UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JENS PFLAESTERER

Appeal 2006-0249
Application 10/315,401
Technology Center 1700

Decided: September 26, 2006

Before GARRIS, KRATZ, and TIMM, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims 1-13 and 31-36. Claim 14, the only other pending claim, has been withdrawn by the Examiner. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 134.

INTRODUCTION

The claims are directed to an elastic sealing element (e.g., Fig. 1 at 17) that encloses the cell separator plates and membrane electrode assembly of a fuel cell. The sealing element includes a peripheral sealing band (e.g., Fig. 1 at 28) and a peripheral sealing strip (e.g., Fig. 1 at 20). Claim 1 is illustrative:

> 1. A sealing arrangement for fuel cells having including at least one composite formed of two cell separator plates with a deformable membrane electrode assembly placed therebetween, the deformable membrane electrode assembly being composed of two porous, gas-permeable plates or layers and an ion-exchange membrane placed therebetween, the membrane electrode assembly having lateral surfaces set back with respect to lateral surfaces of the cell separator plates to leave a sealing gap, the sealing arrangement comprising:
>
> an elastic sealing element having a sealing band peripherally enclosing the composite and having a peripheral sealing strip extending into the sealing gap to seal the sealing gap in a gas-tight manner by compression between the cell separator plates.

The Examiner relies on the following prior art references to show unpatentability:

Kühl	US 3,746,176	Nov. 5, 1974
Singelyn	US 4,774,154	Sep. 27, 1988
Schmid	US 6,080,503	Jun. 27, 2000
Inoue	US 2002/0055027 A1	May 9, 2002
Wozniczka	GB 2 368 968 A	May 15, 2002
Osenar	US 2002/0068212 A1	Jun. 6, 2002

The rejections under review are as follows:

1. Claims 1-6, 8-13, and 31-36 rejected under 35 U.S.C. § 103(a) as unpatentable over Inoue in view of any one of Singelyn, Kühl, or Wozniczka;[1]
2. Claims 1 and 31 rejected under 35 U.S.C. § 103(a) as unpatentable over Inoue in view of Osenar; and
3. Claim 7 rejected under 35 U.S.C § 103(a) as unpatentable over the above evidence further in view of Schmid.

We have considered the issues on appeal in accordance with the grouping of claims as evidenced by the separate headings within the argument section of the Brief. Based on our review of the issues as presented in the Answer and Brief, we sustain the Examiner's rejections of claims 1, 2, 5-7, 9-13, and 31-34 under 35 U.S.C. § 103(a). However, we do not sustain the rejection of claims 3, 4, 8, 35, and 36 under those statutory grounds.

OPINION

The Rejections over Inoue in View of Singelyn, Kühl, and Wozniczka

Appellant argues claims 3, 4, 8, 31, 35 and 36 separately from claim 1. We, therefore, consider each of these claims separately.

Claim 1

The evidence supports a prima facie case of obviousness with respect to claim 1 and those claims stand or falling therewith. Inoue, as found by

[1] Both Appellant and the Examiner refer to Wozniczka as GB '968.

the Examiner, describes a fuel cell structure such that the membrane electrode assembly has lateral surfaces set back with respect to lateral surfaces of cell separator plates to leave a sealing gap (Answer 3-4; *see also* Inoue, ¶¶ 12, 37, and 45). According to Inoue, fuel gas, oxidizing gas, and coolant are flowed in individual gas passages separated from each other by a seal (Inoue ¶ 6, ll. 1-4). Various portions of the apparatus are sealed. "For example, a seal is provided around a communicating opening of the gas passages penetrating the fuel cell stack, around the membrane electrode assembly, around a coolant passage provided on the outer surface of the separator, and around the circumference of the outer surface of the separator." (Inoue, ¶ 6, ll. 4-10.) The invention of Inoue is directed to seals used between the pair of separators and the membrane (Inoue, ¶ 12, ll. 1-7). All of the secondary references describe sealing the outer circumference of a fuel cell. It follows from the evidence that it would have been obvious to one of ordinary skill in the art to have sealed the outer circumference of the fuel cell of Inoue as taught in the secondary references. Wozniczka, in particular, provides an express suggestion for providing such an additional seal. Wozniczka explains that "[i]f one or more individual cell seals fails, the encapsulating seal 80 maintains the integrity of the barrier protecting the cells and prevents leaks of reactant or coolant fluids." (Wozniczka, p. 13, l. 31 to p. 14, l. 2.) Wozniczka also discloses that the encapsulating seal provides electrical and/or thermal insulation, protects the components of the fuel cell from the external environment, and may insulate the outside environment from the cell stack (Wozniczka, p. 14, ll. 2-11). Prima facie, the sealing arrangement of claim 1 would have been obvious to one of ordinary skill in the art based on the evidence relied upon by the Examiner.

