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**Datasheet for the decision
of 10 March 2022**

Case Number: T 0210/20 - 3.3.05

Application Number: 12834844.8

Publication Number: 2760564

IPC: B01D53/83

Language of the proceedings: EN

Title of invention:

DRY SORBENT INJECTION DURING STEADY-STATE CONDITIONS IN DRY
SCRUBBER

Patent Proprietor:

The Babcock & Wilcox Company

Opponent:

S.A. LHOIST RECHERCHE ET DEVELOPPEMENT

Headword:

Dry sorbent injection/BABCOCK

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (no) - obvious combination of known features

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 0210/20 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 10 March 2022

Respondent: The Babcock & Wilcox Company
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Appellant: S.A. LHOIST RECHERCHE ET DEVELOPPEMENT
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
26 November 2019 concerning maintenance of the
European Patent No. 2760564 in amended form.**

Composition of the Board:

Chairman E. Bendl
Members: T. Burkhardt
K. Kerber-Zubrzycka

Summary of Facts and Submissions

- I. Initially, both the patent proprietor (now respondent) and the opponent (appellant) lodged an appeal against the opposition division's decision to maintain European patent No. 2 760 564 as amended on the basis of the then first auxiliary request (sole claim request presently on file).
- II. The patent proprietor withdrew its appeal before submitting a statement setting out the grounds of appeal. It also failed to react to the opponent's statement setting out the grounds of appeal, did not request oral proceedings and did not make any comments as to the substance of the appeal.
- III. The following documents are among those discussed at the opposition stage:

D4 US 2002/0102189 A1
D7 US 5,814,288 A
- IV. The parties were summoned to oral proceedings.
- V. In a communication under Article 15(1) RPBA 2020 the parties were informed that the first auxiliary request as maintained by the opposition division appeared to lack inventive step, that the patent would probably be revoked and that it appeared to be possible to cancel the oral proceedings.
- VI. In response, the respondent indicated that it would not attend the oral proceedings.

VII. The oral proceedings were cancelled.

VIII. The appellant's arguments, as far as relevant to the present decision, are summarised as follows:

Auxiliary request 1 as maintained by the opposition division lacked inventive step over D4, possibly in combination with D7 or with Figure 1 of the patent in suit.

The patent in suit should therefore be revoked.

IX. Claim 1 of auxiliary request 1 as maintained by the opposition division reads as follows:

"1. A method for reducing combustion emissions produced during normal operating conditions in a combustion system having a gas flowpath that travels sequentially from a combustion chamber through an air preheater, a particulate collection device and a spray dryer absorber to a baghouse downstream of the spray dryer absorber, the method comprising:

mixing a dry calcium hydroxide powder into a flue gas at an injection location downstream of the combustion chamber and upstream of the air preheater;

spraying water into the flue gas in the spray dryer absorber to humidify and reduce the temperature of the flue gas; and

passing the flue gas through the baghouse, wherein the calcium hydroxide powder captures pollutants in the flue gas."

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

In view of the only claim request on file, the respondent's implicit request is that the appeal be dismissed.

Reasons for the Decision

Auxiliary request 1 as maintained by the opposition division

Compared with the patent as granted, this request has been limited to the "injection location B" of the sorbent, i.e. downstream of the combustion chamber 205 and upstream of the air preheater 240 (see Figure 2 and paragraph [0045] of the patent in suit).

For the reasons set out below, this request does not meet the requirements of Article 56 EPC.

1. Inventive step
 - 1.1 The invention relates to a method for reducing combustion emissions.
 - 1.2 D4 discloses a method for reducing combustion emissions (paragraph [0011]).

The embodiment of Figure 2 discloses the process sequence: combustion chamber (here construed as *only* the lower furnace region (26)), air preheater (32) and "emission control devices" (34).

Claim 1 on file requires the presence of "a combustion chamber" (emphasis added by the board), which is not specified any further. Reference sign 42 in Figure 2 of

D4 designates the flue gases. This figure shows that the combustion occurs upstream of the sorbent injection and there is no reason why the combustion chamber in Figure 2 of D4 must comprise both the lower and the upper furnace regions 26 and 28.

