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**Datasheet for the decision
of 21 December 2022**

Case Number: T 1727/20 - 3.3.05

Application Number: 11746943.7

Publication Number: 2539040

IPC: B01D46/00, B01D53/94,
B01J23/44, B01J35/00,
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F01N13/00, B01J23/42

Language of the proceedings: EN

Title of invention:
IMPROVED CATALYZED SOOT FILTER

Patent Proprietor:
BASF SE
BASF Corporation

Opponent:
Umicore AG & Co. KG

Headword:
Soot filter/BASF

Relevant legal provisions:
RPBA 2020 Art. 12(2), 12(4)
EPC Art. 123(2), 54, 56

Keyword:

Amendments - allowable (yes)

Novelty - (yes)

Inventive step - (yes)

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1727/20 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 21 December 2022

Appellant: BASF SE
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
4 August 2020 concerning maintenance of the
European Patent No. 2539040 in amended form.**

Composition of the Board:

Chairman T. Burkhardt
Members: G. Glod
 S. Fernández de Córdoba

Summary of Facts and Submissions

- I. The appeals lodged by the patent proprietors (appellants 1) and by the opponent (appellant 2) lie from the opposition division's decision finding that the European patent EP 2 539 040 as amended on the basis of what was then auxiliary request 1 met the requirements of the EPC.
- II. The following documents used in the impugned decision are of relevance here:
- D1: US 2009/0193796 A1
 - D3: WO 2006/031600 A1
 - D4: Johansen, K. et al., SAE Document 2007-01-1921
 - D5: Dornhaus, F. et al., Proceedings of the Fifth International Exhaust Gas and Particulate Emissions Forum on 19/20 February 2008 "Forum am Schlosspark", Ludwigsburg
- III. With the reply to the appeal, appellants 1 submitted the following as an annex:
- D6: experiments from the patent proprietor
- IV. In the communication pursuant to Article 15(1) RPBA 2020 the board expressed the preliminary opinion that the fourth auxiliary request appeared to be allowable.
- V. In response, the parties withdrew their requests for oral proceedings on condition that the board did not change its preliminary view. In addition, the patent proprietor submitted the previously pending fourth auxiliary request as its main request.

VI. Since the board did not see any reason to deviate from its preliminary view, oral proceedings were cancelled and the decision can be rendered in writing.

VII. Claim 1 of the now main request reads as follows:

"1. A catalyzed soot filter, comprising a wall flow substrate comprising an inlet end, an outlet end, a substrate axial length extending between the inlet end and the outlet end, and a plurality of passages defined by internal walls of the wall flow filter substrate; wherein the plurality of passages comprise inlet passages having an open inlet end and a closed outlet end, and outlet passages having a closed inlet end and an open outlet end; wherein the internal walls of the inlet passages comprise an inlet coating that extends from the inlet end to an inlet coating end, thereby defining an inlet coating length, wherein the inlet coating length is $x\%$ of the substrate axial length, wherein x is in the range of from 20 to 70; wherein the internal walls of the outlet passages comprise an outlet coating that extends from the outlet end to an outlet coating end, thereby defining an outlet coating length, wherein the outlet coating length is $100-x\%$ of the substrate axial length; wherein the inlet coating length defines an upstream zone of the catalysed soot filter and the outlet coating length defines a downstream zone of the catalyzed soot filter; wherein the inlet coating comprises an oxidation catalyst comprising platinum (Pt) and optionally palladium (Pd); wherein the outlet coating comprises an oxidation catalyst comprising Pd and optionally Pt,

wherein the Pt concentration in the outlet coating is lower than the Pt concentration in the inlet coating and wherein the weight ratio of Pt : Pd in the outlet coating is 0:1;

wherein the inlet coating and the outlet coating are present on the wall flow substrate at a coating loading ratio in the range of from 0.5 to 1.5, calculated as ratio of the loading of the inlet coating (in g/L (g/in³)):loading of the outlet coating (in g/L (g/in³))."

Claims 2 to 19 directly or indirectly relate to claim 1.

- VIII. Appellants 1 argued that D4 and D5 should not be part of the proceedings. Their other arguments are reflected in the reasoning below.
- IX. Appellant 2 contested the inventive step in view of D1 or D3 in combination with D4 or D5. In particular, Figure 16 of D5 showed the oxidation of NO for Pd only.
- X. Appellants 1 request that the decision under appeal be set aside and that the patent be maintained as amended on the basis of the main request filed on 19 July 2022. Alternatively, they request that the opposition be rejected (patent be maintained as granted) or, in the alternative, that the patent be maintained as amended on the basis of one of auxiliary requests 2 to 6, auxiliary requests 2 to 4 submitted with the statement of grounds of appeal as auxiliary requests 1 to 3, or auxiliary requests 5 and 6 submitted by letter on 7 May 2021.

Appellant 2 requests that the decision under appeal be set aside and that the patent be revoked.

