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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HONEYWELL INTERNATIONAL, INC.

Appeal 2007-2908
Application 10/379,456
Technology Center 1700

Decided: August 24, 2007

Before FRED E. McKELVEY, *Senior Administrative Patent Judge*, and
RICHARD TORCZON and SALLY GARDNER LANE, *Administrative
Patent Judges*.

TORCZON, *Administrative Patent Judge*.

DECISION ON APPEAL

The subject matter of the claims on appeal relates to catalytic converter for reducing pollutant levels, particularly for airplane bleed air systems. (See Specification (Spec.) ¶001.) All of the pending claims stand rejected over prior art. The appellant (Honeywell) seeks review of the rejections. We affirm.

THE CLAIMS

Claims 1-3, 5-31, 34-59, and 61-74 are pending and rejected. (New Appeal Brief in Response to Notification of Non-Compliant Appeal Brief (Br.) 5.) Honeywell has identified two groups of claims that stand or fall together for the purposes of this appeal: (I) 1-3, 5-28, 58, 59, and 61-65; and (II) 29-31, 34-57, and 66-74. (Br. 5.) We select a claim from each group as representative of the group. 37 C.F.R. § 41.37(c)(1)(vii). The claim language is taken from the claims appendix to the brief.

Claim 1 defines the invention as:

An ozone and hydrocarbon destroying system,
comprising[:]
a core;
an active metal oxide washcoat applied to said core that
destroys ozone, wherein said active metal oxide washcoat is an
oxide of a metal selected from the group consisting of
palladium, copper, silver, iron, cobalt, nickel and combinations
thereof; and
an active metal impregnated in said active metal oxide
washcoat that destroys hydrocarbons.

The transitional term "comprising" is used, which opens the system to the inclusion of elements not expressly listed in the claim such as additional layers or active metals.

We must construe a claim as broadly as possible in view of the specification. In one embodiment, the washcoat is made of "a refractory metal oxide such as alumina, silica, titania, zirconia, or combinations thereof" plus a first and second active metal. (Spec. ¶033.) The specification teaches another embodiment in which the washcoat layer "may contain oxides of the said first active metal". The embodiment includes one example where an active metal oxide is used instead of a refractory metal

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oxide. (Spec. ¶038.) The specification also teaches the inclusion of a synthetic liquid resin such as silicones, siloxanes, and organic solvents in the washcoat. (Spec. ¶046.) Thus, in view of the specification, the broadest reasonable construction of "active metal oxide washcoat" requires the washcoat to "contain" an active metal oxide (Spec. ¶038) but not to exclude other components. In the absence of an express definition or clearly exclusive claim language, we cannot read the claim to exclude everything from the washcoat other than active metal oxides from the specified group of metals. *In re Morris*, 127 F.3d 1048, 1054-56, 44 USPQ2d 1023, 1028-30 (Fed. Cir. 1997).

The term "active metal" is not defined in the specification, but lists of suitable active metals are provided. (Spec. ¶¶033 & 048.) The first list is "manganese, palladium, copper, silver, iron, cobalt and nickel or combinations thereof." The second list is "platinum, gold, iridium, rhodium, manganese, copper, iron, nickel or any combination thereof." The specification suggests that the groups are distinct. One group "has a high efficiency for the conversion of ozone to oxygen", while the other "has a high efficiency for the conversion of hydrocarbons to carbon dioxide and water." (Spec. ¶¶033 & 048.) Thus, the meaning of "active metal" is ambiguous until further qualified by functional language in a claim. We note that some metals (manganese, copper, iron, and nickel) appear on both lists and may be active in both functions.

Claim 29 defines the invention as:

An ozone and hydrocarbon destroying system,
comprising[:]
a core;
a high surface area refractory metal oxide washcoat
applied to said core;

a first active metal impregnated in said washcoat layer that destroys ozone;
a second active metal impregnated in said washcoat layer that destroys hydrocarbons; and
wherein the first active metal is palladium or silver and the second active metal is platinum, gold, rhodium or iridium or the first active metal is manganese, copper, iron, cobalt or nickel and the second active metal is manganese, copper, iron or nickel.

The washcoat in claim 29 has a high surface area and contains a refractory metal oxide. Although the term "refractory metal oxide" is not specifically defined in the specification, examples are given of what Honeywell means by the term. Honeywell offers as examples " alumina, silica, titania, zirconia, or combinations thereof."

Honeywell appears to intend two exclusive lists for the first and second active metal. (Br. 8-9.) The limitation does not include the word "either", which would have clarified the question. Moreover, the portion of the specification that Honeywell cites in support of these exclusive groupings (Spec. 8:18-24; cf. ¶033) actually supports the broader reading that any first active metal and any second active metal may be selected. In its disclosure, Honeywell does not provide embodiments supporting the exclusive groupings Honeywell contends are claimed. Since we are required to use the broadest construction reasonable in view of the specification, and the applicant is in the best position to avoid ambiguity, we should read the lists as not exclusive. In any case, the art appears to address either reading.

Although Honeywell does not identify any other group of claims for separate treatment, it in fact provides separate argument for a separate rejection of claims 62 and 63. (Br. 29-31.) Since we affirm a different

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rejection that includes these two claims, however, we do not reach this separate rejection of claims 62 and 63.

THE REJECTIONS

Claim 1 stands rejected under 35 U.S.C. § 102(e) as having been anticipated by—

Di-Jia Liu, Daniel R. Winstead, and Peter M. Michalakos, *Environmental control system including ozone-destroying catalytic converter having anodized and washcoat layers*, US 6,576,199 B1 (issued 10 June 2003) (Liu).

Claims 62 and 63 are also objects of this rejection.

The subject matter of claim 29 stands rejected under 35 U.S.C. § 103(a) as having been obvious in view of the Liu patent.

Claims 1 and 29 stand rejected for obviousness-type double-patenting in view of claims 1-9 of the Liu patent.

The subject matter of claims 1 and 29 stand rejected under § 103(a) as having been obvious in view of—

George R. Lester and Stephen T. Homeyer, *Catalytic converter with metal monolith having an integral catalyst*, US 6,203,771 B1 (issued 20 March 2001) (Lester).

The subject matter of claim 62 stands rejected under § 103(a) as having been obvious in view of the Lester patent and of—

Chung-Zong Wan and Joseph C. Dettling, *Stabilized alumina catalyst support coatings*, U.S. 4,677,095 (issued 30 June 1987) (Wan).

ANTICIPATION

The Liu patent is directed to an ozone-destroying catalytic converter comprising a core, an anodized layer on the core, a washcoat layer on the

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anodized layer, and an ozone-destroying catalyst impregnated in the washcoat layer. (Liu 2:10-14.) The washcoat is formed from a slurry including a refractory metal oxide and an organosilane resin. (Liu 2:29-48.) Suitable refractory metal oxides for the washcoat include alumina, silica, aluminum silicate, magnesia, manganese oxide, titania, zirconia and ceria. (Liu 6:8-14.)

Liu teaches that the catalyst may be a precious metal or bimetallic catalyst including oxides. Suitable precious metals include palladium, platinum, rhodium, gold, iridium, and silver. Transition metal co-catalysts include nickel, manganese, cobalt, iron, and copper. (Liu 3:51-4:2.)

Honeywell urges a distinction between the refractory metal oxide washcoat of Liu and claim 1's active metal oxide washcoat based on morphology and crystal phase. (Br. 15-16; Reply 6-7.) The argument is not supported with evidence and is not commensurate with the reasonable scope of the claim. First, the argument posits differences between active metals and refractory metals, but points to no support in the record for this difference. There is no expert testimony in the record and we cannot accept attorney argument. Honeywell has not pointed us to a basis in its specification or in the cited references. If anything the specification and references support the rejection. Both the specification and Liu teach a washcoat of a refractory metal with active metals included. This formulation for the washcoat is consistent with claim 1. Thus, even if there is a relevant difference between a refractory metal and an active metal, the washcoat may reasonably contain both.

Liu teaches the limitations of claim 1. Liu teaches an ozone-destroying catalytic converter (the claimed ozone-destroying system) comprising a (claimed) core, an (unclaimed) anodized layer, a (claimed)

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washcoat including a refractory metal and one or more active metal catalysts. The bimetallic catalysts may be oxides. All of the active metals listed in claim 1 are either precious metal catalysts or transition metal co-catalysts in Liu, including Liu's preferred palladium and nickel, respectively. Most of Liu's catalysts (except palladium and silver) and all of the co-catalysts are the metals that Honeywell lists as efficient hydrocarbon destroying active metals. Thus, most of the possible Liu bimetallic catalysts would inherently destroy both ozone and hydrocarbons, including Liu's preferred bimetallic catalyst of nickel and palladium. We find that one skilled in the art would understand the Liu patent to have taught the invention of claim 1.

Claims 2, 3, 5-28, 58, 59, and 61-65 stand or fall with claim 1. Hence, the anticipation rejection of these claims also stands.

OBVIOUSNESS OVER LIU

In analyzing obviousness, the scope and content of the prior art must be determined, the differences between the prior art and the claims ascertained, and the ordinary level of skill in the art resolved. Objective evidence of the circumstances surrounding the origin of the claimed subject matter (so-called secondary considerations) may also be relevant. Such secondary considerations guard against the employment of impermissible hindsight. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 36 (1966), *cited with approval in KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 82 USPQ2d 1385 (2007). Honeywell's Appeal Brief does not rely on any objective evidence of secondary considerations."

Scope and content of the prior art

As discussed above, Liu teaches an ozone-destroying catalytic converter with a core, a refractory metal oxide washcoat, and first and second catalysts in the washcoat.

Liu's washcoat has a high surface area to support the catalyst. The washcoat may be applied directly to the core or to an oxidized layer on the core. (Liu 4:38-48.) The washcoat may even be applied directly to the unanodized core. (Liu 10:35-42.) The catalyst could include additional metals, including more than one precious metal and a transition metal. (Liu 10:49-54.) Liu's preferred precious metal is palladium, which would leave silver, platinum, gold, rhodium, and iridium as choices for the second precious metal. Recall that most of Liu's catalysts and co-catalysts inherently destroy hydrocarbons as well.

