

The opinion in support of the decision being entered today
is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAVIT A. DRAKE, WILLIAM H. WILSON, and
MATTHEW S. KLEE

Appeal 2007-0489
Application 10/190,822
Technology Center 1700

Decided: July 30, 2007

Before EDWARD C. KIMLIN, BRADLEY R. GARRIS, and
JEFFREY T. SMITH, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

Statement of the Case

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 9-12, 15-19, 26, and 28-38. We have jurisdiction under 35 U.S.C. § 6.

Appellants invented a fuel cell system that includes a main fuel cell, a fuel stream delivery system, an oxidant stream delivery system, and a sensor

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system. The chemical sensor provides an indication of when the chemical sensor is exposed to at least one of the electrocatalytic poisons.
(Specification 3-4). Claim 9 is reproduced below:

9. A fuel cell system, comprising:

a main fuel cell comprising a stack of constituent fuel cells, wherein each of the constituent fuel cells comprises one or more electrocatalytic sites inducing between a fuel and an oxidant an electrochemical reaction that is inhibited by exposure of the one or more electrocatalytic sites to one or more electrocatalytic poisons;

a fuel stream delivery system that directs a fuel stream to the main fuel cell;

an oxidant stream delivery system that directs an oxidant stream to the main fuel cell; and

a sensor system coupled to the fuel stream delivery system at one or more locations upstream of the main fuel cell and comprising two or more chemical sensors and a manifold that selectively couples the chemical sensors to the fuel stream delivery system, wherein each of the chemical sensors provides an indication of when the chemical sensor is exposed to at least one of the electrocatalytic poisons.

The prior art set forth below is relied upon by the Examiner as evidence of unpatentability.

Meltser	US 5,637,415	Jun. 10, 1997
Grot	US 6,001,499	Dec. 14, 1999
Wilkinson	WO 00/02282	Jan. 13, 2000
Zhang	US 6,527,943 B1	Mar. 3, 2003
Clingerman	US 6,893,756 B2	May 17, 2005

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The Examiner entered the following rejections.

- I. Claims 9, 15, 17, and 35-37 stand rejected under 35 U.S.C. § 102(b) over Meltser.¹
- II. Claims 9 and 15-19 stand rejected under 35 U.S.C. 102(e) over Clingerman.
- III. Claims 9, 10, 15-17, 26, and 29-34 stand rejected under 35 U.S.C. § 102(b) over Wilkinson (WO 00/02282).²
- IV. Claims 11 and 12 stand rejected under 35 U.S.C. § 103(a) over Clingerman in view of Zhang.
- V. Claim 28 stands rejected under 35 U.S.C. § 103(a) over Clingerman in view of Grot.
- VI. Claim 38 stands rejected under 35 U.S.C. § 103(a) over Meltser.

The Rejections over Metzler.

Claims 9, 15, 17, and 35-37 stand rejected under 35 U.S.C. § 102(b) over Meltser.³

¹ The Examiner has withdrawn the rejection of claims 18 and 19 over Meltser (Answer 8).

² The Examiner has indicated that the Wilkinson reference cited in the rejection is WO 00/02282 and not U.S. 6,673,480 cited in Appellants' principal Brief.

³ Appellants have presented arguments for all the claims together except for claim 35. Consequently, except for claim 35, all the claims will stand or fall with the arguments presented for independent claim 9.

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The Examiner contends Meltser describes a fuel cell system that comprises first and second hydrogen sensors 10 and 14, shown in FIG. 1 of Meltser, that anticipates the fuel cell system of claim 9 (Answer 3).

Appellants contend the first and second hydrogen sensors 10 and 14 of Meltser are used to control the amount of oxygen supplied to the PROX reactor 2 in the PROX reactor system. Appellants further contend that the first and second hydrogen sensors 10 and 14 do not provide indications of when they are exposed to at least one of the electrocatalytic poisons that inhibit an electrochemical reaction between a fuel and an oxidant that is induced by one or more electrocatalytic sites of a main fuel cell, as recited in claim 9 (Br. 5).

The first issue before us is whether Appellants have shown that the Examiner erred in rejecting claims 9, 15, 17, and 35-37 under 35 U.S.C. § 102(b). The issue turns on whether the Examiner has established a reasonable belief that the first and second hydrogen sensors 10 and 14 provide indications of when they are exposed to at least one of the electrocatalytic poisons, and if the Examiner met his initial burden, whether the Appellants have adequately rebutted the Examiner's position by showing that the first and second hydrogen sensors 10 and 14 do not provide indications of when they are exposed to at least one of the electrocatalytic poisons. Specifically, the issue is: Do the hydrogen sensors of Meltser provide an indication of when they are exposed to at least one electrocatalytic poison? We answer this question in the affirmative.

