

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* THOMAS A. TRABOLD, MICHAEL R. SCHOENEWEISS,  
and MICHAEL SCOZZAFAVA

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Appeal 2008-3334  
Application 10/369,145  
Technology Center 1700

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Decided: September 25, 2008

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Before ROMULO H. DELMENDO, JEFFREY T. SMITH, and  
LINDA M. GAUDETTE, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Primary Examiner's final rejection of claims 97-108.<sup>1</sup> We have jurisdiction pursuant to 35 U.S.C. § 6.

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<sup>1</sup> In rendering this decision we have considered the Appellants' arguments presented in the Brief dated May 15, 2007 and the Reply Brief dated October 19, 2007.

Appellants' invention is directed to methods for forming a catalytic coating on a substrate. The method comprises preparing a catalytic fluid and dispensing the catalytic fluid onto a substrate by using a direct writing instrument that has been programmed to dispense the catalytic fluid onto the substrate in a pattern that forms a first coating on a first side of the substrate. (Spec. ¶ 5). Claim 97 is representative of the invention and is reproduced below:

97. A method of fabricating an article incorporating a fuel cell, said method comprising:

providing a fuel supply manifold;

providing an oxidant supply manifold;

preparing a membrane electrode assembly by acts comprising,  
preparing a catalytic fluid,

dispensing said catalytic fluid onto an intermediate material using a direct writing instrument that has been preprogrammed to dispense said catalytic fluid onto said intermediate material in a pattern that forms a catalytic coating on said intermediate material, wherein said pattern of said catalytic fluid is formed in a plane parallel to said intermediate material through movement of said direct writing instrument and wherein the pattern is aligned with the channels in flow field plate of said fuel cell,

transferring said catalytic coating from said intermediate material to a first side of an electrolyte membrane,

dispensing said catalytic fluid onto an intermediate material using a direct writing instrument that has been preprogrammed to dispense said catalytic fluid onto said intermediate material in a pattern that forms a catalytic coating on said intermediate material, wherein said

pattern of said catalytic fluid is formed in a plane parallel to said intermediate material through movement of said direct writing instrument and wherein the pattern is aligned with channels in the flow field plate of said fuel cell, and

transferring said catalytic coating from said intermediate material to a second side of said electrolyte membrane; and

positioning said membrane electrode assembly between said fuel supply manifold and said oxidant supply manifold.

#### ISSUES ON APPEAL

Claims 97-108 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Yan, published US patent application 2003/0232714 A1, dated December 18, 2003, and Reichert, published US patent application 2003/0219645 A1, dated November 27, 2003.

The Examiner (Ans. 3) contends that Yan teaches a method of making membrane electrode assemblies that are suitable for use with an oxygen source and a fuel source along with other layers to provide a fuel cell (see Fig. 1). The method comprises making a membrane from a slurry which includes an ionically conductive material, an electrically conductive material, a catalyst and a solvent. Yan teaches the slurry is applied onto the substrate in discrete patterns that are dried to form decals and then transferred to the membrane. Reichert teaches coating a release substrate for subsequent transfer or applying the catalyst coating directly to a substrate by printing. The Examiner concludes that it would have been obvious for a person of ordinary skill in the art to have modified Yan by substituting one coating technique with another conventional coating technique. (Ans. 3).

Appellants contend that none of the cited references teach or suggest a direct writing instrument that has been preprogrammed to directly dispense a catalytic fluid onto an intermediate material in a pattern that is in a plane parallel to the intermediate material, wherein the pattern is created based on the motion of the dispensing direct writing instrument itself as recited in claim 97.<sup>2</sup> (App. Br. 8). Appellants also contend that Yan and Reichert are not properly combinable because there is no motivation or suggestion to combine the prior art references nor is there a suggestion in the prior art about the desirability of such a combination. (App. Br. 8).

The issue presented is: Did Appellants identify reversible error in the Examiner's rejection of claims 97-108 under § 103? We answer this question in the negative. The issue turns on whether the cited prior art rendered obvious directly depositing catalytic fluid on an intermediate substrate in a pattern utilizing a direct writing instrument.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we are in complete agreement with the Examiner that the claimed subject matter is unpatentable within the meaning of § 103 in view of the applied prior art. Accordingly, we AFFIRM the Examiner's rejections.

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<sup>2</sup> Appellants have indicated that claims 97, 100, 103, and 106, all of the presented independent claims, are representative of the rejected claims. While Appellants have addressed these claims under separate headings, the principal arguments for each are the same. Our analysis will be limited to claim 97, which we select as representative of all the appealed claims. We will also address the Appellants' arguments directed to specific claims.