Differences between prior art and the claims

The examiner cites as a difference the specific groupings of active metals in claim 29. (Examiner's Answer (Ans.) 6-7.) Assuming for the sake of argument that claim 29 really requires separate groups of claims, the examiner nevertheless appears to be mistaken about this difference. The examiner apparently overlooked (and thus apparently did not consider) Liu's express teaching to use more than one precious metal and a transition metal. We cannot and do not read claim 29 to exclude the use of more than two active metals. If, following Liu's teaching, one used two precious metals or two transition metals, most of the possible trimetallic combinations within Liu's teaching would also be within the scope of claim 29.

Liu does not teach the use of a catalyst to destroy hydrocarbons. Most of Liu's ozone-destroying catalysts also destroy hydrocarbons, however,

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according to Honeywell. Thus, simply following Liu's teachings would usually produce a washcoat that destroys both ozone and hydrocarbons. The prior art and the applicant may arrive at the same compositions for different reasons without making the compositions themselves any less obvious. *In re Dillon*, 919 F.2d 688, 692-94, 16 USPQ2d 1897, 1901-02 (Fed. Cir. 1990) (en banc); *In re Beattie*, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992). Thus, Honeywell's argument that "there would be no motivation...to come up with a different combination of active metal catalysts to destroy both ozone and hydrocarbons" (Br. 24) is at best misplaced since Liu teaches the same combinations albeit for different reasons.

When Liu's teachings are taken as a whole, there is no material difference between many of Liu's trimetallic catalytic converters and the subject matter of claim 29.

Ordinary level of skill in the art

We look to the evidence of record—the applicant's disclosure, the cited references, and any declaration testimony—in resolving the ordinary level of skill in the art. *Ex parte Jud*, 2006 WL 4080053 at *2 (BPAI) (rehearing with expanded panel). In this appeal, there is no testimony. We focus on what those in the art knew and could do.

The specification shows that the basic idea of a catalytic converter with an ozone-reducing washcoat was known for airplane bleed air systems. The need to reduce hydrocarbons, and at least one way to do so, were also known in the art. (Spec. ¶¶004-007.) The specification expresses confidence that those in the art understand design and fabrication choices, such as the use of segmented monoliths for the core, the best methods of

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brazing and welding, the details of calcining, the best ways of applying the washcoat to the core, and other modifications within the scope of the invention, all without much additional guidance. (Spec. ¶¶041, 042, and 049-052.)

From Liu, those in the art knew how to make an ozone-destroying catalytic converter with a core, a high surface area refractory metal oxide washcoat, and two or more metal catalysts in the washcoat, including two precious metals and a transition metal.

Conclusion

When the teachings of Liu are taken as a whole, the trimetallic catalytic converters anticipated the invention of claim 29. Since anticipation is the ultimate of obviousness, it follows that claim 29 would have been obvious to a person having ordinary skill in the art.

Alternatively, to the extent the choice of active metals is a difference, Liu provides guidance to pick two precious metals in addition to a transition metal. Liu's preferred precious metal is palladium, which along with silver is the first active metal in claim 29. As long as silver is not selected as the second precious metal (out of a choice of five other precious metals listed), the combination would be within the scope of claim 29. Although the second metal would not be chosen to destroy hydrocarbons, any choice other than silver would inherently do so (as well as destroying ozone).

Claims 30, 31, 34-57, and 66-74 stand or fall with claim 29. Since the obviousness rejection stands for claim 29, it stands for these claims as well.

OBVIOUSNESS-TYPE DOUBLE-PATENTING

The examiner has rejected claims 1, 3, 5-12, 14-23, 35, 28-29, 31, 34-40, 42-44, 47-52, 54, 57-59, 61, and 64-74 as obvious variations on the subject matter in claims 1-9 of the Liu patent. We have already determined that these claims (and more) were either anticipated or obvious in view of the Liu patent.

The availability of the Liu patent as prior art has not been raised as an issue on appeal. The claims of the Liu patent are presumably supported by the Liu disclosure. Moreover, the Liu patents are part of the teachings of the Liu patent. Thus, it is difficult to see on these facts how this rejection is not moot.

This appeal with respect to this rejection is DISMISSED as moot.

THE REJECTIONS OVER LESTER AND LESTER WITH WAN

Claims 1-3, 5-31, 34-59, 61. and 64-74 stand rejected over Lester. Claims 62 and 63 stand rejected over Lester in combination with Wan. Rejections of all of these claims (and more) over the Liu patent have been affirmed.

Lester is highly pertinent prior art, but it does not teach a washcoat. This deficiency makes Lester less pertinent than Liu to the claims as we have construed them. We DISMISS the appeal with respect to this rejection as moot.

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HOLDING

We affirm the rejection of all pending claims on the basis of the anticipation and obviousness rejections over the Liu patent. All other rejections are thus moot.

AFFIRMED

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