

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 SEAN M. KELLY, KARL J. HALTINER, JR.,
and CHRISTOPHER M. DEMINCO

Appeal 2006-2637
Application 10/178,878
Technology Center 1700

Decided: April 27, 2007

Before CHUNG K. PAK, PETER F. KRATZ, and CATHERINE Q. TIMM,
Administrative Patent Judges.

KRATZ, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal from the Examiner's final rejection of claims 1-9 and 12-31. We have jurisdiction pursuant to 35 U.S.C. §§ 6 and 134.

Appellants' invention is directed to a solid-oxide fuel cell system including, *inter alia*, a plurality of individual fuel cells, a reformer, and an integrated fuel/air manifold that is useful for generating electric power. The manifold includes top, bottom and middle plates, and upper and lower partitioned elements defining a pattern of upper and lower chambers. In one embodiment, the fuel cell system is combined with an automobile vehicle for providing auxiliary power. Claims 1, 25, and 28 are illustrative of the claimed subject matter and are reproduced below:

1. A fuel cell system for generating electric power by combination of oxygen with hydrogen-containing fuel, comprising:

a) a plurality of individual fuel cells organized into at least one fuel cell stack assembly including a plurality of cathodes and anodes;

b) a reformer for reforming hydrocarbons to provide said fuel;

c) an air supply system for supplying said oxygen in the form of air; and

d) an integrated fuel/air manifold having a plurality of external openings communicating with a plurality of internally-connected chambers for receiving said fuel from said reformer, conveying said fuel to said anodes, and returning said fuel as tail gas from said anodes, and for receiving said air from said air supply system, conveying said air to said cathodes, and returning said air from said cathodes,

said manifold including a bottom plate, a top plate, a middle plate disposed between said top plate and said bottom plate, a lower partitioned element disposed between said bottom plate and said middle plate defining a pattern of lower chambers, and an upper partitioned element disposed between said middle plate and said top plate defining a pattern of upper chambers, said middle plate having a plurality of openings for communication between said lower and upper chambers, and said top plate mounted to said stack and said reformer; and

said manifold including means for flow communication of said reformer and said air supply system with said stack assembly.

25. An automotive vehicle, comprising a fuel cell system for generating auxiliary power for said vehicle, said system including

a plurality of individual fuel cells organized into at least one fuel cell stack assembly including a plurality of cathodes and anodes,

a reformer for reforming hydrocarbons to provide said fuel,

an air supply system for supplying said oxygen in the form of air, and

an integrated fuel/air manifold having a plurality of external openings communicating with a plurality of internally-connected chambers for receiving said fuel from said reformer, conveying said fuel to said anodes, and returning said fuel as tail gas from said anodes, and for receiving said air from said air supply system, conveying said air to said cathodes, and returning said air from said cathodes,

said manifold including a bottom plate, a top plate, a middle plate disposed between said top plate and said bottom plate, a lower partitioned element disposed between said bottom plate and said middle plate defining a pattern of lower chambers, and an upper partitioned element disposed between said middle plate and said top plate defining a pattern of upper chambers, said middle plate having a plurality of openings for communication between said lower and upper chambers, and said top plate mounted to said stack and said reformer; and

said manifold including means for flow communication of said reformer and said air supply system with said stack assembly.

28. A fuel cell system for generating electric power by combination of oxygen with hydrogen-containing fuel, comprising:

a) a plurality of individual fuel cells organized into at least one fuel cell stack assembly including a plurality of cathodes and anodes;

b) a reformer for reforming hydrocarbons to provide said fuel; and

c) an integrated fuel/air manifold including a bottom plate, a top plate, a middle plate disposed between said top plate and said bottom plate, a lower partitioned element disposed between said bottom plate and said middle plate defining a pattern of lower chambers, and an upper partitioned element disposed between said middle plate and said top plate defining a pattern of upper chambers, said middle plate having a plurality of openings for communication between said lower and upper chambers, and said top plate mounted to said stack and said reformer to provide flow communication of said reformer with said stack assembly.

The Examiner relies on the following prior art references as evidence in rejecting the appealed claims:

Elangovan	5,480,738	Jan. 2, 1996
Mukerjee	6,692,859 B2	Feb. 17, 2004

Claims 1-3, 6-9, and 12-31 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Mukerjee. Claims 4 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mukerjee in view of Elangovan. We reverse both rejections advanced by the Examiner.

§ 102(e) Rejection

All of the appealed claims subject to the Examiner's anticipation rejection require, as part of the claimed apparatus, an integrated fuel/air manifold, as described below. The claimed manifold includes, *inter alia*, a bottom plate, a top plate, and a middle plate. A lower partitioned element is disposed between the bottom plate and the middle plate and defines a pattern of lower chambers. Also, an upper partitioned element, which defines a pattern of upper chambers, is disposed between the upper plate and the middle plate. The middle plate includes a plurality of openings for

communication between said lower and upper chambers and the top plate is mounted to a fuel cell stack and a reformer. *See* rejected independent claims 1, 25, and 28.

