United States Court of Appeals for the Federal Circuit

LG ELECTRONICS INC.,
Appellant

v.

IMMERVISION, INC.,
Appellee

2021-2037, 2021-2038

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2020-00179, IPR2020-00195.

Decided: July 11, 2022

JULIE S. GOLDEMBERG, Morgan, Lewis & Bockius LLP, Philadelphia, PA, argued for appellant. Also represented by DION MICHAEL BREGMAN, ALEXANDER STEIN, Palo Alto, CA; ANDREW V. DEVKAR, Los Angeles, CA; WILLIAM R. PETERSON, Houston, TX.

JOHN DAVID SIMMONS, Panitch Schwarze Belisario & Nadel, LLP, Wilmington, DE, argued for appellee. Also represented by DENNIS JAMES BUTLER; KEITH AARON JONES, STEPHEN EMERSON MURRAY, Philadelphia, PA.

Before NEWMAN, STOLL, and CUNNINGHAM, *Circuit Judges*.

Opinion for the court filed by *Circuit Judge* STOLL.

Opinion dissenting in part filed by *Circuit Judge* NEWMAN.

STOLL, *Circuit Judge*.

This appeal requires us to consider how to treat a prior art reference in which the alleged teaching of a claim element would be understood by a skilled artisan not to be an actual teaching, but rather to be an obvious error of a typographical or similar nature. LG Electronics Inc. appeals from the United States Patent Trial and Appeal Board's final written decisions in a pair of inter partes review proceedings challenging claims 5 and 21 of U.S. Patent No. 6,844,990. In both proceedings, the Board found that LG had not shown the challenged claims were unpatentable. Because substantial evidence supports the Board's finding that prior art disclosure critical to both of LG's petitions for inter partes review was an apparent error that would have been disregarded or corrected by a person of ordinary skill in the art, we affirm.

BACKGROUND

I

The '990 patent relates to capturing and displaying digital panoramic images. Panoramic (e.g., super-wide angle) objective lenses typically have linear image point distribution functions. This means there is a linear relationship between the distance of an image point from the image's center and the corresponding relative angle of the object point to the image's center. While this linearity allows digital panoramic images to be easily rotated, shifted, and enlarged or shrunk, it also limits image quality to "the resolution of the image sensor used when taking the initial image." '990 patent col. 3 ll. 1–9. This limitation on image

quality is most noticeable when enlarging sectors of the image. The '990 patent purports to improve the resolution of particular sectors of a digital panoramic image "without the need to increase the number of pixels per unit of area of an image sensor or to provide an overlooking optical enlargement system." *Id.* at col. 3 ll. 35–42.

Specifically, the '990 patent specification describes capturing an initial digital panoramic image using an objective lens having a non-linear image point distribution function that "expands certain zones of the image and compresses other zones of the image." *Id.* at col. 3 l. 62–col. 4 l. 38. The "non-linearity of the initial image" can then be corrected to produce a final panoramic image for display. *Id.* at col. 4 ll. 47–53. "[T]he expanded zones of the image cover" a higher "number of pixels of the image sensor" than they would with a lens having linear image point distribution. *Id.* at col. 3 l. 62–col. 4 l. 10.

The challenged claims specify that the lens "compresses the center of the image and the edges of the image and expands an intermediate zone of the image located between the center and the edges of the image." *Id.* at col. 19 ll. 48–51. Dependent claim 5, which depends from cancelled claim 1, is representative:

> 1. (Cancelled) A method for capturing a digital panoramic image, by projecting a panorama onto an image sensor by means of a panoramic objective lens, the panoramic objective lens having an image point distribution function that is not linear relative to the field angle of object points of the panorama, the distribution function having a maximum divergence of at least ±10% compared to a linear distribution function, such that the panoramic image obtained has at least one substantially expanded zone and at least one substantially compressed zone.
>
> . . .

> 5. The method according to claim 1, wherein the objective lens *compresses the center of the image and the edges of the image and expands an intermediate zone of the image located between the center and the edges of the image.*

Id. at col. 19 ll. 26–51 (claim 5) (emphasis added); *see also id.* at col. 20 l. 51–col. 21 l. 11 (claim 21).[1]

II

On November 27, 2019, LG filed two petitions for inter partes review, each challenging a dependent claim of the '990 patent. J.A. 322–66 (IPR2020-00179 challenging claim 5); J.A. 3338–87 (IPR2020-00195 challenging claim 21). Fundamental to LG's obviousness arguments is U.S. Patent No. 5,861,999 ("Tada"), directed to a "Super Wide Angle Lens System Using an Aspherical Lens."[2] Tada describes four embodiments that share a general system structure and differ in aspects such as lens element thickness, separation distance, and lens shape. Each embodiment satisfies a set of eight conditions relating to the aspheric characteristics of various lens elements. Tada col. 2 ll. 7–67. The embodiment relevant to this appeal, Embodiment 3, is depicted in Figure 11 and described by a prescription—or set of optical parameters—set forth in Table 5. *Id.* Fig. 11, Tbl. 5.

Tada claims priority from Japanese Patent Application No. 09-201903, which was published as JP H10-115778 ("Japanese Priority Application"). Tada "expressly

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[1] Independent claims 1 and 17 were cancelled in ex parte reexamination. The claims at issue here were not subject to reexamination.

[2] Tada was published with the title "Super Wide Angel Lens System Using an Aspherical Lens"; a Certificate of Correction dated December 28, 1999, updated the title to its present form.

incorporated" these priority applications "by reference in their entireties." *Id.* at col. 3 ll. 9–13.

LG argued that Tada discloses, as recited in the challenged claims, a panoramic objective lens having a non-linear image point distribution that compresses the center and edges of an image and expands an intermediate zone of the image between the center and the edges of the image. Tada, however, does not explicitly discuss the image point distribution functions of its lenses. Instead, LG relied on its expert Dr. Russell Chipman's declaration for the proposition that Tada's third embodiment has a distribution function producing "a compressed center and edges of the image and an expanded intermediate zone of the image between the center and the edges of the image" as recited in challenged claims 5 and 21.

Dr. Chipman "reconstruct[ed] the lens of Figure 11 [of Tada] using the information in Table 5 of Tada" by inputting certain "information from Table 5 [as published] . . . into an optical design program." J.A. 1486–87 (Chipman Decl. ¶ 46). Dr. Chipman then plotted the image point distribution function for the lens system at six wavelengths and testified that the "function is not linear" in any of them. J.A. 1490–93 (Chipman Decl. ¶¶ 52–53). More specifically, Dr. Chipman explained that this embodiment of Tada's lens system "compresses the center of the image and the edges of the image and expands an intermediate zone of the image located between the center and the edges of the image." J.A. 1503 (Chipman Decl. ¶ 68). LG relied exclusively on Dr. Chipman's calculations and plots using the prescription in Table 5 to show that Tada's third embodiment meets the compression and expansion zone limitation of the challenged claims. LG did not rely on any other prior art reference or any other portion of Tada's disclosure for this limitation.

The Board instituted inter partes review in both proceedings. The parties engaged in expert discovery, with

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