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Datasheet for the decision of 31 July 2018

Case Number: T 1555/16 - 3.3.05

Application Number: 11707237.1

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IPC: C01B3/56, C01B3/10, C10J3/00, C10J3/72, F23C10/00, G05B19/02

Language of the proceedings: EN

Title of invention:
CONTROL SYSTEM AND METHOD FOR OPTIMIZING CHEMICAL LOOPING PROCESSES

Applicant:
General Electric Technology GmbH

Headword:
Optimisation of chemical loop/GE

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

Keyword:
Inventive step - (yes) - non-obvious solution
Amendments - allowable (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 1555/16 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 31 July 2018

Appellant: (Applicant)	General Electric Technology GmbH Brown Boveri Strasse 7 5400 Baden (CH)
Representative:	General Electric Technology GmbH Global Patent Operation - Europe Brown Boveri Strasse 7 5400 Baden (CH)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 19 February 2016 refusing European patent application No. 11707237.1 pursuant to Article 97(2) EPC**

Composition of the Board:

Chairman	E. Bendl
Members:	J.-M. Schwaller
	R. Winkelhofer

Summary of Facts and Submissions

I. This appeal lies from the decision of the examining division to refuse European patent application No. 11 707 237.1 on the grounds that claim 1 of the main request then on file lacked inventive step over D1 (US 2009/222108 A1) and claim 1 of the auxiliary request infringed Article 123(2) EPC.

II. With its statement of grounds of appeal, the appellant contested the decision and filed a new main request and two auxiliary requests.

III. Following several communications from the board, the appellant filed a new set of claims dated 19 July 2018 as main request, with claim 1 reading:

"*1. A method for controlling and optimizing a chemical loop, the method comprising:*

providing a control system (280, 480), a first chemical loop (100, 300) comprising an oxidizer (120, 310B) having a first conduit (150, 305B) in fluid communication with an interior area of the oxidizer (120, 310B), a separator (180, 320B) in fluid communication with the first conduit and having a second conduit (190, 325B) coupled thereto, a portion of the second conduit (190, 325B) being positioned substantially vertically, a control valve (200, 330B) positioned in the second conduit (190, 325B), a sensor positioned in the substantially vertical portion of the second conduit (190, 325B) between the separator (180, 320B) and the control valve (200, 330B), the sensor being in communication with the control system (280, 480), wherein the sensor is a level sensor (S194, S329B);

measuring at the sensor (S194, S329B) at least one data signal representative of an amount of solids in the second conduit (190, 325B);

receiving the at least one data signal (D194, D329B) at the control system (280, 480); and

controlling the control valve (200, 330B) with the control signal and regulating flow of the solids through the chemical loop (100, 300), and wherein the at least data signal (D194, D329B) is representative of a height of solids in the second conduit (190, 325B)."

Dependent claims 2 to 6 define specific embodiments of the invention.

IV. The appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of the main request, submitted with letter dated 19 July 2018.

Reasons for the Decision

1. Allowability of the amendments under Article 123(2) EPC

The subject-matter of claim 1 at issue derives directly and unambiguously from the combination of the subject-matter of independent claims 13 and 14 (with claim 14 being dependent on claim 13 only) and the passages on page 5, lines 9 and 10 and lines 21 and 22, of the description as filed. The reference numbers defined in claim 1 at issue have a basis in figures 1 and 2 as filed.

The subject-matter of dependent claims 2 to 5 has its basis respectively in claims 17 to 20 as filed.

The subject-matter of dependent claim 6 derives directly and unambiguously from the passages on page 4, line 14, and page 12, line 6, and from figures 1 and 2, all as filed.

The requirements of Article 123(2) EPC are therefore met.

2. Novelty

Novelty was not objected to by the examining division. The board does not take a different stance.

3. Inventive step

Applying the problem-solution approach, the subject-matter of the claims of this request involves an inventive step for the following reasons:

3.1 The examining division held D1 to represent the closest prior art. The board concurs with this conclusion, as D1 discloses (see paragraph [0023]) an integrated process design and control optimisation system for a chemical loop system, with one of the preferred variables to be controlled by the system being the solids transport inventory (claim 18).

3.2 According to the appellant (see statement of grounds of appeal, heading "Inventive step", paragraph starting with "Knowing the level of solids ..."), the problem underlying the application was the provision of a more accurate sensing system to improve control of the chemical loop.

3.3 According to the subject-matter of claim 1 at issue, this problem is solved by sensing the level of solids

in the substantially vertical portion of the second conduit by means of a level sensor which measures at least one data signal representative of a height of solids in said conduit.

3.4 For the board, it is credible that the solution proposed above successfully solves the problem identified in point 3.2 above, as the level of solids provides a seal pressure to the whole loop, thereby making it easy to maintain a maximum operation range for the system by regulating the feeding of the solids. In addition, a difference in the change of the level of solids in the different loops points to an imbalance in the solids transport between the loops. The level sensor information can therefore be used to regulate the airflow and balance the solid mass flow exchange between the loops. Also, the controller can easily push the whole system into the extreme points with less fluctuation when accurate information about the solids level is available, because the more stable the system is around the extreme points, the more profit can be gained from the system.

3.5 As none of the prior art documents cited in the course of the examination proceedings discloses or suggests solving the above problem in this way, the subject-matter of claim 1 at issue, and by the same token that of claims 2 to 6 which depend upon it, involves an inventive step within the meaning of Articles 52(1) and 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 examining division with the order to grant a patent on the basis of the set of claims dated 19 July 2018, and a description to be adapted thereto.

The Registrar: The Chairman:

D. Magliano E. Bendl

Decision electronically authenticated