## OPINION

We determine the following Findings of Fact (FF) from the record presented in this appeal:

- (1) The Specification defines direct writing as “depositing fluid directly onto a surface of a substrate in a pattern defined by the motion of the instrument, the motion of the substrate, or both.” (Spec. ¶ 37).
- (2) A direct writing instrument is illustrated by FIG. 5. The direct writing instrument comprises a design system, a writing system controller and a writing system. (Spec. ¶ 38).
- (3) The writing system 160 further comprises a fluid dispensing system 168, a nozzle 166, a nozzle tip 167, and a substrate holding device 162. (FIG. 5; Spec. ¶ 38).
- (4) The design system 152 electronically communicates the stored pattern to the writing system controller 154 such that the writing system controller 154 controls the writing system 160 in a manner that allows the writing system 160 to draw the pattern stored in the design system 152 on the substrate 110. (FIG. 5; Spec. ¶ 38).
- (5) Yan discloses the slurry is applied onto a non-porous substrate in a pattern and dried to form a decal. The decal is bonded to a membrane and then the substrate is

- peeled from the decal in a substantially undamaged condition so that it may be reused. (¶¶ 5 & 6).
- (6) Yan discloses the catalyst slurry is applied to the substrate by any coating technique, for example, by printing processes or spray coating processes. (¶ 44).
- (7) Yan FIG. 8 describes a process beginning with the slurry preparation station indicated at 114. The process utilizes two substrates 72, each provided as a continuous loop running around various rollers 116 in the direction indicated by the arrows. At the coating stations 118 a layer or layers of ink 70 is coated on the substrate 72. The catalyst slurry or ink is pattern coated onto the substrate. The slurry may be spread using printing processes or spray coating processes. At the drying stations 120, the ink 70 is dried and the dried ink 70 forms the anode electrode 42 and the cathode electrode 44. (¶ 49).
- (8) Reichert teaches a variety of techniques are known for CCM manufacture which apply an electrocatalyst coating composition including spraying, painting, patch coating and screen, decal, pad or flexographic printing. (¶ 50).
- (9) Reichert discloses a slurry is applied onto a substrate in a pattern and dried to form a decal. The decal is bonded to

a membrane and then the substrate is peeled from the decal. (¶ 55).

- (10) Reichert teaches coating a release substrate for subsequent transfer or applying the catalyst coating directly by printing. (¶ 55).

A claimed invention is unpatentable if the differences between it and the prior art are “such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.” 35 U.S.C. § 103(a) (2000); *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1734 (2007); *Graham v. John Deere Co.*, 383 U.S. 1, 13-14 (1966). Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations such as evidence of unexpected results. See *Graham v. John Deere Co.*, 383 U.S. at 17-18.

Applying the preceding legal principles to the Factual Findings (FF) in the record of this appeal, we determine that the Examiner has established a *prima facie* case of obviousness. The Specification (FF (1)) defines direct writing as “depositing fluid directly onto a surface of a substrate in a pattern defined by the motion of the instrument, the motion of the substrate, or both.” As shown by FF (5-10) above, the cited prior art describes a method comprising preparing a catalytic fluid and dispensing the catalytic fluid onto a substrate by using a direct writing instrument that has been programmed to dispense the catalytic fluid onto the substrate in a pattern that forms a first

coating on a first side of the substrate. Yan teaches the slurry is applied onto the substrate in discrete patterns that are dried to form decals and then transferred to the membrane. Yan teaches the slurry is applied onto the substrate (intermediate material) in discrete patterns at coating stations, i.e., direct writing instruments. Reichert is evidence that various techniques are known for coating a release substrate for subsequent transfer or applying the catalyst coating directly by printing. A person of ordinary skill in the art would have reasonably expected that various known techniques for coating a release substrate for subsequent transfer would have been suitable for the invention of Yan. The Examiner properly concluded that the claimed subject matter is not patentable over the cited prior art.

Appellants have not explained why the printing technique utilized in the cited prior art to create a pattern on the intermediate substrate does not create a pattern based on the motion of the direct writing instrument. It reasonably appears that the substrate or some components of the direct writing instrument must move, whether it is the application of the pattern on or about the substrate to be coated, the movement of the printing (coating) heads of the printing apparatus or the application of a printing plate on the substrate for creating a pattern on the intermediate substrate.

For the foregoing reasons and those stated in the Answer, we affirm the appealed rejection.

#### ORDER

The rejection of claims 97-108 under 35 U.S.C. § 103(a) is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

PL Initial:  
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