be e.g. water vapour and/or carbon dioxide and thus encompasses substances which even do not fall under the definition of "noxious substances".

1.2.2 However, as concluded by the Board in paragraph 1.1.7 above there exists only a basis that either the concentration of all waste gas substances or that only the concentration of the hydrocarbons is measured.

1.3 The Board therefore concludes that claim 1 of the first auxiliary request contravenes Article 123(2) EPC. The first auxiliary request is thus also not allowable.

Second auxiliary request

1.4 Feature i) of the second auxiliary request defines that "the concentration of the **noxious** substances ... is established by an optical method in an exhaust duct (4)".

1.4.1 As already concluded in point 1.1.7 above there exists no clear and unambiguous basis for this feature in the application as originally filed.

Consequently, the appellant's arguments that page 7, fourth full paragraph to page 8, first paragraph and page 8 fourth paragraph would form a basis for this amendment cannot be accepted.

1.4.2 Claim 1 with feature i) of the second auxiliary request therefore contravenes Article 123(2) EPC. The second auxiliary request is therefore not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders