NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

2006-1450
(Interference No. 105, 281)

SHYAMA MUKHERJEE and TERJE A. SKOTHEIM,

Appellants,

v.

MAY-YING CHU, LUTGARD C. DE JONGHE,
STEVEN J. VISCO, and BRUCE D. KATZ,

Appellees.

Laurence S. Rogers, Ropes & Gray LLP, of New York, New York, for appellants. With him on the brief was Douglas J. Gilbert.

Charles L. Gholz, Oblon, Spivak, McClelland, Maier & Neustadt, P.C., of Alexandria, Virginia, for appellees. With him on the brief were James J. Kelly and Frank J. West. Of counsel was Alton D. Rollins.

Appealed from: United States Patent and Trademark Office,
Board of Patent Appeals and Interferences

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DECIDED: February 15, 2007

Before MICHEL, Chief Judge, RADER and SCHALL, Circuit Judges.

MICHEL, Chief Judge.

Shyama Mukherjee and Terje A. Skotheim (collectively "Mukherjee") appeal the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences ("Board") holding Mukherjee's claims in Interference No. 105,281 unpatentable for failure to comply with the written description requirement of 35 U.S.C. § 112, ¶1. For the reasons discussed below, we affirm.

I. BACKGROUND

May-Ying Chu, Lutgard C. De Jonghe, Steven J. Visco, and Bruce D. Katz (collectively "Chu") are the inventors named in U.S. Patent No. 6,030,720 ("the '720

patent") directed to liquid electrolyte lithium-sulfur batteries. U.S. Patent No. 6,030,720 (filed Oct. 10, 1997) (issued Feb. 29, 2000). On February 27, 2001, Mukherjee filed U.S. Patent Application No. 09/795,915 directed to rechargeable lithium-sulfur batteries and entitled "Novel Composite Cathodes, Electrochemical Cells Comprising Novel Composite Cathodes, and Processes for Fabricating Same." U.S. Patent Application No. 09/795,915 (filed February 27, 2001) (published May 9, 2002) ("Mukherjee application").

In lithium-sulfur batteries, the anode (i.e., negative electrode) usually contains lithium metal; the cathode (i.e., positive electrode) usually contains sulfur; and the electrolyte allows charged ions to migrate between the anode and cathode. The Mukherjee application discloses that in addition to sulfur, the cathodes contain an Electroactive Transition Metal Chalcogenide[1] ("ETMC") composition. As defined in the Mukherjee application, ETMC is "an electroactive material having a reversible lithium insertion ability, wherein the transition metal is at least one selected from the group consisting of Ti, V, Cr, Mn, Fe, Nb, Mo, Ta, W, Co, Ni, Cu, Y, Zr, Ru, Rh, Pd, Hf, Re, Os, and Ir, and the chalcogenide is at least one selected from the group consisting of O, S, and Se." Mukherjee application at 19.

Along with his February 27, 2001 application, Mukherjee filed a preliminary amendment which, inter alia, added claims 94-100 for the purpose of provoking an interference with the '720 patent. On April 13, 2005, Administrative Patent Judge ("APJ") James T. Moore (of the Board) declared Interference No. 105,281 between the

[1] Chalcogenides are compounds that contain chalcogen elements, i.e., elements from the chalcogen group of the periodic table of chemical elements. Chalcogens include sulfur (S) and selenium (Se).

Mukherjee application and the ’720 patent, designating Mukherjee as the senior party and Chu as the junior party. Chu v. Mukherjee, No. 105,281 (B.P.A.I. Apr. 13, 2005) (“Patent Interference Decision”). The sole count of the interference was either claim 94 of the Mukherjee application or claim 41 of the ’720 patent. Patent Interference Decision at 4. Claim 94 of the Mukherjee application reads:

> 94. A battery cell comprising:
> (a) an anode comprising a metal or an ion of a metal;
> (b) a cathode comprising a mixture of:
> (i) an electrochemically active material comprising sulfur in the form of at least one of elemental sulfur, a sulfide of the metal, and a polysulfide of the metal; and
> (ii) an electronically conductive material; and
> (c) a liquid electrolyte comprising a solvent for at least some discharge products of said cathode,
> wherein the battery cell is characterized by a separation distance between a back boundary where the liquid electrolyte is farthest removed from said anode and a front boundary where the liquid electrolyte is nearest said anode, wherein the separation distance is about 125 micrometers.

Patent Interference Decision at 4 n.2. Noticeably absent from claim 94 is any requirement that the cathode contain an ETMC. APJ Moore designated claims 94-96, 98, 100, and 101[2] of the Mukherjee application (“Mukherjee’s involved claims”) and claims 28-49 of the ’720 patent as claims corresponding to the interference count. Patent Interference Decision at 4. None of Mukherjee’s involved claims recites that the cathode contains an ETMC composition.