Appellants invented a fuel cell system that includes a main fuel cell, a fuel stream delivery system, an oxidant stream delivery system, and a sensor system (Specification 3: 22-25). The sensor functions to detect chemicals that are poisonous to the fuel cell systems (Specification 2: 20-24). Exemplary poisons to the fuel cell system include sulfur and carbon monoxide (Specification paragraph bridging pages 4 and 5).

Meltser describes a method for efficiently reducing the carbon monoxide (CO) content of an H₂ rich fuel gas for a H₂ and O₂ fuel cell (Meltser, col. 2, ll. 58-65). Meltser discloses that carbon monoxide contained in a hydrogen rich reformate stream must be removed or reduced to very low concentrations through the use of a preferential oxidation reaction in a PROX reactor (Meltser, cols. 1-2). Meltser discloses that a sufficient amount of oxygen must be supplied to the fuel stream to react with and reduce the carbon monoxide present (Meltser, col. 3, ll. 5-11). Meltser discloses the sensors measure a concentration of hydrogen in the fuel stream and sends the corresponding signal to the electronic control module (Meltser, col. 4, ll. 17-24). Since the sensors of Meltser function to measure the hydrogen content in the fuel stream, there is also a determination as to the carbon monoxide content in the fuel stream, so that the appropriate amount of oxygen can be added to the fuel stream for reaction with the carbon monoxide. Thus, the chemical sensors of Meltser provide an indication of when the chemical sensor is exposed to at least one of the electrocatalytic poisons.

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A claimed invention is anticipated under 35 U.S.C. § 102 when all of the elements of the claimed invention are found in one reference. See *Scripps Clinic & Research Found. V. Genentech Inc.*, 927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991). The prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently. *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

The present record establishes that Meltser teaches a fuel cell system that includes a main fuel cell, a fuel stream delivery system, an oxidant stream delivery system, and a sensor system. Appellants contend that these sensors of Meltser do not provide an indication of exposure to poisons to the fuel stream (Br. 5; Reply Br. 2). It is undisputed that Meltser discloses that the information obtained from these sensors is utilized to determine the appropriate amount of oxygen to add to the fuel stream for removal of the poisonous carbon monoxide. Thus, the sensors of Meltser provide an indication of the level of poisons contained in the system. As such, we determine that the Examiner has a reasonable basis to believe that Meltser teaches a fuel cell system that provides an indication of when they are exposed to electrocatalytic poisons.

Appellants' arguments regarding claim 35 are not persuasive. Claim 35 specifies that the fuel system comprises a valve coupled between the fuel stream delivery system and the main fuel cell. The Examiner relies on valve (8) of Meltser for describing the limitations of claim 35. Meltser discloses hydrogen used in the fuel cell is derived from reformation of methanol or

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other organics that contain high concentrations of carbon monoxide (Meltser, col. 1, ll. 21-25). The system of Meltser is located after the formation of reformulated fuel for removal of carbon monoxide and before the fuel enters the main fuel cell. Thus, the Examiner has correctly determined that the system of Meltser comprises a valve that is located between the fuel delivery stream (i.e., the fuel before reformulation) and the main fuel cell.

Claim 38 stands rejected under 35 U.S.C. § 103(a) over Meltser. Appellants state that “claim 38 is patentable over Meltser for at least the same reasons that are explained in connection with the rejection of claim 9 over Meltser” (Reply Br. 2). We affirm the rejection of claim 38 for the reasons presented above regarding the independent claim 9 and the reasons presented by the Examiner.

The Rejections over Clingerman.

Claims 9 and 15-19 stand rejected under 35 U.S.C. 102(e) over Clingerman.

The Examiner contends Clingerman describes a fuel cell system that comprises a stack of fuel cells. Inclusive in the fuel cell stack are fuel cells that function as sensors for these various constituent components of the fuel stream. The Examiner contends that Clingerman's fuel system anticipates the fuel cell system of claim 9 (Answer 3-4).

Appellants contend that the Examiner impermissibly has relied on a single element (i.e., the fuel cell stack 32) in Clingerman's system to meet

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two separate and distinct elements (i.e., the main fuel cell and the sensor system) that are recited in claim 9 (Br. 8).

The issue before us is whether the Examiner has shown that Clingerman's stack of fuel cells, that includes fuel cells that function as a sensor, meets the limitations of claims 9 that requires a sensor system coupled to the fuel stream delivery system at one or more locations upstream of the main fuel cell under 35 U.S.C. § 102(e). The issue turns on whether Clingerman describes a fuel cell system that comprise a sensor system coupled to the fuel stream delivery system at one or more locations upstream of the main fuel cell stack of fuel cells. We answer this question in the negative.

