United States Court of Appeals for the Federal Circuit

REALTIME DATA, LLC, DBA IXO,
Appellant

v.

ANDREI IANCU, UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE,
Intervenor

2018-1154

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2016-00783.

Decided: January 10, 2019

KAYVAN B. NOROOZI, Noroozi PC, Santa Monica, CA, argued for appellant.

SARAH E. CRAVEN, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, argued for intervenor. Also represented by THOMAS W. KRAUSE, JOSEPH MATAL, FARHEENA YASMEEN RASHEED.

Before DYK, TARANTO, and STOLL, *Circuit Judges.*

STOLL, *Circuit Judge.*

Hewlett Packard Enterprise Co., HP Enterprise Services, LLC, and Teradata Operations, Inc. (collectively, "HP") sought inter partes review of claims 1–4, 8, 14–17, 21, and 28 of U.S. Patent No. 6,597,812 (the '812 patent) before the U.S. Patent and Trademark Office's Patent Trial and Appeal Board. The Board instituted review and, in its final written decision, found that all of the challenged claims would have been obvious over the prior art. Realtime Data, LLC, owner of the '812 patent, appeals the Board's decision. We affirm.

BACKGROUND

I

The '812 patent discloses "[s]ystems and methods for providing lossless data compression and decompression . . . [that] exploit various characteristics of run-length encoding, parametric dictionary encoding, and bit packing." '812 patent Abstract. Run-length encoding is a form of lossless data compression where a "run" of characters is replaced with an identifier for each individual character and the number of times it is repeated. For example, using run-length encoding, the input string AAABBBBBBCCCCAA could be represented as 3A6B4C2A, which contains seven fewer characters.

Dictionary encoding is a form of lossless data compression that assigns a code word to a particular data string, maps that code word to an index, and replaces every matching data string with the corresponding code word. For example, the same input string described above could be assigned the code word "EASY123," which contains eight fewer characters. This assignment would be mapped into an index, or dictionary, so that every time the input string AAABBBBBBCCCCAA appeared, it would be replaced with EASY123.

Claim 1, which combines run-length and dictionary encoding techniques, is illustrative of the challenged claims:

> 1. A method for compressing input data comprising a plurality of data blocks, the method comprising the steps of:
>
> > detecting if the input data comprises a run-length sequence of data blocks;
> >
> > outputting an encoded run-length sequence, if a run-length sequence of data blocks is detected;
> >
> > maintaining a dictionary comprising a plurality of code words, wherein each code word in the dictionary is associated with a unique data block string;
> >
> > building a data block string from at least one data block in the input data that is not part of a run-length sequence;
> >
> > searching for a code word in the dictionary having a unique data block string associated therewith that matches the built data block string; and
> >
> > outputting the code word representing the built data block string.

Id. at col. 16 l. 53–col. 17 l. 2.

Claim 4 is relevant to the claim construction dispute raised by Realtime on appeal. The claim further limits the "maintaining a dictionary" step and reads as follows:

> 4. The method of claim 1, wherein the step of maintaining a dictionary comprises the steps of:
>
> > dynamically generating a new code word corresponding to a built data block string,

> if the built data block string does not match a unique data block string in the dictionary; and
>
> adding the new code word in the dictionary.

Id. at col. 17 ll. 17–23.

II

In April 2016, HP petitioned for inter partes review of the '812 patent, alleging that claims 1–4, 8, 14–17, 21, and 28 would have been obvious under 35 U.S.C. § 103(a).[1] In particular, HP argued that claims 1–4, 8, and 28 would have been obvious over U.S. Patent No. 4,929,946 ("O'Brien") in view of Nelson, a data compression textbook,[2] and that claims 14–17 and 21 would have been obvious over O'Brien in view of Nelson and U.S. Patent No. 4,558,302 ("Welch").

With respect to independent claim 1, HP argued that O'Brien disclosed the preamble, the "detecting" step, and the first "outputting" step, and that O'Brien and Nelson both individually disclosed the "maintaining" step, the "building" step, the "searching" step, and the second "outputting" step. For the "maintaining" and "searching" steps, HP clarified that even though O'Brien did not use the specific claim term "dictionary," a person of ordinary

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[1] Because the issue date of the '812 patent is July 22, 2003, and neither the '812 patent nor the application from which it issued ever contained a claim with an effective filing date on or after March 16, 2013, the version of 35 U.S.C. § 103 that applies here is the one preceding the changes made by the America Invents Act. See Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284, 293, § 3(n) (2011).

[2] Mark Nelson, *The Data Compression Book* (1992).

skill in the art "would have recognized this and known, as taught in Nelson, that O'Brien's string compression is a dictionary algorithm." Pet. Requesting Inter Partes Review, *SAP Am. Inc. et al. v. Realtime Data LLC*, IPR2016-00783, Paper 1 at 41 (P.T.A.B. Apr. 1, 2016).

In its response, Realtime conceded that O'Brien's string compression was, in fact, dictionary encoding as required by the claims. Instead of challenging O'Brien's teaching of dictionary encoding, Realtime primarily focused its response on the "maintaining" step. Specifically, Realtime argued that O'Brien did not disclose "maintaining a dictionary" because O'Brien generates a new dictionary for each data segment, while the '812 patent processes an input data stream through a single dictionary that resets to its initial state only when full. Realtime also argued that HP presented insufficient evidence of a motivation to combine O'Brien and Nelson, and that HP attempted instead to sidestep this requirement by arguing Nelson as an alternative to O'Brien. As Realtime noted, "[i]ndeed, Petitioner and its declarant allege O'Brien in fact discloses *all* of the limitations of *all* claims challenged in Ground 1." Patent Owner Resp., *Hewlett-Packard Enter. Co. v. Realtime Data LLC*, IPR2016-00783, Paper 29 at 44 (P.T.A.B. Jan. 5, 2017) (emphasis in original).