In asserting that Mukerjee anticipates appealed claims 1-3, 6-9, and 12-31, the Examiner contends that:

Mukerjee et al. teaches that the manifold is an assembly comprising a plurality of components including a bottom, middle, and top plate as well as a lower partitioned element and that said top plate has a means for mounting the stack and reformer. Mukerjee et al. also teaches that the partitioned elements are integral with the manifold (claim 1 and column 6, lines 28 et seq.). Because of the open claim language and broadness of the recited claim terms used in claims 12-16, the Mukerjee et al. reference reads on the claims as so recited. The examiner also notes that the orientation words used are relative to a reference point, which has not been provided by applicants. Therefore the specified parts according to the orientation words can be situated practically anywhere within the apparatus.

Answer 4.

Appellants contend that:

... the Mukerjee reference does not anticipate all of the limitations included in claims 1,25 and 28. Specifically, the Examiner's interpretation that the housing (80) teaches a middle plate, an upper partitioned element, and a lower partitioned element is unsupported by the Murkerjee reference....

As best seen in FIG. 4 of the Murkerjee reference, the housing (80) is merely a single partitioned element having a plurality of chambers represented by passages (87, 91, 95, 99, 102) that extend between top and bottom plates (82, 84). The housing (80) does not include a pattern of upper chambers defined between the top plate (84) and a middle plate, and a pattern of lower chambers defined between the bottom plate (82) and a middle plate. Appellants submit that interpreting the passages (87, 91, 95, 99, 102) as both the upper and lower

chambers in claims 1, 25, and 28, as suggested by the Examiner, is improper in view of the specification and prosecution history of the present patent application. See Specification, pgs. 13-15; FIGS. 13-18.

Moreover, the Examiner has failed to provide any evidence in the Mukerjee reference to support the conclusion that the housing (80) further includes a middle plate having a plurality of openings for communication between the lower and upper chambers as set forth in claims 1, 25, and 28. As stated above, the housing (80) is a single partitioned element having a plurality of passages (87, 91, 95, 99, 102) that extend between top and bottom plates (82, 84). For at least these additional reasons, Appellants submit that the Mukerjee reference fails to teach all of the limitations included in claims 1, 25 and 28 and any claims that depend therefrom.

Reply Br. 2-3.

Thus, a dispositive issue raised in this appeal is: Whether Appellants have established that the Examiner erred in rejecting claims 1-3, 6-9, and 12-31 as being anticipated by Mukerjee? More particularly, has the Examiner established that Mukerjee describes a fuel cell system meeting all of Appellants' claim limitations, including a fuel cell system having a manifold with an upper partitioned element defining a pattern of upper chambers, a lower partitioned element defining a pattern of lower chambers, and a middle plate having a plurality of openings for effecting communication between the upper and lower chamber, as well as the other claim features including a top plate and a bottom plate?

We answer the first question in the affirmative and the second in the negative. Hence, we reverse the Examiner's anticipation rejection for reasons well developed in Appellants' Briefs.

Anticipation under 35 U.S.C. § 102 is established only when a single prior art reference discloses, either expressly or under the principles of

inherency, each and every element of a claimed invention. *See RCA Corp. v. Applied Digital Data Systems, Inc.*, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). Here, as pointed out by Appellants in the Briefs, the Examiner has not established that the rejected claims read on the manifold depicted in drawing Figure 4 of Mukerjee, as further described in the text of that reference. In particular, the Examiner has not fairly detailed how the center housing (80, Fig. 4) of Mukerjee's manifold includes structure that describes the here-claimed manifold limitations requiring a middle plate having a plurality of openings, an upper partitioned element defining a pattern of upper chambers that is located between the middle plate and an upper plate of the manifold, and a lower partitioned element defining a pattern of lower chambers that is located between the middle plate and a lower plate of the manifold.

Because we agree with Appellants that all of the argued manifold limitations required by the appealed claims have not been established as being described by Mukerjee, we need not address the other claimed features that Appellants argue as missing from Mukerjee in reaching our determination that the Examiner has not presented a *prima facie* case of anticipation.

On this record, we reverse the Examiner's § 102 rejection.

§ 103 Rejection

In rejecting claims 4 and 5 as being obvious over Mukerjee and Elangovan, the Examiner relies on the additional teachings of Elangovan for establishing the obviousness of the features of dependent claims 4 and 5. The Examiner does not explain how Elangovan would teach or suggest the

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manifold limitations of independent claim1, from which claims 4 and 5 depend. In light of our determinations above regarding the lack of a disclosure of the here claimed manifold features by Murkejee, it follows that we shall also reverse the Examiner's obviousness rejection of claims 4 and 5, on this record.

CONCLUSION

The decision of the Examiner to reject claims 1-3, 6-9, and 12-31 under 35 U.S.C. § 102(e) as being anticipated by Mukerjee and to reject claims 4 and 5 under 35 U.S.C. § 103(a) as being unpatentable over Mukerjee in view of Elangovan is reversed.

REVERSED

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