

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KENNETH E. VOSS, BULENT O. YAVUZ, ROBERT J. FARRAUTO
and MICHAEL P. GALLIGAN

Appeal No. 1997-3094
Application 08/405,279¹

ON BRIEF

Before GRON, WARREN and OWENS, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the examiner's final rejection of

¹ Application for patent filed March 16, 1995. According to appellants, the application is a division of Application 08/247,531, filed May 23, 1994, now U.S. Patent no. 5,491,120, issued February 13, 1996, which is a continuation of Application 07/973,462, filed November 19, 1992, now abandoned.

claims 25-42, which are all of the claims remaining in the application.

THE INVENTION

Appellants claim a method for oxidizing oxidizable components of a gas-borne stream by use of a recited catalyst.² Claims 25 and 26 are illustrative and read as follows:

25. A method for oxidizing oxidizable components of a gas-borne stream comprises contacting the stream with a catalyst composition at a temperature high enough to catalyze oxidation of at least some of the oxidizable component, the catalyst composition comprising a catalytic material having a BET surface area of at least 10 m²/g and consists of a combination of bulk ceria having a BET surface area of at least about 10 m²/g and a bulk second metal oxide selected from the class consisting of one or more of titania, zirconia, ceria-zirconia, silica, alumina-silica, and "-alumina.

26. A method for treating a gas-borne stream comprising a diesel engine exhaust stream containing a volatile organic fraction comprises contacting the stream with a catalyst composition at a temperature high enough to catalyze oxidation of at least some of the volatile organic fraction, the catalyst composition comprising a catalytic material having a

²A gas-borne stream is "a gaseous stream which may contain non-gaseous components such as solid particulates and/or vapors, liquid mist or droplets, and/or solid particulates wetted by a liquid" (specification, page 5, lines 28-31).

Appeal No. 1997-3094
Application 08/405,279

BET surface area of at least 10 m²/g and consisting essentially of a combination of bulk ceria having a BET surface area of at least about 10 m²/g and a bulk second metal oxide selected from the class consisting of one or more of titania, zirconia, ceria-zirconia, silica, alumina-silica and "-alumina."^[3]

THE REFERENCES

Wan et al. (Wan) 1987	4,714,694	Dec. 22,
Rudy 1991	5,010,051	Apr. 23,
Bedford et al. (Bedford) 1992	5,081,095	Jan. 14,

THE REJECTIONS

The claims stand rejected under 35 U.S.C. § 103 as follows: claims 25-31 and 38-42 over Rudy in view of Bedford; claims 32-37 over Rudy in view of Bedford and Wan; and claims 25-28 and 31-42 over Wan.

OPINION

We have carefully considered all of the arguments

³ "[T]he present Office practice is to insist that each claim must be the object of a sentence starting with 'I(or we)claim', 'The invention claimed is' (or the equivalent)." See *Manual of Patent Examining Procedure*, § 608.01(m) (7th ed., July 1998). Thus, in appellants' claims 25 and 26, the "comprises" transition term should be changed to "comprising" so that the claims read as the object of a sentence.

Appeal No. 1997-3094
Application 08/405,279

advanced by appellants and the examiner and agree with appellants that the rejections of claims 25, 27/25, 28/25, 29/25, 30/25, 31/25, 38/25, 39/25, 40/25 and 41 are not well founded. Accordingly, we reverse these rejections. We affirm the rejections of claims 26, 27/26, 28/26, 29/26, 30/26, 31/26, 32-37, 38/26, 39/26, 40/26 and 42.

Appellants state in their brief (page 8) that the claims stand or fall in the following two groups: 1) claim 25 and dependent claims 27-31, 38, 40 and 41 to the extent that they depend from claim 25, and 2) claim 26 and dependent claims 27-40 and 42 to the extent that they depend from claim 26. Although the rejections in the examiner's answer are new rejections based on the references applied in the final rejection, appellants do not separately argue any claim in the reply brief and do not present a separate argument as to the rejection of dependent claims 32-37. Thus, we limit our discussion to one claim in each of the above groups, i.e., claims 25 and 26. See *In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37 USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR § 1.192(c)(7)(1995).

Rejection of claim 25 over Wan

Although claim 25 states that the catalyst composition "comprises" a catalytic material, it states that the catalytic material "consists of" a combination of bulk ceria and a bulk second metal oxide. Appellants' specification states (page 10, lines 23-29) that "[t]he basic and novel characteristics of the present invention are believed to reside in the use of the defined combination of ceria and second metal oxide as an oxidation catalyst without the addition of metal catalytic components thereto, except as specifically otherwise defined in certain dependent claims." Hence, in view of the specification, we interpret claim 25 as limiting the catalytic component of the catalyst to only the bulk ceria and second bulk metal oxide.

