

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

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MICHAEL P. GALLIGAN,
ALBERT K. BOND AND
JOSEPH C. DETTLING

Appeal 2007-1178
Application 10/376,836
Technology Center 1700

Decided: May 21, 2007

Before EDWARD C. KIMLIN, CATHERINE Q. TIMM, and LINDA M. GAUDETTE, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-7, 46, and 47.

Claims 1 and 46 are illustrative:

1. A catalyst member comprising:

a carrier substrate having a metal anchor layer disposed thereon by electric arc spraying, wherein the anchor layer comprises nickel and aluminum; and

catalytic material disposed on the anchor layer.

46. A catalyst member comprising:

an open carrier substrate selected from the group consisting of at least one of monolithic honeycomb carrier substrate, woven mesh, non-mesh, wadded fibers, and foamed metal, the open substrate having a plurality of fluid flow paths thereon and being characterized by having a portion of the surface area thereof obscured relative to a line of sight from a spray head, the substrate having a metal anchor layer disposed thereon by electric arc spraying the open substrate from the spray head; and

catalytic material disposed on the metal anchor within the gas flow passages.

The Examiner relies upon the following references in the rejection of the appealed claims:

Rondeau	US 4,027,367	Jun. 7, 1977
Ishida	US 4,455,281	Jun. 19, 1984
Donomoto	US 4,798,770	Jan. 17, 1989
Gorynin	US 5,204,302	Apr. 20, 1993
Draghi	US 6,042,879	Mar. 28, 2000

Appellants' claimed invention is directed to a catalyst member comprising a metal anchor layer formed on a carrier substrate by electric arc spraying and a catalytic material disposed on the anchor layer. Claim 1 on appeal recites that the anchor layer comprises nickel and aluminum, whereas claim 46 on appeal defines "an open carrier substrate" selected from the recited group of substrates, e.g., woven and non-woven mesh. Claim 46 also recites that the open substrate has "a plurality of fluid flow paths thereon and

being characterized by having a portion of the surface area thereon obscured relative to a line of sight from a spray head."

Appealed claims 3, 6, 7, and 46 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ishida. The appealed claims also stand rejected under 35 U.S.C. § 103(a) as follows:

(a) claims 1-7, 46, and 47 over Ishida in view of Donomoto or Draghi,

(b) claims 1, 2, 4, 6, and 7 over Gorynin in view of Rondeau.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we fully concur with the Examiner that the claimed subject matter is unpatentable over the cited prior art. Accordingly, we will sustain the Examiner's rejections for the reasons set forth in the Answer, which we incorporate herein, and we add the following primarily for emphasis.

We consider first the Examiner's rejection of claims 3, 6, 7, and 46 under § 102 over Ishida. Ishida, like Appellants, discloses a catalyst member comprising a metal anchor layer coated on the substrate by electric arc spraying and a catalytic material disposed on the metal anchor layer. It is Appellants' contention that the substrate of Ishida is not an "open carrier substrate," and also that the catalyst member of Ishida does not have the presently claimed "plurality of fluid flow paths thereon and being characterized by having a portion of the surface area thereof obscured relative to a line of sight from a spray head."

For the claimed "open carrier substrate," Appellants refer to their Specification at page 10, lines 21-27. Appellants assert that the

Specification "distinguishes between the perforated metal plates of the type disclosed in Ishida et al. and the open carrier substrate recited in claims 3, 6, 7, and 47" (page 6 of Brief, second para.). The cited Specification reads as follows:

An open substrate defines numerous apertures, pores, channels or similar structural features that cause liquid and/or gas to flow therethrough in turbulent or substantially non-laminar fashion and give the substrate a high surface area per overall volume of the flow path of the fluid through the substrate, e.g., features that create a high mass transfer zone for the fluid therein. In contrast, a dense substrate, such as a plate, tube, foil and the like, has a relatively small surface area per overall volume of the flow path through the substrate regardless of whether it is perforated or not, and does not substantially disrupt laminar flow therethrough.

Notwithstanding Appellants' assertion to the contrary, we totally agree with the Examiner that Ishida describes an open carrier substrate which corresponds to the recitation in claim 46 and Appellants' Specification. According to claim 46, a monolithic honeycomb carrier substrate and a mesh qualify as an open carrier substrate, and Appellants' Specification states that substrates having structural features similar to apertures, pores and channels that cause turbulent flow qualify as open substrates. With this in mind, we find no error in the Examiner's factual determination that Ishida expressly describes carrier substrates that are in the form of Appellants' mesh and honeycomb. In particular, the carrier substrate depicted in Ishida's Figure 5 can be reasonably considered a mesh/honeycomb structure, particularly since Ishida specifically teaches that "[a]n

expanded metal refers to a screen-shaped thin metal plate wherein a multiplicity of slits of short length are rendered in alternate and intermittent manner and tensile force is applied perpendicularly to those slits to form meshes," wherein the expanded metal plate of Figure 5 comprises metal portions 6A constituting meshes (col. 4, ll. 4-11). We also find no error in the Examiner's analysis that the perforated metal plate depicted in Figures 9-11 of Ishida can be reasonably characterized as a monolithic honeycomb substrate, and Appellants have not established otherwise (*see* page 5 of Answer, penultimate para.). Moreover, contrary to Appellants' argument, it is not clear on this record that a perforated, tubular metal substrate is not encompassed by the claimed "open carrier substrate," inasmuch as Appellants' Specification states that the perforated, tubular metal substrate of Figure 2H formed "a catalyst member in accordance with the present invention" (page 8 of Specification, ll. 12-13).