We agree with Appellants that Clingerman describes a fuel cell system that includes a main fuel cell (32), but it does not include a sensor system that is coupled to the fuel stream delivery system at a location upstream of the main fuel cell (32) (Br. 8). The Examiner has indicated that the fuel cell stack (32) comprises one or more fuel cells (94) that function as sensing fuel cells. The Examiner asserts that the language "upstream" is construed to mean that the sensing fuel cell will receive the fuel gas before a non-sensing fuel cell (Answer 4). We do not agree. The claim language specifically indicates that the sensor system is located upstream of the main fuel cell. The sensing system described in Clingerman is located within the main fuel cell. As such the description appearing in Clingerman does not anticipate the subject matter of claim 9 within the meaning of § 102.

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Claims 11 and 12 stand rejected under 35 U.S.C. § 103(a) over Clingerman in view of Zhang. Claim 28 stands rejected under 35 U.S.C. § 103(a) over Clingerman in view of Grot. We reverse. Claims 11, 12, and 28 depend upon claim 9. The Zhang and Grot references were not cited to address the differences in claim 9 discussed above. The Examiner has not presented other evidence to remedy the deficiency in the Clingerman reference discussed above. Thus, for the reasons set forth above, we reverse the rejection of claims 11, 12, and 28.

The Rejections over Wilkinson.

Claims 9, 10, 15-17, 26 and 29-34 stand rejected under 35 U.S.C. § 102(b) over Wilkinson.

The Examiner contends Wilkinson describes a fuel cell system that comprises a stack of fuel cells and inclusive therein are fuel cells that function as sensors for the various constituent components of the fuel stream. The Examiner contends that Wilkinson's fuel system anticipates the fuel cell system of claim 9 (Answer 4-5).

Appellants contend that the Examiner impermissibly has relied on a single element (i.e., the fuel cell stack 210) in Wilkinson's system to meet two separate and distinct elements (i.e., the main fuel cell and the sensor system) that are recited in claim 9 (Br. 10).

The issue before us is whether the Examiner has shown that Wilkinson's stack of fuel cells that includes fuel cells that function as a sensor meets the limitations of claim 9 that require a sensor system coupled to the fuel stream delivery system at one or more locations upstream of the

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main fuel cell under 35 U.S.C. § 102(b). The issue turns on whether Wilkinson describes a fuel cell system that comprise a sensor system coupled to the fuel stream delivery system at one or more locations upstream of the main fuel cell stack of fuel cells. We answer this question in the negative.

We agree with Appellants that Wilkinson describes a fuel cell system that includes a main fuel cell (210), but it does not include a sensor system that is coupled to the fuel stream delivery system at a location upstream of the main fuel cell (210) (Br. 10). The Examiner has indicated that the fuel cell stack comprises one or more fuel cells that function as sensing fuel cells. The Examiner asserts that the language “upstream” is construed to mean that the sensing fuel cell will receive the fuel gas before a non-sensing fuel cell (Answer 10). We do not agree. The claim language specifically indicates that the sensor system is located upstream of the main fuel cell. The sensing system described in Wilkinson is located within the main fuel cell. As such the description appearing in Wilkinson does not anticipate the subject matter of claim 9 within the meaning of § 102.

Remand to the Examiner

Claims 10-12, 18, 19, and 28-34 have only been rejected over the Clingerman and Wilkinson references. We reverse the rejections over Clingerman and Wilkinson because the sensing system described in each reference is located within the main fuel cell. The present record does not include a determination whether it would have been obvious to a person of ordinary skill in the art to locate the sensing system upstream from the main

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fuel cell of Clingerman and/or Wilkinson. Thus, we remand the application to the Examiner to determine whether the subject matter of the rejected claims would have been obvious to a person of ordinary skill in the art.

Decision

The rejections of claims 9, 15, 17, and 35-38 over Meltser are affirmed. The rejections of claims 9, 11, 12, 15-19, and 28 over Clingerman are reversed. The rejection of claims 9, 10, 15-17, 26, and 29-34 over Wilkinson is reversed.

The instant application is remanded to the Examiner to consider the aforementioned issues and act accordingly.

In addition to affirming the Examiner's rejection of one or more claims, this decision contains a remand. 37 C.F.R. § 41.50(e) provides that

[w]henever a decision of the Board includes a remand, that decision shall not be considered final for judicial review. When appropriate, upon conclusion of proceedings on remand before the Examiner, the Board may enter an order otherwise making its decision final for judicial review.

Regarding any affirmed rejection, 37 C.F.R. § 41.52(a)(1) provides "[a]ppellant may file a single request for rehearing within two months from the date of the original decision of the Board."

The effective date of the affirmation is deferred until conclusion of the proceedings before the Examiner unless, as a mere incident to the limited proceedings, the affirmed rejection is overcome. If the proceedings before the Examiner do not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals

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and Interferences for final action on the affirmed rejections, including any timely request for rehearing thereof.

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-IN-PART
REMANDED

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