Wan discloses a method for treating exhaust from internal combustion engines, such as automobile and other gasoline fueled engines, using a catalyst which contains bulk aluminum-stabilized ceria (col. 1, lines 19-22; col. 8, lines 11-20). The ceria is stabilized by impregnating it with a liquid dispersion of any suitable aluminum-stabilizer precursor such

Appeal No. 1997-3094
Application 08/405,279

as aluminum nitrate, aluminum chloride, aluminum oxychloride or aluminum acetate (col. 9, lines 5-11). Wan states that after the impregnated ceria is dried in air, the aluminum probably is present in a compound, presumably alumina (col. 9, lines 11-22).

Appellants' specification states (page 7, lines 20-26) that "[r]eference herein or in the claims to ceria, any of the second metal oxides, or alumina as being in 'bulk' form means that the ceria, second metal oxides or alumina are present as discrete particles (which may be, and usually are, of very small size, e.g., 10 to 20 microns in diameter or even smaller) as opposed to having been dispersed from solution into particles of another component." Thus, the alumina stabilizer on Wan's ceria particles is not a bulk second metal oxide as required by appellants' claim 25.

Wan discloses that the catalyst composition can contain alumina particles as a support for a platinum group metal catalytic component (col. 10, lines 36-39). Because the

catalytic component in appellants' claim 25 is limited to the bulk ceria and bulk second metal oxide, Wan's platinum group metal catalytic component is excluded by the claim. The examiner argues that it would have been obvious to one of ordinary skill in the art to eliminate the platinum along with its function (answer, pages 16-17). This argument is not well taken because if the platinum were eliminated, the need for the alumina particles as a support for the platinum also would be eliminated. The catalyst composition then would not include the bulk second metal oxide required by appellants' claim 25. The examiner, therefore, has not established a *prima facie* case of obviousness of the method recited in claim 25 over Wan.

Rejection of claim 25 over Rudy in view of Bedford

Rudy discloses a method for treating exhaust gases from internal combustion engines, such as gasoline fueled automobile and other spark ignition engines, by use of a two stage catalyst system (col. 1, lines 18-20; col. 2, line 64 - col. 3, line 11). The examiner relies (answer, page 4) on the upstream catalyst member which includes "a platinum catalytic

component disposed on an activated alumina refractory support, a platinum catalytic component disposed on an alumina-stabilized bulk ceria support, and a rhodium catalytic component disposed on an activated alumina support" (col. 5, line 65 - col. 6, line 2). Bedford is relied upon (answer, pages 5-6) for a disclosure of the ceria particle size required by claim 25 (col. 2, lines 57-58). We note that Wan is incorporated by reference in Rudy (col. 7, lines 22-24). See *In re Howarth*, 654 F.2d 103, 106, 210 USPQ 689, 692 (CCPA 1981); *In re Lund*, 376 F.2d 982, 989, 153 USPQ 625, 631 (CCPA 1967). Wan discloses high surface area ceria which is suitable for treating combustion exhaust gas and which has a surface area of at least about 100 m²/g (col. 10, lines 13-16).

The examiner argues that it would have been obvious to one of ordinary skill in the art to eliminate Rudy's platinum (and, apparently, also the rhodium) along with its function (answer, page 18). This argument is not persuasive because Rudy's bulk ceria and alumina are merely supports for the platinum and rhodium catalytic components. Thus, if the

Appeal No. 1997-3094
Application 08/405,279

catalytic components were eliminated, the catalyst composition would not include the bulk ceria and bulk second metal oxide required by appellants'

claim 25. Hence, the examiner has not established a *prima facie* case of obviousness of the method recited in claim 25 over Rudy in view of Bedford.

Rejection of claim 26 over Wan

Appellants argue that Wan's catalyst was conventionally known in the art for use in treating exhaust streams containing hydrocarbons, CO and NO_x, and that Wan would not have suggested using the catalyst to treat diesel exhaust streams which contain volatile organic fractions or SO₂ (brief, page 18). We do not find this argument to be convincing because, as indicated by appellants (specification, page 1), diesel exhaust also contains hydrocarbons and CO, which are two components which Wan removes using his catalyst. The fact that Wan's disclosed treatment temperature of 400EC (col. 14, line 60) is within appellants' range of about 100-

Appeal No. 1997-3094
Application 08/405,279

800EC (specification, page 5, lines 17-23) indicates that Wan's method is capable of oxidizing at least some volatile fraction of diesel exhaust as required by appellants' claim 26.

