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Datasheet for the decision of 9 April 2024

Case Number: T 1866/22 - 3.2.07

Application Number: 15190639.3

Publication Number: 3159640

IPC: F27D17/00, B01D47/06, C21B7/22, F27D19/00, C21C5/40

Language of the proceedings: EN

Title of invention:
CLEANING FURNACE GAS PROCESS AND METAL PRODUCTION PLANT

Patent Proprietor:
Danieli Corus BV

Opponent:
Paul Wurth S.A.

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

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Case Number: T 1866/22 - 3.2.07

D E C I S I O N
of Technical Board of Appeal 3.2.07
of 9 April 2024

Appellant: (Patent Proprietor)	Danieli Corus BV Rooswijkweg 291 1951 ME Velsen Noord (NL)
Representative:	De Vries & Metman Overschiestraat 180 1062 XK Amsterdam (NL)
Respondent: (Opponent)	Paul Wurth S.A. 32, rue d'Alsace 1122 Luxembourg (LU)
Representative:	Office Freylinger P.O. Box 48 8001 Strassen (LU)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 19 May 2022 concerning maintenance of the European Patent No. 3159640 in amended form.**

Composition of the Board:

Chair	G. Patton
Members:	A. Cano Palmero
	E. Mille

Summary of Facts and Submissions

I. The patent proprietor (appellant) lodged an appeal within the prescribed period and in the prescribed form against the decision of the opposition division to maintain European patent No. 3 159 640 in amended form on the basis of the then auxiliary request 4.

II. The opposition was filed against the patent in its entirety and was based on Article 100(a) EPC (lack of novelty and inventive step), Article 100(b) EPC (insufficiency of disclosure) and Article 100(c) EPC (unallowable amendments).

III. In preparation for oral proceedings requested by the parties, the board communicated its preliminary assessment of the case in a communication pursuant to Article 15(1) RPBA. Neither of the parties replied to this communication in substance.

IV. Oral proceedings before the board took place on 9 April 2024. At the conclusion of the proceedings the decision was announced. Further details of the proceedings can be found in the minutes thereof.

V. The final requests of the parties are as follows,

for the appellant

that the decision under appeal be set aside and that the patent be maintained in amended form according to the main request filed during the oral proceedings before the board;

for the respondent (opponent)

that the appeal be dismissed.

VI. The following documents have been filed during the opposition proceedings and are relied upon by the parties in the present decision:

D1: US 4,668,253 A;
D6: US 4,909,160 A;
D14: RU 2 430 971 C2 and English translation (D14');
D18: WO 2013/045534 Al;
D20: CN 1037541 A;
D27: EP 1 139 023 A1.

VII. The lines of argument of the parties relevant for the present decision, which are focused on inventive step of the subject-matter of claim 1 of the main request are dealt with in detail in the reasons for the decision.

VIII. **Claim 1** of the main request reads as follows:

"A process for cleaning blast furnace gas flowing from a furnace via a dust removing device (6) to one or more filter stations (21), comprising the following steps:
- one or more sensors are used to continuously monitor one or more parameters indicative for an expected temperature peak in the furnace gas flow;
- in case the measured parameter exceeds a predefined limit value, a coolant, e.g., water, is sprayed into the furnace gas flow;
characterized in that
- after passing the dust removing device and before passing the filter stations the blast furnace gas flows downward through a conditioning tower having an inlet

at its top section and an outlet near its bottom, the conditioning tower comprising nozzles spraying said coolant co-currently or counter-currently into the blast furnace gas flow;
- during the residence time in the conditioning tower the coolant evaporates before the blast furnace gas passes a blast furnace gas outlet (16), wherein the parameter includes a temperature of the blast furnace gas flow measured at an off-take of a blast furnace."

Reasons for the Decision

1. *Main request - Inventive step starting from document D14 as closest prior art, Article 56 EPC*

1.1 It is undisputed that document D14 is to be considered as closest prior art with regard to the subject-matter of claim 1 of the main request.

1.2 It is also undisputed that the subject-matter of claim 1 of the main request differs from the known process of D14 at least in
(a) a conditioning tower (instead of a conditioning pipeline) having an inlet at its top section and an outlet near its bottom,
(b) spraying the coolant (in the conditioning tower) co-currently or counter-currently into the blast furnace gas flow, and
(c) the parameter (monitored by the one or more sensors) includes a temperature of the blast furnace gas flow measured at an off-take of a blast furnace.

1.3 The respondent concurred with the findings in the decision under appeal with regard to the then auxiliary request 2 (see point 11.4 of the reasons for the decision under appeal), that features (a) and (b) on

the one hand and feature (c) on the other hand were not synergistically linked. In particular, the opposition division found that this lack of synergy was due to the fact that dew was already avoided in D14. Consequently, the distinguishing features (a) and (b) could be treated separately from feature (c) under a partial problem approach.

