

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KOZO IIDA,
TORU TAKASHINA and SHINTARO HONJO

Appeal No. 2002-0864
Application 09/022,817

ON BRIEF

Before KIMLIN, PAK, and PAWLIKOWSKI, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1 and 2, which are all of the claims pending in the above-identified application.

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APPEALED SUBJECT MATTER

The subject matter on appeal is directed to a process for treating a combustion exhaust gas containing NO_x, SO_x and mercury wherein a specific amount of a mercury chlorinating agent, together with ammonia, is added to the combustion exhaust gas in the presence of a particular denitrating catalyst to remove nitrogen oxides while simultaneously converting mercury-containing compounds to mercury chlorides. See the specification, pages 6 and 7. Details of the appealed subject matter are illustrated in representative claim 1 which is reproduced below:

1. A process for treating combustion exhaust gas comprising:

adding a mercury chlorinating agent and ammonia to combustion exhaust gas containing No_x, So_x, and mercury to carry out removal of nitrogen oxides from the exhaust gas in the presence of a solid catalyst comprising: (1) a carrier comprised of at least one compound selected from the group consisting of TiO₂, SiO₂, ZrO₂, and zeolite, and (2) at least one element selected from the group consisting of Pt, Ru, Ir, V, W, Mo, Ni, Co, Fe, Cr, Cu, and Mn, wherein said element is carried by said carrier, and wherein the mercury chlorinating agent is added in an amount greater than the stoichiometric amount relative to the mercury present in the exhaust gas to produce a mercury chloride; and

wet-desulfurizing the denitrated exhaust gas using an alkaline absorbing unit.

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PRIOR ART

The examiner relies on the following prior art references:¹

Kubisa (Published German Patent Application)	DE 42 08 355 A1	Sep. 23, 1993
Tabata et al. (Tabata) (Published Japanese Patent Application)	JP 6-126134-A	May 10, 1994
Kato et al. (Kato) (Published Japanese Patent Application)	JP 6-319950-A	Nov. 22, 1994

Appellants' admission at pages 2 and 3 of the specification in reference to prior art Figure 3 (hereinafter referred to as "admitted prior art").

The appellants rely on the following literature:

Jumpei Ando, "Review of Japanese NO_x Abatement Technology for Stationary Sources," NO_x-Symposium Karlsruhe 1985, pp. A1-A42 (hereinafter referred to as "Ando").

REJECTION

Claims 1 and 2 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined teachings of the admitted prior art, Kubisa, Kato and Tabata.

We reverse.

¹Our reference to the published German and Japanese patent applications is to their corresponding English translations of record.

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The examiner properly finds (Answer, page 5) that:

The Applicants' description of the prior art set forth on pg. 2 to pg. 3 in their specification discloses a method for treating combustion exhaust gas from a boiler, comprising:

adding ammonia to the combustion exhaust gas so that the ammonia can react with and remove nitrogen oxides out of the combustion exhaust gas;

subjecting the⁴ [sic, the] exhaust gas to a wet desulfurizing unit so that sulfur oxides and mercury chloride can be removed out of the gas.

According to the examiner (Answer, page 6), both Kato and Tabata teach that the above nitrogen oxide removal (conventional denitrating step) is normally carried out in the presence of the claimed denitrating catalyst. We find that both Kato and Tabata teach that nitrogen oxides are removed from a combustion exhaust gas with ammonia in the presence of the claimed denitrating catalyst at a temperature below 600°C. See Kato, pages 18/27 and 21/27 and Tabata, pages 12/17 and 14/17.

The dispositive question is whether it would have been prima facie obvious to add a specific amount of a mercury chlorinating agent, together with ammonia, to a combustion

exhaust gas in the presence of a specific denitrating catalyst to convert mercury compounds therein to mercury chlorides, while simultaneously removing nitrogen oxides. On this record, we answer this question in the negative.

As found by the examiner (Answer, page 5), Kubisa discloses treating a combusted waste gas containing at least sulfur dioxide, hydrogen chloride, and mercury with an added amount of a mercury chlorinating agent, i.e., hydrogen chloride, to remove mercury in the form of mercury chlorides at a temperature of 800 to 850°C. See also Kubisa, pages 1-3. Kubisa discloses that converting mercury into mercury chloride allows the efficient and effective removal of the mercury content in the waste gas possible. See pages 2-3. According to Kubisa (page 6), the resulting waste gas can then be further treated to remove sulfur oxides and nitric oxides.

Given the similarity between the waste gas and the admittedly known power furnace boiler gas above (Brief, page 5), we concur with the examiner that the prior art references as a whole would have provided sufficient suggestion and/or motivation to employ a mercury chlorinating agent, such as hydrogen

chloride, in the admittedly known method as modified and/or explained by Kato and Tabata. However, we determine that the combined teachings of these prior art references would not have resulted in the claimed invention inasmuch as they would have suggested the desirability of converting mercury and/or mercury compounds in a boiler gas to mercury chloride before denitrating it in the presence of ammonia and a specific denitrating catalyst.

In reaching this determination, we have also considered the teachings of Ando relied upon by both the examiner and the appellants. See the Answer, page 8, and the Brief, pages 4-5. While Ando teaches and/or suggests that a temperature applicable to a non-catalytic denitration reaction step (reacting nitrogen oxides with ammonia in the absence of a catalyst) is equally applicable to a temperature for converting mercury/mercury compounds into mercury chloride (chlorination) (see page A39), it does not teach or suggest that both the above-mentioned chlorination and denitration reactions can be carried out simultaneously in the presence of a specific denitration catalyst (see Ando in its entirety). Specifically, the examiner has not

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demonstrated that the temperature range taught by Ando to be useful for a non-catalytic denitrating step is also applicable to the admittedly known catalytic denitration step as explained and/or modified by Kato and Tabata.² Nor has the examiner demonstrated that one of ordinary skill in the art would have reasonably expected to obtain the same or similar chlorination reaction taught by Kubisa in the presence of, inter alia, the claimed denitration catalyst.

On this record, the examiner simply has not established a prima facie case of obviousness regarding the claimed subject matter within the meaning of 35 U.S.C. § 103.³ Accordingly, we reverse the aforementioned Section 103 rejection.

² Indeed, as indicated supra, both Kato and Tabata teach that a catalytic denitration step involving the claimed catalysts is desirably carried out at a temperature below 600°C which is much below the mercury chlorination temperature suggested by Kubisa.

³ Since no prima facie case is established, we need not address the sufficiency of the secondary evidence proffered by the appellants. See, e.g., In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

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The decision of the examiner is reversed.

REVERSED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
)	
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CHUNG K. PAK)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
)	
)	
BEVERLY A. PAWLIKOWSKI)	
Administrative Patent Judge)	

CKP:psb

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