Claim 26 recites a catalytic material "consisting essentially of" the recited bulk ceria and bulk second metal oxide. The term "consisting essentially of" includes not only what is specifically recited in appellants' claim, but also any other materials which do not materially affect the basic and novel characteristics of the claimed invention. See *In re Herz*, 537 F.2d 549, 551-2, 190 USPQ 461, 463 (CCPA 1976); *In re De Lajarte*, 337 F.2d 870, 873-4, 143 USPQ 256, 258 (CCPA 1964); *In re Janakirama-Rao*, 317 F.2d 951, 954, 137 USPQ 893, 896 (CCPA 1963). The fact that Wan's exemplary amount of platinum, i.e., about 0.01 to about 8 wt% of the total catalyst material (col. 12, lines 9-14), can fall within the amount of platinum used by appellants, i.e., about 0.1 to 15 g/ft³ of the composition (specification, page 4, lines 33-36), indicates that the amounts of platinum used in Wan's method include amounts which do not materially affect the basic and

novel characteristics of appellants' claimed invention.

Appellants argue that the presence of up to 0.5 g/ft³ of platinum unexpectedly causes suppression of the oxidation of SO₂ to SO₃ (brief, page 19), and that no evidence of unexpected results is needed because it would have been unexpected that appellants' catalytic material has any of the recited catalytic activity (reply brief, pages 3-4). This argument is not persuasive because Wan teaches that high surface area ceria is believed to serve as a promoter for oxidation-reduction reactions (Col. 8, lines 11-13) and can either provide a synergistic effect to the platinum group metal catalytic component (col. 8, lines 13-15) or can be used in the absence of a platinum group metal catalytic component (abstract, first sentence). Thus, it reasonably appears that one of ordinary skill in the art would have expected appellants' catalyst to have the recited activity. The claims do not require suppression of the oxidation of SO₂. To show unexpected results, appellants must provide evidence in the form of a comparison of appellants' claimed invention with the closest prior art, see *In re Baxter Travenol Labs.*, 952 F.2d

Appeal No. 1997-3094
Application 08/405,279

388, 392, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991); *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984), and the comparison must be commensurate in scope with the claims. See *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 778 (Fed. Cir. 1983); *In re Clemens*, 622 F.2d 1029, 1035, 206 USPQ 289, 296 (CCPA 1980).

For the above reasons we affirm the rejection over Wan of claim 26 and the claims which depend therefrom.

Rejection of claim 26 over Rudy in view of Belford

Appellants argue that there is no disclosure in Rudy directed toward use of a catalytic material consisting essentially of a combination of ceria and a bulk second metal oxide to oxidize volatile organic fractions in a diesel exhaust gas stream (brief, page 14). Rudy's teaching that his method is effective for treating exhaust spark ignition engines generally (col. 1, lines 18-20) would have fairly suggested, to one of ordinary skill in the art, use of the method to treat diesel engine exhaust. The fact that the temperatures used, i.e., at least about 400EC to 800EC (col. 3, lines 23-26), are within the range used by appellants,

i.e., about 100-800EC, indicates that Rudy's method is capable of oxidizing at least some volatile hydrocarbon fraction as required by appellants' claim 26. Rudy's catalyst includes platinum in an amount which Rudy does not disclose as being limited. However, because 1) Rudy's method treats spark ignition engine exhaust using a catalyst which contains both of appellants' bulk ceria and bulk alumina, 2) platinum can be included in appellants' catalyst, and 3) Rudy's operating temperatures are within the range used by appellants, it reasonably appears that Rudy's platinum would not materially affect the basic and novel characteristics of appellants' catalytic material.

Appellants argue that minor amounts of a precious metal can enhance oxidation of oxidizable gaseous components while minimizing the oxidation of SO_2 to SO_3 (brief, pages 14-15). This argument is not convincing because appellants' claims do not require that SO_2 oxidation is minimized, and no comparison with the closest prior art has been provided which demonstrates that this characteristic is an unexpected result.

For the above reasons, we affirm the rejection over Rudy

Appeal No. 1997-3094
Application 08/405,279

in view of Bedford of claim 26 and the claims which depend therefrom, and the rejection of claims 32-37 over Rudy in view of Bedford and Wan.

DECISION

The rejections of claims 25, 27/25, 28/25, 29/25, 30/25, 31/25, 38/25, 39/25, 40/25 and 41 are reversed. The rejections of claims 26, 27/26, 28/26, 29/26, 30/26, 31/26, 32-37, 38/26, 39/26, 40/26 and 42 are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR

Appeal No. 1997-3094
Application 08/405,279

§ 1.136(a).

AFFIRMED-IN-PART

TEDDY S. GRON)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
CHARLES F. WARREN)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
TERRY J. OWENS)	
Administrative Patent Judge)	

TJO/pgg
Chief Patent Counsel

Appeal No. 1997-3094
Application 08/405,279

Engelhard Corporation
101 Wood Avenue
Iselin, NJ 08830