Appellant argues that Inoue teaches away from using a "sealing band peripherally enclosing the composition" as required by claim 1 (Br. 7, 11, and 15). This is because, according to Appellant, Inoue discloses a sealing structure for a fuel cell in which two separate seals 10, 20 oppose each other and these seals intentionally do not peripherally enclose the separator plate and membrane electrode assembly composite. Appellant alleges that "[t]he entire purpose of the sealing structure 10, 20 of Inoue is to eliminate the stresses associated for example with circumferential seals, and to provide for even dispersion of stresses as stated for example in [0011] and [0013] to [0020]" and that "Inoue teaches one of skill in the art that seals being provided 'around the circumference of the outer surface of the separator' (see paragraph [0006] of Inoue) do not adequately deal for variations in MEA thicknesses and variations in size of the separator." (*Id*., *citing* [0006] and [0008] of Inoue).

We cannot agree that Inoue "teaches away" in the sense that it suggests that providing a circumferential seal around the periphery of the Inoue fuel cell assembly will not work. *See In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994) ("In general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant."); *See also Baxter Int'l, Inc. v. McGaw, Inc.*, 149 F.3d 1321, 1328, 47 USPQ2d 1225, 1230 (Fed. Cir. 1998) (the reference must lead one of ordinary skill in the art to the conclusion that the process will not work.). Paragraph 6 of Inoue merely indicates that, conventionally, various seals are required in fuel cell assemblies and provides examples of areas that must be sealed. For instance, various openings must be sealed as well as the

membrane electrode assembly (MEA), and the circumference of the outer surface of the separator. Inoue is directed to the compressive sealing structure provided between the separators and the membrane. It is that compressive sealing structure to which the improvement of Inoue is directed, i.e., elimination of stresses. There is no disclosure that circumferential seals will not work to provide sealing. Further there is evidence that circumferential seals can be used together with individual compressive seals for added protection and to prolong seal effectiveness (Wozniczka, p. 13, l. 31 to p. 14, l. 11).

For each secondary reference combined with Inoue, Appellant argues that there is no motivation for anyone of skill in the art to combine the references, especially in view of the fact that Inoue specifically states that it is trying to avoid peripheral sealing bands with the attendant problems identified by Inoue (Br. 8, 12, 15-16). We disagree. Inoue, Singelyn, and Kühl all provide evidence that circumferential sealing was conventional in the art. Wozniczka provides specific reasons why such sealing is beneficial. The prior art as a whole indicates that there are benefits to incorporating peripheral sealing bands into fuel cell sealing arrangements. The motivation comes from within the prior art and supports a prima facie case of obviousness.

For each secondary reference Appellant further argues that the seal element of the secondary reference would be separate from the two elements of Inoue and thus no "peripheral sealing strip extending into the sealing gap to seal the sealing gap in a gas-tight manner by compression between the cell separator plates" would be provided (Br. 8, 12, and 16). The fact, however, that the two elements of Inoue would be separate from the seal suggested by

the secondary references does not support Appellant's argument. When applying a seal as taught by the secondary references, the circumferential sealing material would extend into the sealing gap as claimed. This is because the sealing material would enter the gap between separators 6 and extend toward seals 10 and 20. The claim does not require that the sealing material fill the gap, it merely requires that it is "extending into the gap." The sealing material would extend into the gap as claimed.