Thus, contrary to the opposition division's view (see the third paragraph of page 12 of the decision under appeal), the injection of the sorbent into the "upper furnace region 28" via the line 16 is indeed "downstream of the combustion chamber 26" and upstream of the "air preheater 32".

Paragraph [0021] moreover discloses that the "emission control devices 34" can comprise a particulate collection device, a spray dryer absorber and a baghouse.

Figure 2 and paragraphs [0022] and [0023] disclose a list of sorbents that encompass dry calcium hydroxide powder ("lime" in "powdered form"). The sorbent is mixed into the flue gas at one or more of several injection locations, namely the "upper furnace region 28, the convection pass region 30, at the emissions control devices 34, prior to exiting the system 10 through the stack 36, or in with the fuel 38".

Paragraph [0023] specifies that the sorbent injection via the line 16 into the upper furnace region 28 was tested and "is known to work", contrary to the other locations that "are expected to work" but are "yet to be tested".

However, a *multiple* selection from several lists is necessary to arrive at the subject-matter of claim 1, i.e. by choosing:

- the claimed sequence: particulate collection device, spray dryer absorber and baghouse (from paragraph [0021] of D4)
- powdered lime as the sorbent (from paragraph [0022]) and
- injection via the line 16 in Figure 2 (see also paragraphs [0022] and [0023])

Since D4 relates to the same technical field as the patent in suit and has numerous features in common with claim 1, it is a suitable starting point for assessing inventive step.

- 1.3 According to the patent in suit, the problem to be solved is to provide a method for reducing combustion emissions with highly efficient removal of acids (paragraphs [0007] and [0038]).
- 1.4 It is suggested to solve this problem by means of the method of claim 1, which is characterised by the *combination* of:
- the specific sequence of the emission control devices, i.e. particulate collection device, spray dryer absorber and baghouse
 - the use of dry calcium hydroxide powder as the sorbent and
 - a sorbent injection location downstream of a combustion chamber and upstream of an air preheater
- 1.5 Since sorbent injection upstream of the spray dryer absorber allegedly results in improved sorbent dispersion (paragraph [0055] of the patent in suit) and since there is no evidence to the contrary, it may be acknowledged that the problem is successfully solved.

1.6 However, the subject-matter of claim 1 is obvious for the following reasons.

As explained above under point 1.2, the distinguishing features are in principle all disclosed in D4 (albeit in several lists).

The respondent has provided no evidence for a synergistic effect between the specific sequence of the emission control devices, the nature of the sorbent and its injection between the combustion chamber and the air preheater.

The specific sequence of the "emissions control devices" required by claim 1 is known from:

- prior-art Figure 1 of D4 itself (the board notes that D4 aims at "retrofitting" existing power plants; paragraph [0011])
- Figure 2 of D7 or
- Figure 1 of the patent in suit, which relates to a conventional design (paragraph [0025])

The board agrees with the opposition division that the skilled person would specifically choose the sorbent injection via the line 16 in Figure 2 of D4 since paragraph [0023] indicates that this alternative was tested and did work, whereas the other alternatives were "yet to be tested" and only "expected to work" (see the first three paragraphs of page 12 of the decision under appeal).

Moreover, the injection *via* the line 16 occurs "downstream of the combustion chamber" (see point 1.2 above).

Finally, using calcium hydroxide powder as a sorbent is obvious for the skilled person in view of the kind of emissions to be removed (see paragraph [0022] of D4).

Under these circumstances, the further improved dispersion of the sorbent cannot confer an inventive step. The established case law indicates that:

"... if, having regard to the state of the art, it would already have been obvious for a skilled person to arrive at something falling within the terms of a claim, because an advantageous effect could be expected to result from the combination of the teachings of the prior art documents, such claim lacked inventive step, irrespective of the circumstance that an extra effect (possibly unforeseen) was obtained" (Case Law of the Boards of Appeal, 9th edition, 2019, I.D.10.8).

The skilled person would hence arrive at the subject-matter of claim 1 without exercising inventive skill.

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:



L. Malécot-Grob

E. Bendl

Decision electronically authenticated