NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

EVEREADY BATTERY COMPANY, INC.,
Appellant

v.

SPECTRUM BRANDS, INC.,
Appellee

2015-1824

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. 95/001,683.

Decided: May 31, 2016

DAVID BOGDAN CUPAR, McDonald Hopkins LLC, Cleveland, OH, argued for appellant. Also represented by ROBERT BARAONA, MATTHEW JOHN CAVANAGH.

DEBORAH ANN STERLING, Sterne Kessler Goldstein & Fox, PLLC, Washington, DC, argued for appellee. Also represented by ROBERT GREENE STERNE, NIRAV DESAI.

Before WALLACH, BRYSON, and TARANTO, *Circuit Judges*.

BRYSON, *Circuit Judge*.

Eveready Battery Company, Inc., appeals from a decision of the Patent Trial and Appeals Board in an *inter partes* reexamination. The Board held all the claims of Eveready's U.S. Patent No. 6,849,360 ("the '360 patent") invalid for obviousness. We affirm.

I

The '360 patent is directed to a lithium/iron disulfide ("Li/FeS_2") electrochemical cell or battery. Li/FeS_2 cells were well known when the application for the '360 patent was filed on June 5, 2002.[1] The claimed invention of the '360 patent is focused on improving the design of such cells. Specifically, the patent describes the need for a Li/FeS_2 cell "with an increased energy density and discharge efficiency that accommodates the volume increase of the reaction products generated during discharge." '360 patent, col. 2, ll. 7-9.

The patent's background section asserts that a "key challenge" in designing an improved Li/FeS_2 cell is the efficient use of the cell's internal volume. *Id.*, col. 1, ll. 27-28. That challenge arises because a Li/FeS_2 cell generates chemical reaction byproducts when it produces electricity. The accumulation of the reaction byproducts can cause a battery to swell; as a result, it is necessary for the cell design to incorporate sufficient void spaces to accommo-

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[1] Section 14.10 of the 1995 edition of a standard text in the field, David Linden, Handbook of Batteries, is dedicated to such cells. Li/FeS_2 consumer AA cells were standardized in the American National Standards Institute's C18.3M, Part 1-1999 standard.

date the expansion. *Id.*, col. 1, ll. 28-32. That space is generally lost to more productive uses.

The '360 patent asserts that a cell with improved performance was "achieved, surprisingly, with an anode underbalance," i.e., with less anode capacity than cathode capacity. *Id.*, abstract. According to the patent, conventional Li/FeS_2 cells were "typically . . . overbalance[d]," i.e., they had more anode capacity than cathode capacity. *Id.*, col. 2, ll. 1-2.

Claim 1 of the '360 patent, the only independent claim, reads as follows:

> An electrochemical cell comprising
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> a cathode assembly, said cathode assembly comprising a metallic cathode current collector having two major surfaces and a cathode coating disposed on at least one of said two major surfaces, said coating comprising iron disulfide,
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> said cell further comprising a metallic lithium anode alloyed with aluminum,
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> wherein the anode to cathode input ratio is less than or equal to 1.0.

In 2011, Spectrum Brands filed a petition for *inter partes* reexamination challenging the validity of all of the '360 patent's claims. During the reexamination, Eveready canceled claims 14-22 and added claims 23-37. Those changes eliminated all of independent claims except for claim 1. In a lengthy opinion, the examiner found that the remaining claims would have been obvious in view of a number of different combinations of references.

Eveready appealed the examiner's rejections of claim 1 to the Board. Eveready's appeal did not include any substantive discussion of the rejected dependent claims. The Board affirmed the examiner's determination that claim 1 was invalid for obviousness in light of (1) a

European Patent Application known as Gan; (2) the combination of U.S. patents to Leger, Georgopoulos, and Munshi; and (3) a U.S. patent to Smesko. The Board found that Eveready had not made a separate argument with respect to any of the dependent claims, and it therefore affirmed those rejections without discussion.

