NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

PULSE ELECTRONICS, INC.,
Appellant

v.

U.D. ELECTRONIC CORP.,
Cross-Appellant

2020-2129, 2020-2177

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2019-00511.

Decided: July 1, 2021

ERIC CARR, Gazdzinski & Associates, PC, San Diego, CA, argued for appellant.

ROBERT H. SLOSS, Procopio, Cory, Hargreaves and Savitch LLP, Palo Alto, CA, argued for cross-appellant.

Before DYK, LINN, and O'MALLEY, *Circuit Judges*.

DYK, *Circuit Judge*.

Patent owner Pulse Electronics, Inc. ("Pulse") appeals the final written decision by the Patent Trial and Appeal Board ("Board") in an inter partes review proceeding. Petitioner U.D. Electronic Corp. ("UDE") cross-appeals. We *affirm in part* and *reverse in part*.

BACKGROUND

Pulse is the owner of U.S. Patent No. 6,773,302 (the "'302 patent"), which is directed to an improved design for a connector such as a phone jack or ethernet plug. *See* '302 patent, Abstract; col. 1, l. 63–col. 2, l. 4; col. 4, ll. 46–52. The '302 patent's design is intended to use the interior volume of the connector more efficiently while reducing crosstalk and electromagnetic interference between the internal components. To achieve these ends, the '302 patent specification describes using one or more substrates, such as circuit boards, arranged vertically within the connector housing and orthogonal to the front face of the connector. The specification also teaches shaping the conductors within the housing using approximately 90° bends to reduce the extent to which the conductors overlap with each other (thereby reducing interference).

UDE filed a petition for inter partes review of the '302 patent on December 28, 2018, challenging claims 1, 3–9, and 11–16 as obvious over various combinations of prior art references. In addition to its response, Pulse filed a contingent motion to amend in which it proposed substitute claims 17–23, corresponding to original claims 1, 9, 11, and 13–16, in the event that the Board found any of said original claims unpatentable.

After instituting inter partes review proceedings, the Board issued its final written decision on July 22, 2020, concluding that all of the original challenged claims were unpatentable. The Board granted the motion to amend with respect to substitute claims 18, 19, 22, and 23, but determined that substitute claims 17, 20, and 21 are indefinite. Pulse appeals as to original claims 1, 3–9, and 11–16

(i.e., all of the challenged original claims), as well as substitute claims 17, 20, and 21. UDE cross-appeals as to substitute claims 22 and 23.

DISCUSSION

I

Pulse contends that original claims 1, 3, 7, 9, and 13–16 are patentable because the Board erred in its construction of the term "effectively curved portion" appearing in those claims. We disagree.

Claim 1, which the Board found illustrative, reads as follows:

> A connector assembly comprising:
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> a connector housing comprising a connector having:
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> . . .
>
> a plurality of first conductors disposed . . . to form an electrical contact . . .
>
> . . .
>
> wherein at least a portion of said first conductors are substantially coplanar and each include an effectively curved portion, the effective radius of each said effectively curved portion being different for each of said first conductors.

'302 patent, col. 19, ll. 23–47.

The Board construed "effectively curved portion" as "any form of bend of the first conductors," finding that this interpretation is consistent with the term's plain meaning and that the specification does not define the term differently. J.A. 15–16.

Because UDE filed its petition for inter partes review after November 13, 2018, the *Phillips* claim construction

standard applies. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (codified at 37 C.F.R. § 42.100(b)). We exercise de novo review when, as here, the Board's claim construction does not rely on extrinsic evidence. *See SIPCO, LLC v. Emerson Elec. Co.*, 980 F.3d 865, 870 (Fed. Cir. 2020) (citing *AC Techs. S.A. v. Amazon.com, Inc.*, 912 F.3d 1358, 1365 (Fed. Cir. 2019)).

Pulse contends that the claim should be construed to limit the curvature to approximately 90 degrees, arguing that the figures in the specification support this definition and that the orientation of the substrate requires that the conductors curve at approximately 90 degrees. UDE responds that Pulse's construction would improperly limit the claim language by reference to embodiments in the specification.