Mukherjee and Chu filed a number of preliminary motions as part of the interference proceeding. Chu moved for a judgment that Mukherjee’s involved claims were unpatentable for failure to comply with the written description requirement of

[2] Mukherjee added claim 101 in an Amendment dated August 18, 2003. See Chu v. Mukherjee, No. 105,281 (B.P.A.I. Apr. 7, 2006).

35 U.S.C. § 112, ¶1[3] ("Chu's Motion 4"), arguing that because the involved claims do not recite ETMC as part of the cathode component of a battery cell, the claims are broader than the specification on which they are based. On April 7, 2006, the Board granted Chu's Motion 4, holding that one of skill in the art would have understood from a reading of the disclosure as a whole that Mukherjee's invention was limited to battery cells with cathodes that contain an ETMC composition. Chu v. Mukherjee, No. 105,281 (B.P.A.I. Apr. 7, 2006) ("Board Decision"). Accordingly, the Board entered final judgment against Mukherjee and dismissed the remaining preliminary motions as moot. Mukherjee filed a timely appeal based on 35 U.S.C. § 141. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

II. DISCUSSION

Our review of the Board's decision is limited by statute. Pursuant to 5 U.S.C. § 706, we must affirm the Board's "action, findings, and conclusion" unless they are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law . . . [or] are unsupported by substantial evidence." See also Dickinson v. Zurko, 527 U.S. 150, 152, (1999) (holding that 5 U.S.C. § 706 governs our review of findings of fact made by the Patent and Trademark Office). Written description is a question of fact, judged from the perspective of one of ordinary skill in the art as of the relevant filing

[3] The statute provides in pertinent part:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

35 U.S.C. § 112, ¶1.

date, which we review in this appeal for substantial evidence. 5 U.S.C. § 706; Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). Substantial evidence is evidence "a reasonable person might accept as adequate to support a conclusion." In re Zurko, 258 F.3d 1379, 1384 (Fed. Cir. 2001) (internal citations omitted).

In an extensive and meticulous sixty-four page decision, the Board (in a panel consisting of APJs Delmendo, Medley, and Moore) examined every section of the Mukherjee application to determine whether it provided written description support for Mukherjee's involved claims. The Board found that the Technical Field Section states that ETMC is included in the cathode material. The Board determined that in the Background Section, Mukherjee criticizes non-ETMC cathodes in the prior art and distinguishes his invention over this prior art by disclosing that cathodes that contain ETMC ("ETMC cathodes") overcome the drawbacks associated with the prior art (e.g., problems stemming from the excessive out-diffusion of anionic reduction products from non-ETMC cathodes into the rest of the cell) and by disclosing that ETMC cathodes improve the life and capacity of batteries. The Board observed that the Detailed Description of the Invention Section continued with the notion that an ETMC cathode is a distinguishing feature of the invention, citing the following as support:

> The present invention also pertains to the design and configuration of composite cathodes of the present invention. The relative configuration of the electroactive sulfur-containing cathode material and the electroactive transition metal chalcogenide composition in the composite cathode is critical. In all cases, in order to retard out-diffusion of anionic reduction products from the cathode compartment in the cell, the sulfur-containing cathode material must be effectively separated from the electrolyte or other layers or parts of the cell by a layer of an electroactive transition metal chalcogenide composition.

Board Decision at 55 (citing Mukherjee application) (emphasis added). The Board noted that (1) the non-ETMC cathodes used as experimental controls in the Example Section had inferior properties or performance and (2) the sole independent claim in the originally filed claims required ETMC in the cathode component. Based on its review of the entire specification, the Board found that the application does not disclose non-ETMC cathodes as the invention or alternatives to the invention and does not characterize ETMC as an optional part of the cathode.

Next, the Board reviewed the testimony of Dr. Anderman (a battery cell expert for Chu) and Dr. Reddy (a battery cell expert for Mukherjee). Dr. Anderman testified that every description of a battery cell in Mukherjee's application contained a composite cathode and that every composite cathode contained (a) an electroactive sulfur-containing cathode material and (b) an ETMC. Id. at 10-11 (citing Dr. Anderman's testimony). Therefore, Dr. Anderman concluded that every battery described in the Mukherjee application contained ETMC. Dr. Anderman found no description of a battery cell that lacked ETMC and no statement that ETMC was an optional component of the cathode. Dr. Anderman further testified that it would have been clear to one of skill in the art that the Mukherjee invention was limited to ETMC cathodes because it was the presence of chalcogenide in the cathode that overcame the drawbacks of previous sulfur batteries. Id. at 11.