On appeal to this court, Eveready asserts that the Board erred in affirming those rejections.[2]

II

We focus on whether claim 1 would have been obvious in light of Gan, the European Patent Application. Gan is directed to the control of swelling in electrochemical cells that use alkali metals, such as lithium. The discussion in Gan centers on reducing swelling in lithium/silver vana-

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[2] In the Statement of the Issues section of its brief, Eveready states in two footnotes that it is appealing not only the rejection of claim 1, but also the separate rejections of all of the dependent claims. However, in the Argument section of its brief Eveready makes no separate substantive argument with respect to the dependent claims. Nor does Eveready challenge the Board's ruling that Eveready failed to challenge rejections VII to XX, which were directed to the dependent claims. A footnote allusion to combinations of references, without more, does not present a cognizable argument on appeal, *see Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1383 (Fed. Cir. 2015), nor may a party raise in this court rejections that it did not appeal to the Board, *see In re Watts*, 354 F.3d 1362, 1367 (Fed. Cir. 2004). Accordingly, with respect to the dependent claims that were rejected based on combinations of prior art using Gan as the primary reference, we treat Eveready's argument as confined to its challenge to the Board's analysis of Gan.

dium oxide ("Li/SVO") cells by managing the creation of decomposition products.

A

Eveready first argues that Gan applies only to Li/SVO cells and not to cells using other cathode materials, such as Li/FeS_2. Eveready does not dispute that Gan is directed to swelling in lithium cells or that swelling is a key concern in designing a Li/FeS_2 cell. In fact, Eveready acknowledges that the swelling issue in Li/FeS_2 cells is even greater than in Li/SVO cells. Instead, Eveready argues that a person of ordinary skill in the art would not have applied Gan to Li/FeS_2 cells because of the differences in battery chemistry between Li/FeS_2 cells and Li/SVO cells.

The Board concluded that Gan is not limited to Li/SVO cells. Instead, the Board noted that although Gan discusses the Li/SVO electrochemical cell "as an illustrated embodiment of the invention, Gan discloses generally that the invention relates to balancing the anode-to-cathode ("A/C") capacity ratio in order to improve cell swelling in alkali metal electrochemical cells." Moreover, the Board pointed out that Gan explicitly refers to Li/FeS_2 cells when stating that "[a]dditional cathode active materials useful with the present invention include . . . iron disulfide."[3] The Board's ruling on that issue is consistent with the examiner's findings that claim 1 of Gan is not limited to Li/SVO cells and that Gan's claims generally cover cells with an A/C capacity ratio of less than 1.0, including such Li/FeS_2 cells.

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[3] Gan states that the cathode may "comprise a metal element, a metal oxide, a mixed metal oxide, and a metal sulfide, and combinations thereof"; iron disulfide is listed as one of ten specifically identified cathode materials.

In making its findings, the Board considered extensive record materials besides Gan, including competing expert declarations. Those declarations included explanations of why Gan would be applicable to Li/FeS_2 cells. Spectrum's expert explained that while the swelling problem in Li/SVO cells is different from the swelling problem in Li/FeS_2 cells, Gan nonetheless "generally teaches that one achieves the best performance at a selected end point voltage, by properly balancing the anode to cathode capacity." He added that a person of ordinary skill could apply Gan's teaching to Li/FeS_2 cells using well known practices.

In addition, as the examiner noted, the record contains statements by Eveready that Gan discloses a Li/FeS_2 cell and that a person of ordinary skill would take the disclosure of Gan into account in creating an improved Li/FeS_2 cell. In proceedings before the European Patent Office on essentially the same patent application, Eveready stated that Gan appeared to be the closest prior art as it was "directed to the same technical problem(s)."[4] Eveready conceded that Gan "discloses electrochemical cells containing a lithium anode, an FeS_2 cathode arranged on a current collector and further containing a non-aqueous electrolyte." Eveready also stated that Gan was "directed to maintaining the discharge capacity while

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[4] Those statements were made in conjunction with a challenge to EP 1,518,287. The statements concerned both Gan and U.S. Patent No. 6,171,729, which was derived from Gan. The application for the European patent included a specification and claims that were substantively identical to those in the '360 patent. *See* WO 2003/105255. The claims in EP 1,518,287 were amended to add more precise limitations than claim 1 of the '360 patent, including a specific formula for calculating the A/C input ratio.

minimizing swelling during discharge." Eveready admitted that "a person skilled in the art striving to solve the problem of maintaining or improving discharge capacity in a system that experiences swelling would have taken into account the disclosure of [Gan]."