We agree with the Board's claim construction. As UDE notes, the claim language itself does not limit the "effectively curved portion" to curvature of approximately 90 degrees, nor does it specify a particular orientation for arranging the substrates. As we have repeatedly held, it is improper "to import limitations from the specification into the claims." *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371–72 (Fed. Cir. 2014) (citing *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004)). Embodiments in the specification—even if there is only one embodiment—cannot limit the scope of the claims absent the patentee's "words or expressions of manifest exclusion or restriction." *Id.* at 1372 (quoting *Liebel-Flarsheim*, 358 F.3d at 906); *see also Info-Hold, Inc. v. Applied Media Techs. Corp.*, 783 F.3d 1262, 1267 (Fed. Cir. 2015) (explaining that an invention will only be limited to its preferred embodiment when "the patentee uses words that manifest a clear intention to restrict the scope of the claims to that embodiment"). Here, there are no such words; nothing in the claims or specification indicates that

the claims should be limited to the embodiments presented in the specification. The '302 patent demonstrates, moreover, that Pulse knew how to restrict angles to 90 degrees when it wanted to—and did not so limit the "effectively curved portion." *See* '302 patent, col. 20, ll. 14–16 (specifying "substantially orthogonal" placement of substrate relative to the front face of the connector housing); *id.* col. 20, ll. 32–35 (same); *id.* col. 21, ll. 1–3, 39–42 (same); *id.* col. 24, ll. 1–3 (same).

Pulse further argues that the internal structure of the connector *requires* the conductors to bend approximately 90 degrees. Pulse, however, has not demonstrated that the Board's construction would render the device inoperable. *See Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 904 F.3d 965, 972 (Fed. Cir. 2018) (citing *Ecolab, Inc. v. FMC Corp.*, 569 F.3d 1335, 1345 (Fed. Cir. 2009)) (noting impermissibility of an inoperable claim construction when the term admits of an operable construction). This argument therefore does not demonstrate that the Board's claim construction was erroneous.

We therefore affirm the Board's construction of the term "effectively curved portion" and its determination that claims 1, 3, 7, 9, and 13–16 are unpatentable.

Relatedly, Pulse argues that the terminals depicted in a prior art reference, U.S. Patent No. 6,179,668 ("Kan"), are "effectively parallel straight runs" and do not have different effective radii, thus failing to satisfy the claim limitation. *See* Appellant's Br. at 33–34; Kan fig. 3A. We find that the Board's characterization—that the terminals in this portion of Kan have different effective radii—is a factual determination supported by substantial evidence.

II

Pulse next argues that the Board erred in finding claims 6–8 obvious over two prior art references. We see no error in the Board's determination.

A patent claim is unpatentable "if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (pre-AIA).[1] Obviousness is a mixed question of law and fact. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). In reviewing the Board's determination on obviousness, we review the ultimate legal conclusion de novo and the underlying factual findings for substantial evidence. *Id.* (citing *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1280 (Fed. Cir. 2015)).

In relevant part, claim 6 (from which claims 7 and 8 depend) recites:

> A connector assembly comprising:
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> a connector housing comprising a connector having:
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> . . .
>
> at least one substrate having at least one electrically conductive pathway associated therewith;
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> . . .
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> wherein said at least one substrate is disposed in substantially vertical orientation within, and substantially orthogonal to the front of, said housing.

'302 patent, col. 19, l. 61–col. 20, l. 16.

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[1] Because the challenged claims of the '302 patent have an effective filing date before March 16, 2013, we apply the version of § 103 in effect before the adoption of the Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284 (2011). *See id.* § 3(n)(1), 125 Stat. at 293.

The Board determined that the vertical and orthogonal orientation of the substrate was obvious over the combination of Kan and U.S. Patent No. 4,225,209 ("Hughes"). Kan and Hughes—discussed in further detail below—are both directed to electric connectors. In its housing, Kan includes a circuit board with a substantially vertical orientation. Hughes, meanwhile, discloses a connector that can mount orthogonally to an external circuit board. Relying on expert testimony, the Board found that a person of ordinary skill in the art would have been motivated, in view of Hughes, to reorient the circuit board in Kan to achieve a vertical and orthogonal orientation (thereby also saving space in the connector).

Pulse argues that these references teach away from each other because circuit board in Hughes is mounted to the outside of the connector and would be too large to fit inside the connector housing. This does not foreclose the possibility, however, that a skilled artisan could take inspiration from the orientation of the external circuit board in Hughes and apply that insight to reorient the internal circuit board in Kan.

The Board's finding is supported by substantial evidence, and we see no error in its analysis. We therefore affirm the determination that claims 6–8 would have been obvious over the combination of Kan and Hughes. Similarly, we find no error in the Board's finding that the "multi-port connector assembly" in claims 9, 11, 12, and 16 of the '302 patent would have been obvious in light of Kan, Hughes, and a prior art reference directed to a multi-port connector assembly—viz., U.S. Patent No. 5,639,267 ("Loudermilk").

We have considered Pulse's remaining arguments regarding the original claims and find them unpersuasive.

III

Pulse finally argues that the Board erred by finding substitute claims 17, 20, and 21 indefinite. We agree.

Substitute claim 17 reads as follows:

> A connector assembly comprising:
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> a connector housing comprising a connector having:
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> . . .
>
> a plurality of first conductors . . . configured to form an electrical contact . . .
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> wherein at least a portion of said first conductors are substantially coplanar and each include a portion producing a desired effect of being curved by approximately 90 degrees . . . .

J.A. 593 (redline markup removed). Similarly, substitute claim 20 recites "a portion producing a desired effect of changing direction by approximately 90 degrees," *id.* at 598, and substitute claim 21 recites conductors that "include a portion producing a desired effect of being curved by approximately 90 degrees." *id.* at 599.

The Board found that a person of ordinary skill would understand the recited curves of approximately 90 degrees as "a term of degree including values near or equal to 90 degrees" (to account, e.g., for "manufacturing tolerances"). *Id.* at 60. The Board determined, however, that "the addition of 'producing a desired effect' adds ambiguity, and makes it impossible to define the metes and bounds of substitute claims 17, 20, and 21." *Id.* at 57. In the Board's view, because the specification does not define the "desired effect," the term "would be subject to much speculation" and "open to too much interpretation to be considered definite." *Id.* at 59.

A patent must describe the invention "in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same," and "shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶¶ 1–2 (pre-AIA).[2] The Supreme Court has interpreted "§ 112, ¶ 2 to require that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). That is, because claims "notify that public of what is within the protections of the patent, and what is not," claims must "be cast in clear—as opposed to ambiguous, vague, [or] indefinite—terms," to an appropriate degree of "reasonable precision in the use of language in the context of the circumstances." *In re Packard*, 751 F.3d 1307, 1313 (Fed. Cir. 2014).

"Indefiniteness, as a subset of claim construction, is a question of law which this court reviews without deference." *Id.* at 1311 (citing *Kinetic Concepts, Inc. v. Blue Sky Med. Grp., Inc.*, 554 F.3d 1010, 1022 (Fed. Cir. 2009)).

The Board erred in finding that the term "a desired effect" renders substitute claims 17, 20, and 21 indefinite. The "desired effect" has a clear objective meaning: that the conductors curve or change direction by approximately 90 degrees. No "speculation" is necessary to understand "the desired effect"; the term is merely an instance of inartful surplusage rather than a fatal ambiguity. While we generally disfavor claim constructions resulting in surplus language, we have also recognized that "surplusage may exist in some claims." *ERBE Elektromedizin GmbH v. Canady*

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[2] Because the '302 patent was filed before the adoption of the AIA, the prior version of § 112 governs. *See* AIA § 4(e), 125 Stat. at 297.

Tech. LLC, 629 F.3d 1278, 1286 (Fed. Cir. 2010) (citing *Pickholtz v. Rainbow Tech., Inc.*, 284 F.3d 1365, 1373 (Fed. Cir. 2002) (concluding that the word "system" was surplusage when the patent at issue used "computer" and "computer system" interchangeably with no indication of a difference in meaning)). Because the "desired effect" is objectively restricted to curvature "near or equal to 90 degrees," *see* J.A. 60, substitute claims 17, 20, and 21 are not indefinite. The Board's determination to the contrary is reversed.