We conclude that the Examiner has established a prima facie case of obviousness with respect to the subject matter of claim 1 and claims 2, 5-7, and 9-13 which stand or fall with claim 1 which has not been sufficiently rebutted by Appellant.[2]

Claim 3

Appellant argues the subject matter of claim 3 separately. Claim 3 requires that the sealing element have clamp edges extending over first and second outer edges of the outer cell separator plates. The Examiner notes that Inoue includes sealing groove 7 and linear protrusion 8 on the surfaces of the separators and seals 10 and 20 on these surfaces. The Examiner further finds that the seals are clamped between the separators in assembly. We agree with Appellant that the above mentioned structures are not clamp

[2] We wish to add that we further find that Wozniczka anticipates the subject matter of claim 1. Wozniczka describes a seal 80 meeting all the limitations of the claim (Wozniczka, p. 12, l. 29 to p. 14, l. 30). The membrane electrode assembly 5 of Wozniczka has lateral surfaces set back with respect to lateral surfaces of the cell separator so as to leave a sealing gap as shown in Figure 2. Encapsulating seal 80 has a sealing band peripherally enclosing the composite and has a peripheral sealing strip extending into the sealing gap (Fig. 2). The sealing strip seals in a gas-tight manner by compression between the cell separator places as claimed (p. 16, ll. 22-27).

edges on the *sealing element* as claimed. The sealing element at issue is the sealing element including a sealing band peripherally enclosing the composite. The seals 10 and 20 of Inoue do not peripherally enclose the composite much less include clamp edges over the outer edges of the outer cell separator plates as claimed.

We conclude that the Examiner has failed to establish a prima facie case of obviousness with respect to the subject matter of claim 3 and claim 4 dependent thereon.

Claim 8

Appellant also argues claim 8 separately. This claim requires a second sealing strip extending into a second sealing gap. We agree with Appellant that the Examiner did not address the limitation of claim 8.

We conclude that the Examiner failed to establish a prima facie case of obviousness with respect to the subject matter of claim 8.

Claim 31

Appellant argues claim 31 separately. This claim requires that the sealing element be a *single* elastic sealing element. Appellant argues that the sealing element of Inoue is a two part sealing element. While that is true, it does not address the basis of the rejection. When Inoue is modified as suggested by the secondary references, the result is a single elastic sealing element having the required sealing band peripherally enclosing the composition and having the peripheral sealing strip extending perpendicularly from the sealing band into the sealing gap of Inoue as suggested by the secondary references.

We conclude that the Examiner established a prima facie case of obviousness with respect to the subject matter of claim 31 and claims 32-34

stand or falling therewith which has not been sufficiently rebutted by Appellant.

Claim 35

Appellant argues claim 35 separately. This claim, similarly to claim 8, defines a second sealing strip. We agree with Appellant that the Examiner has not addressed this limitation.

We conclude that the Examiner failed to establish a prima facie case of obviousness with respect to claim 35 or claim 36 which is dependent thereon.

The Rejection over Inoue in View of Osenar

Both the rejection presented by the Examiner and the arguments advanced by the Appellant in regard to the rejection over Inoue in view of Osenar parallel those made with respect to the rejections over Inoue in view of Singelyn, Kühl, and Wozniczka. For the reasons provided above, we conclude that the Examiner established a prima facie case of obviousness over Inoue in view of Osenar with respect to the subject matter of claims 1 and 31, the prima facie case not being sufficiently rebutted by Appellant.

The Rejection of Claim 7 further Relying Upon Schmid

To reject claim 7, the Examiner added Schmid to the rejections over Inoue in view of Singelyn, Kühl,Wozniczka, and Osenar. Appellant advances no additional arguments over and above those already addressed above. We, therefore, conclude that the Examiner established a prima facie case of obviousness with respect to the subject matter of claim 7 which has not been sufficiently rebutted by Appellant.

CONCLUSION

In summary, we sustain the rejection of claims 1, 2, 5-7, 9-13, and 31-34 under 35 U.S.C. § 103(a), but we do not sustain the rejection of claims 3, 4, 8, 35, and 35. Accordingly, we affirm-in-part the decision of the Examiner.

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 CFR § 1.136(a)(I)(iv)(2005).

AFFIRM-IN-PART

sld

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