Reasons for the Decision

1. Article 12(2) RPBA 2020

The opposition division admitted D5. The boards do not have the power to disregard on appeal submissions correctly admitted by the opposition division in exercise of their discretion (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, V.A.3.4.4). The board cannot see how the opposition division might have exercised their discretion in an unreasonable way or on the basis of the wrong criteria since the division discussed the admission with the parties and considered D5 to be *prima facie* relevant, which is confirmed by the board as set out below. D5 is therefore part of the proceedings.

2. Article 12(4) RPBA 2020

Appellants 1 submitted D6 with the reply to appellant 2's appeal; the document is considered to be a response to the impugned decision, in which D5 was admitted, and to appellant 2's grounds of appeal, in which D5 was relied on for the inventive step argument. Therefore, the board admits D6, in view of the fact that doing so is not detrimental to procedural economy either.

Main request

3. Article 123(2) EPC

According to claim 1 of the now main request, the weight ratio of platinum:palladium in the outlet coating is 0:1. This amendment is based on claims 1 and

6 as granted, which have not been objected to under Article 100(c) EPC. The corresponding amendment has been made in claim 15. The basis for the amended ratio is found in the application as filed on page 11, line 10.

The restriction of the inlet coating length x is based on page 7, line 40.

The requirements of Article 123(2) EPC are fulfilled.

4. Article 54 EPC

D1 does not anticipate the subject-matter of the claims since it does not disclose an outlet coating having a platinum:palladium ratio of 0:1. By contrast, this ratio is 2:1 in Example 4 of D1 (paragraph [0109]).

The requirements of Article 54 EPC are fulfilled.

5. Article 56 EPC

5.1 The invention relates to a catalyzed soot filter with a zoned design which ensures the filtration of soot particulates, assists the oxidation of carbon monoxide and produces low NO₂ emissions during normal engine operations and active regeneration events (paragraph [0001]).

5.2 D3 is a suitable starting point for the inventive step analysis. It is common ground that D3 discloses (example 5) all the features of claim 1 except for the fact that no palladium is present in the outlet coating.

- 5.3 The problem to be solved by the patent is to provide a catalyzed soot filter which, apart from controlling the NO₂ formation reaction, continually supports the oxidation and abatement of CO and unburned HC and thus allows for a minimum breakthrough of HC and CO (paragraph [0012] of the patent).
- 5.4 The problem is solved by a catalyzed soot filter according to claim 1, characterised in that the outlet coating comprises an oxidation catalyst comprising palladium, wherein the weight ratio of platinum:palladium in the outlet coating is 0:1.
- 5.5 In view of the examples in the patent (in particular Figures 3 and 4) and in view of D6, it is accepted that the problem is successfully solved. There is no evidence to demonstrate that the different ageing processes described under point 4.4 of the patent (paragraphs [0085] and [0086]) have a significant impact on the results. It should also be noted that the board does not consider that the conversion of HC and CO has to be improved but rather merely supported. This is also in line with the examples of the patent and D6, in which HC and CO conversion are not necessarily better with the claimed catalyst compared with a catalyst comprising only platinum in the rear zone.
- 5.6 The proposed solution is not obvious for the following reasons.
- 5.6.1 D5 deals with platinum/palladium-based catalyzed filter technologies for diesel cars. The skilled person trying to solve the stated problem would therefore turn to D5 to learn more about this type of catalyst. The fact that D5 does not relate to a zoned catalyst does not appear relevant. The zoning may have an influence on

the gas composition present on the catalyst, but said composition is also dependent on the input. In any case, claim 1 does not contain any feature relating to the gas composition in the inlet and/or outlet zones.

However, D5 clearly teaches that systems based only on Pd are much less active, as is also evident from Figure 7 (page 134, first sentence). By comparison, the experiments on a synthetic gas mixture (page 136, Figure 10) are less meaningful than on an engine bench. Moreover, D5 relates to platinum/palladium catalysts, and there is no reason why the skilled person would turn to a catalyst that no longer comprises platinum (like that shown in Figure 16). Therefore the skilled person trying to solve the stated problem is not guided towards using an outlet coating having a platinum:palladium ratio of 0:1.

- 5.6.2 Notwithstanding the question of whether D4 should be considered part of the appeal proceedings, D4 does not disclose a platinum:palladium ratio of 0:1 either.
- 5.7 This finding would not be altered if D1 was chosen as the closest prior art since D1 does not disclose an outlet coating having a platinum:palladium ratio of 0:1 either.
- 5.8 The subject-matter of claim 1 and claims 2 to 19, which are directly or indirectly dependent on claim 1, involves an inventive step.
- 6. Since the main request is allowable, there is no need to discuss the auxiliary requests.

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 on the basis of the main request submitted on 19 July 2022 and a description to be adapted accordingly.

The Registrar:

The Chairman:



C. Vodz

T. Burkhardt

Decision electronically authenticated