1.3.1 With regard to features (a) and (b), the respondent argued, in line with the findings of the opposition division (see points 8.5 and 8.6 of the reasons for the decision under appeal with regard to the then auxiliary request 1) that starting from the known process of D14, no clear advantage could be identified and the problem to be solved could be viewed as providing an alternative implementation of the conditioning unit, still enabling to protect the bag filters placed downstream. The skilled person, in view of the conditioning towers comprising co-current cooling sprays taught by D6 or D27, would consider implementing these in place of the gas pipeline of D14.

1.3.2 With respect to feature (c), the respondent agreed with the opposition division that, in the absence of a demonstrated technical effect, the problem to be solved could only be seen as providing an alternative location for the temperature sensor. In particular, the placement of a sensor upstream of the dust removing device could not accurately measure the temperature at the tower since the blast furnace gas might cool upon flowing through the dust removing device. The alleged effect of a more efficient and more robust process put forward by the appellant would then not be realistic. In fact, it would appear that the most relevant temperature to be taken into account is rather the one

at the outlet of the tower in order to prevent filter damage, as already taught by D6 and D27.

1.3.3 Still according to the respondent, the skilled person was aware that sensors could be placed at different locations, depending on the circumstances, in order to monitor the process (see point 11.6 of the reasons for the decision under appeal), these different locations were not incompatible with the ones already taught by D6 or D27. In addition, D6 already taught the use of other thermocouples at different locations along the gas flow, such as directly at the furnace take-off (*e.g.* thermocouples 112 and 114, see figure 1A). Furthermore, D1 taught the use of a temperature sensor 14 directly after the furnace to monitor the process carried out therein (see column 5, lines 24 to 32). D18 also stated in page 2, third paragraph, that it was well known to monitor the temperature in the off-takes in order to diminish the effects of peaks of temperature of the blast furnace gas. Finally, D20 also disclosed to measure the temperature at the off-take of a blast furnace. For these reasons, the skilled person, starting from the known process of D14 would arrive at feature (c) in an obvious manner in view of the common general knowledge or in view of the teachings of D6, D1, D18 or D20.

1.3.4 In sum, the respondent argued that the subject-matter of claim 1 of the main request was obvious in view of D14 in combination with D6 or D27 solving the partial problem of providing an alternative conditioning unit, and in combination with the common general knowledge, D6, D1, D18 or D20 solving the partial problem of providing an alternative location for a temperature sensor.

1.4 The board does not concur with the respondent's arguments and with the findings of the opposition division for the following reasons.

1.4.1 The board does not agree that features (a) and (b) should be treated separately from feature (c) and that they are not synergistically linked. As correctly pointed out by the appellant, an early and timely detection of the temperature at the off-take of the blast furnace according to feature (c) has a direct impact in the spraying at in the conditioning tower according to features (a) and (b). The board thus concurs with the appellant that the technical effect is that the temperature peaks are detected early and in a timely manner thereby solving the problem of providing a more reliable and efficient installation for dry cleaning gas from blast furnace. The spraying in the conditioning tower can indeed be controlled in a more anticipated manner avoiding any occurrences of temperature peaks detrimental to the downstream bag filters. Although the respondent alleged that this effect is not plausible, the board finds that the effect is indeed plausibly presented by paragraph [0031] of the patent in suit.

1.4.2 In any case, the board does not regard feature (c) as obvious starting from D14 as closest prior art. As correctly argued by the appellant, D14 requires calculation of the dew point and therefore requires the measurement of the gas temperature downstream of the dust removing device. There is no hint in D14 that could point to placing further temperature sensors, let alone at an off-take of the blast furnace. This sensor placement is also not taught by D6 or D27, which only teach temperature sensors for the spraying control at the outlet of the conditioning tower. The signals

measured by thermocouples 112 and 114 of D6 do not deliver a parameter which is used to control the spraying but are rather used to control the afterburners which are also not foreseen in D14. Documents D1 and D18 also do not teach the skilled person to use a sensor for measuring the temperature for a spraying control in a conditioning tower, since neither of these documents relate to a dry cleaning process using a conditioning tower. D20 is a Chinese patent document from which, due to the absence of a translation in an official language of the EPO, no direct and unambiguous teaching can be derived. The opponent's view on its disclosure remains therefore a mere allegation. It cannot be assessed whether the skilled person would actually find the solution to the above mentioned problem in D20 and whether they would, *i.e.* not only could, combine D20 with D14 in an obvious manner.

1.5 In sum, the appellant has provided convincing arguments that the opposition division erred in its finding that the subject-matter of claim 1 of the main request lacked an inventive step. The decision under appeal is thus to be set aside. Since no other objections were raised by the respondent, and none are apparent to the board, the patent could be maintained based on the claims according to the main request.

2. *Amended description*

During the oral proceedings before the board, the appellant submitted an amended description adapted to the claims of the main request, to which the respondent raised no objections.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent as amended in the following version:

Claims:

nos. 1 and 2	according to the main request filed during the oral proceedings before the board on 9 April 2024

Description:

page 2	filed during the oral proceedings before the board on 9 April 2024
pages 3 and 4	of the patent specification

Drawings:

figures 1 to 4	of the patent specification.

The Registrar: The Chair:

S. Lichtenvort G. Patton

Decision electronically authenticated