We also agree with the Examiner that the claim language "having a portion of the surface area thereof obscured relative to a line of sight from a spray head" is a limitation on the open substrate, not the fluid flow paths thereof, as asserted by Appellants. In essence, we agree with the reasoning set forth at page 11-12 of the Answer, namely, that the backside of Ishida's metal plate and projections are obscured relative to a line of sight from a spray head. Also, we note that it is implicit in Ishida's disclosure at column 6, lines 35 et seq., that catalyst layers disposed at opposite sides of the expanded metal substrate have portions thereof that are obscured relative to the

pertinent line of sight. We also agree with the Examiner that even if, for the sake of argument, the obscured surface area is that of the flow path, "the 'surface area' of the flow paths would be the entire volume of the reactor, which would include the back side of the metal plate" (page 12 of Answer, first para.).

We now turn to the § 103 rejection of claims 1-7, 46, and 47 over Ishida in view of Donomoto or Draghi. Although Ishida, like Appellants, discloses a catalyst member having an anchor layer deposited on a carrier substrate by electric arc spraying, the reference does not expressly teach that the anchor layer comprises nickel and aluminum. However, we concur with the Examiner that Donomoto and Draghi, especially in light of the admitted prior art to Gorynin, evidences the obviousness of utilizing an anchor layer comprising aluminum and nickel for the catalyst member of Ishida. As explained by the Examiner, Donomoto and Draghi establish that it was known in the art that deposited alloys of aluminum and nickel are heat and corrosion resistant, properties desired by Ishida for the anchor layer. Also, Gorynin, as acknowledged by Appellants, specifically discloses an anchor layer for a catalyst on a substrate comprising the presently claimed aluminum and nickel, thereby alleviating any concerns about the compatibility of an anchor layer comprising aluminum and nickel and an overlying catalyst composition. While Appellants argue that Donomoto and Draghi do not teach that intermediate layers of nickel and aluminum have improved heat or corrosion resistance when used

in *intermediate catalyst layers*, we agree with the Examiner that these properties of the alloy are not contingent upon their use.

We are also not persuaded by Appellants' argument that Donomoto, Draghi and Gorynin apply the aluminum/nickel alloy by plasma spraying rather than the claimed electric arc spraying. Appellants submit that one of ordinary skill in the art would not have combined the teachings of these references with Ishida because that "would destroy the desired feature of improving adhesion between the plasma-sprayed layer and a catalyst formed thereon" (page 11 of Brief, penultimate sentence). However, the modification proposed by the Examiner is that it would have been obvious to one of ordinary skill in the art to employ the electric arc spraying of Ishida for depositing an anchor layer comprising aluminum and nickel.

Finally, regarding the § 103 rejection of claims 1, 2, 4, 6, and 7 over Gorynin in view of Rondeau and Ishida, we will sustain the Examiner's rejection for the reasons set forth in our decision in Appellants' co-pending application, U.S. Serial No. 10/376,782, filed February 28, 2003 (Appeal No. 2007-1018). Suffice it to say that we agree with the Examiner that, based on the collective teachings of Gorynin, Rondeau, and Ishida, it would have been obvious for one of ordinary skill in the art to apply the aluminum/nickel-containing anchor layer of Gorynin by electric arc spraying as taught by Rondeau and Ishida. As set forth at pages 8-10 of the Answer, one of ordinary skill in the art would have understood that a certain balance must be effected in the determination of selecting either plasma spraying or

electric arc spraying for depositing the anchor layer, including a typical cost/benefit analysis. Also, from a somewhat different perspective, as already discussed above and in our decision in the co-pending application, we agree with the Examiner that it would have been obvious for one of ordinary skill in the art, based on the teachings of Gorynin and Rondeau, to use an alloy comprising aluminum and nickel for the anchor layer in Ishida.

As a final point, we note that Appellants base no argument upon objective evidence of nonobviousness, such as unexpected results. Indeed, Appellants' Specification attributes no particular criticality to the selection of an alloy of aluminum and nickel for the anchor layer (*see page 5, ll. 11-18*).

In conclusion, based on the foregoing and the reasons well stated by the Examiner, the Examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(iv)(effective Sept. 13, 2004).

AFFIRMED

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Application 10/376,836

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