On the other hand, Dr. Reddy testified that ETMC was optional because it was not required to make a battery cell work and only improved the function of batteries. Id. at 14 (citing Dr. Reddy's testimony). Dr. Reddy also testified that the relative configuration of the electroactive sulfur-containing cathode material and ETMC is critical

only when the chalcogenide composition is included in the composite cathode. Id. The Board credited Dr. Anderman's testimony over that of Dr. Reddy because Dr. Anderman's testimony was consistent with the text of the disclosure. Id. at 40. The Board observed that Dr. Reddy had concluded that ETMC was optional based on Mukherjee's reference to non-ETMC cathodes in the prior art background section and in comparison data shown in the examples. The Board gave no weight to Dr. Reddy's mistaken belief that any reference to non-ETMC cathodes in the Mukherjee application makes these cathodes part of the disclosed invention. Instead, the Board correctly found that the Mukherjee application as a whole only disclosed non-ETMC cathodes in the context of "touting the advantages or importance of the [ETMC] composition." Id. at 45-46. Determining that Mukherjee was not in possession of an invention that excludes ETMC from the cathode, the Board found that there was no written description support for Mukherjee's involved claims because as they do not claim ETMC as a component of the cathode, they are far broader than the written description. See Tronzo v. Biomet Inc., 156 F.3d 1154, 1158 (Fed. Cir. 1998) (internal citations omitted).

On appeal Mukherjee argues that the Board erred because it did not consider all of Dr. Reddy's testimony. We find this argument unpersuasive. As discussed above, the Board reviewed Dr. Reddy's testimony and gave it less weight than Dr. Anderman's testimony. We defer to the Board's determination of the weight and credibility of evidence. See, e.g., Velander v. Garner, 348 F.3d 1359, 1371 (Fed. Cir. 2003) (stating that it is "within the discretion of the trier of fact to give each item of evidence such weight as it feels appropriate").

Mukherjee further argues that the Board's decision is erroneous because it fails to consider the one part of its application that, Mukherjee contends, discloses methods of making composite cathodes that do not contain an ETMC composition. Mukherjee asserts that although his application discusses several methods that involve the use of chalcogenides, page thirty nine of the application discloses one method that describes cathodes in terms of their thickness and not their use of ETMC. Page thirty nine of the Detailed Description states in relevant part:

> It is well known in the art of battery electrode fabrication that, by casting a slurry of electrode components and removing the solvent, thin films and coatings with the desired thickness can be made. One of skill in the art will appreciate that, by flash evaporation of the solvent from a slurry of electroactive transition metal chalcogenide and the electroactive sulfur-containing cathode material, one can produce finely divided powders with varying particle sizes. Powdered composite cathode materials prepared by the processes of the present invention can be hot or cold pressed, slurry coated or extruded onto current collecting materials by techniques known to those skilled in the art of battery electrode fabrication.
>
> Examples of preferred composite cathodes prepared using the processes of the present invention include thin film structures up to about 25 μm in thickness, coatings on current collectors up to about 100 μm in thickness, and powdered composite structures.

Mukherjee application at 39 (emphasis added). Contrary to Mukherjee's assertion, page thirty nine discloses only ETMC cathodes because the described protocol uses a slurry that contains ETMC. Therefore, the product of this disclosed method is a composite cathode, not a generic, non-ETMC cathode. As repeatedly described in Mukherjee's application, composite cathodes necessarily contain ETMC. In fact, for the composite cathodes disclosed as Mukherjee's invention, ETMC is critical.

Although Mukherjee argues that this passage discusses the thickness of cathodes in general, this argument is unpersuasive because the passage discloses

composite cathodes, not cathodes in general. Therefore, when the passage discusses the thickness of composite cathodes, it in fact refers to the thickness of only ETMC cathodes.

As discussed above and contrary to Mukherjee's contention, the Board reviewed the entire application, including page thirty nine, and determined that the written description does not support the broad cathode limitation recited in Mukherjee's involved claims because the disclosure of the application is limited to cathodes that contain ETMC. We hold that there is substantial evidence to support the Board's determination that the Mukherjee application does not comply with the written description requirement of 35 U.S.C. § 112, ¶1[4] because a reasonable person would find the testimonial and documentary evidence sufficient to support the Board's finding. As a result, we discern no error in the Board's decision and hence no reason to disturb the Board's result. We have considered Mukherjee's other arguments and conclude that they are either unpersuasive or their review is unnecessary for the disposition of this appeal.

[4] Although Mukherjee's new claims may have embraced new matter that lacked adequate support in his original specification, i.e., a classic written description-new matter problem, Chu did not argue and the Board did not address whether Mukherjee's added claims violated the proscription against new matter under 35 U.S.C. § 132(a).