IV

In its cross-appeal, UDE argues that the Board erred by finding that substitute claims 22 and 23 are not rendered obvious by the combination of Kan and Hughes. We see no error in the Board's determination.

Substitute claims 22 and 23 recite a "connector assembly" in which several "first conductors" (or "first conductor means") include a portion in which the conductors change direction by approximately 90 degrees, such that the bent portion of each conductor has a different "effective radius." J.A. 599–602.

Before the Board, UDE argued that substitute claims 22 and 23 were obvious over (1) Kan alone, and (2) Kan in combination with Hughes. According to UDE, it would be obvious to modify Kan in view of Hughes to achieve the claimed bend of 90 degrees.

Kan is directed to an electric connector with an internal circuit board (to enable functionality such as processing input signals and preventing crosstalk) and "curved contacts." Kan, Abstract; col. 1, ll. 6–11, 29–35. In particular, Kan includes a set of terminals that run horizontally through a terminal board, in which the terminals are spaced out by curving away from one another. *See id.*, figs. 1, 3A. The terminals then bend downward by about 90 degrees, protruding out of the terminal board, and then

continue to curve back underneath the terminal board. *Id.*, fig. 3B.

Hughes discloses a type of phone jack that can be plugged into a receptacle; the receptacle can in turn be orthogonally mounted to a circuit board. This is enabled by the plurality of conductors in the receptacle, which are "bent laterally . . . through an angle of 90 degrees." *See* Hughes, col. 3, ll. 42–44; *see also id.*, figs. 1, 3. The ends of the conductors extend through the side wall of the receptacle so that they can be soldered into a circuit board mounted on the side of the receptacle. *See id.*, col. 3, ll. 56–59; col. 4, ll. 11–13; fig. 1.

The Board determined that substitute claims 22 and 23 would not have been obvious over Kan alone. The Board noted that the "first conductors" in the substitute claims must have "portions" that *both* produce a net change in direction of approximately 90 degrees *and* have different effective radii. The Board found that the terminals in Kan fail to teach that combination—i.e., while Figures 1 and 2 of Kan depict a 90-degree bend in the terminals, and Figure 3A depicts the terminals as having different effective radii, the 90-degree bend and the different radii are found in separate portions of the terminals. *See* J.A. 62–63 (citing Kan, figs. 1, 2, 3A). Thus, Kan does not depict terminals in which *the same* portion is bent 90 degrees with different effective radii.

The Board also rejected UDE's argument (the only argument UDE presses on appeal) that the orthogonal connection taught in Hughes could be combined with Kan to produce a change in direction of 90 degrees. The Board found no motivation to combine Kan and Hughes to "rearrange the conductors" and "meet the limitations of proposed substitute claims 22 and 23." J.A. 63. As such, the Board determined that the combination of Kan and Hughes did not render substitute claims 22 and 23 obvious.

Substantial evidence supports the Board's decision. Pulse's expert testified that a skilled artisan would not have been motivated to combine Kan and Hughes, given the substantial differences between the two prior art connectors. This evidence supports a finding that a skilled artisan would not have combined the terminals in Kan with the orthogonal bend in Hughes to create the structure of the conductors recited in substitute claims 22 and 23.

UDE also argues that the Board's finding that substitute claims 22 and 23 are not obvious over the combination of Kan and Hughes is inconsistent with its finding that this combination renders claims 6–8 obvious. With respect to claims 6–8, however, the Board was discussing a different aspect the prior art—finding a motivation to reorient Kan's internal circuit board in view of Hughes. The fact that the references could be combined for one purpose does not require that they would necessarily be combined for another purpose.

We therefore affirm the Board's decision to grant the motion to amend with respect to substitute claims 22 and 23.

AFFIRMED IN PART AND REVERSED IN PART

COSTS

No costs.