In light of the evidence before the Board, we hold that substantial evidence supports the Board's finding that a person of ordinary skill in the art would have considered the teaching of Gan to be applicable to Li/FeS_2 cells.

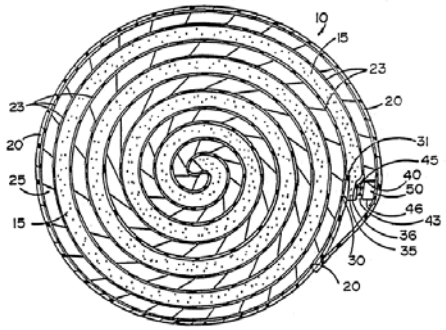
B

Eveready next argues that Gan does not disclose an anode-to-cathode input ratio less than or equal to 1.0. The examiner found that the claim term "anode to cathode input ratio" should be construed to mean "the anode capacity divided by the cathode capacity, wherein the anode and cathode capacities are determined based on the interfacial area, i.e., the portions of the anode and cathode which overlap with each other." That construction is not disputed on appeal. Instead, Eveready asserts that the Board erred in finding that there was sufficient evidence to show that the "interfacial ratio" portion of the limitation, as construed, is taught by Gan.

Gan addresses the ratio of the total amount of anode to the total amount of cathode and teaches that the total A/C ratio should be between about 0.68 and 0.96. According to Eveready, the total A/C ratio is unrelated to the interfacial A/C ratio, because there are situations in which the total amounts of anode and cathode material in a cell can be quite different from the amounts of anode and cathode material that are in an interfacial relationship. The examiner and the Board found that the battery structure disclosed in Gan answers that argument.

The examiner found that Gan discloses a battery design known as the "jellyroll." That design consists of a spirally wound structure of anode and cathode strips

facing one another. The following figure from one of the prior art references in the record provides an example of the jellyroll design:



The examiner found that the anode and cathode in the jellyroll structure are similarly sized and almost completely interfacial to one another (as seen in the figure above). The examiner also found that the record reflected that it would be wasteful, and even counterproductive, to have a significant amount of non-interfacial area in such a structure, as non-interfacial elements generate no reaction and take up space. The examiner concluded that it would have been obvious to a person of ordinary skill in the art "to prepare Gan's electrochemical cell in jellyroll form such that the cathode and anode are similar in size with little cathode not in interfacial relationship with anode so as to ensure optimal discharge rates and avoid waste of material." In that configuration, the examiner found, "Gan's anode to cathode capacity ratio of about 0.68 to about 0.96 would be equivalent to or very close to" the interfacial A/C ratio, and thus render obvious the claimed A/C input ratio of less than or equal to 1.0.

The Board agreed with the examiner that the total A/C ratio would be closely correlated to the interfacial A/C ratio in a jellyroll battery. As the Board explained, "combining the concept of an anode limited cell as taught by Gan[] with an electrochemical cell having substantial overlap between the cathode and anode would have

resulted in the interfacial A/C ratio recited in the claims." The Board added that the claims of the '360 patent did not require any specific ratio—only that the ratio not be overbalanced by having an excess of anode capacity.

The Board's findings are supported by substantial evidence. The record contains ample evidence that Gan discloses a jellyroll cell, that the A/C input ratio of a jellyroll cell is closely correlated to the total A/C ratio in the cell, that Gan teaches an A/C ratio less than or equal to 1.0, and that the principles of Gan apply to a Li/FeS_2 cell. In light of that evidence, we affirm the Board's finding that claim 1 of the '360 patent would have been obvious in view of Gan.

III

Because we find that the Board did not err in its affirmance of Gan, we need not address whether the Board was correct in affirming the rejections of claim 1 in light of Smesko or the combination of Leger, Georgopoulos, and Munshi.

AFFIRMED