The Board agreed with Realtime's statement, finding that O'Brien discloses the "maintaining a dictionary" limitation and every other limitation in independent claim 1. While recognizing that there was a dispute as to the construction of the phrase "maintaining a dictionary," the Board determined that no construction was necessary as O'Brien taught every step for "maintaining a dictionary" identified in dependent claim 4. The Board also determined that O'Brien teaches the limitations of claims 1–4, 8, and 28.

The Board next addressed why "a person having ordinary skill in the art would have had to turn to Nelson after reading O'Brien when O'Brien allegedly teaches all the limitations of all claims challenged in Ground 1." *Hewlett-Packard Enter. Co. v. Realtime Data LLC*, IPR2016-00783, 2017 WL 4349409, at *9 (P.T.A.B. Sept. 28, 2017). The Board noted that HP's primary obviousness argument established only that "Nelson makes clear that O'Brien's string encoding . . . is dictionary-based encoding" without using Nelson for the disclosure of a particular claim limitation. *Id.* at *12. According to the Board, HP's other argument—that it would have been obvious to a person of ordinary skill in the art to substitute Nelson's dictionary compression techniques with O'Brien's string compression—was an "argument[] in the alternative." *Id.*

Even though the Board agreed with HP's primary obviousness argument—that O'Brien alone teaches every limitation in claims 1–4, 8, and 28—the Board nevertheless addressed the question of motivation to combine O'Brien in view of Nelson. The Board compared the compression techniques in O'Brien and Nelson and found that they "share striking similarities." *Id.* at *11. The Board also found that O'Brien "suggests that a wide variety of adaptive compression algorithms could be used and encourages a person having ordinary skill in the art to turn to 'well known' algorithms such as Nelson's algorithms for techniques of performing string compression in O'Brien's system, which would be a simple substitution yielding predictable results." *Id.* Thus, the Board concluded, "Petitioner has established by a preponderance of the evidence that a person having ordinary skill in the art would have been motivated to turn to Nelson after reading O'Brien even though O'Brien teaches all the limitations of all claims challenged in ground 1." *Id.* at *12.

As to claims 14–17 and 21, the Board found that Welch taught the additional limitation that a software

program be used to implement the claimed method. *Id.* at *21. Consequently, the Board held that claims 1–4, 8, and 28 would have been unpatentable under 35 U.S.C. § 103 in view of O'Brien alone, or alternatively, in further view of Nelson, and claims 14–17 and 21 would have been unpatentable under 35 U.S.C. § 103 in view of O'Brien, Nelson, and Welch. Realtime appeals. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

Realtime makes two primary arguments on appeal: (1) that the Board erred in its determination that a person of ordinary skill in the art would have been motivated to combine the teachings of O'Brien and Nelson; and (2) that the Board erred by failing to construe the "maintaining a dictionary" limitation and in finding that O'Brien disclosed the "maintaining a dictionary" limitation. We address these issues in turn.

I

An invention cannot be patented, "though the invention is not identically disclosed or described as set forth in section 102," if, at the time of the invention, the differences between the claimed invention and the prior art would have rendered the claimed invention "obvious" to a person of ordinary skill in the art. 35 U.S.C. § 103(a). We have long held that when a party claims that a combination of references renders a patented invention obvious, the "factfinder must further consider the factual questions of whether a person of ordinary skill in the art would be motivated to combine those references." *Dome Patent L.P. v. Lee*, 799 F.3d 1372, 1380 (Fed. Cir. 2015); *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) ("[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art."). This requirement is necessary because "claimed discoveries almost of necessity will be combinations of what, in some sense, is

already known," and the mere existence of independent elements in the prior art does not in itself foreclose the possibility of an inventive combination. *KSR*, 550 U.S. at 418–19.

Here, HP's primary argument to the Board was that all of the elements of claims 1–4, 8, and 28 were disclosed in O'Brien, a single reference. HP relied on Nelson simply to demonstrate that a person of ordinary skill in the art would have understood that the string compression disclosed in O'Brien was, in fact, a type of dictionary encoder, the terminology used in the '812 patent. As both the Board and Realtime recognized, HP also argued *in the alternative* that Nelson disclosed some of the elements in the claims at issue.

We conclude that, in this case, the Board was not required to make any finding regarding a motivation to combine given its reliance on O'Brien alone. Certainly, had the Board relied on HP's alternative argument, HP would have been required to demonstrate a sufficient motivation to combine the two references. In its primary argument, however, HP relied on Nelson merely to explain that O'Brien's encoder is a type of dictionary encoder. In addition, Realtime conceded the point HP sought to use Nelson to prove: that O'Brien disclosed a dictionary encoder. *See Hewlett-Packard*, 2017 WL 4349409, at *5 ("At the outset, we note that Petitioner, Patent Owner, and their respective declarants all agree that O'Brien's encoder is a type of dictionary encoder.").

Under these circumstances, the Board was free to come to the very conclusion it reached: that O'Brien alone disclosed every element of claims 1–4, 8, and 28. And because the Board did not rely on Nelson for the disclosure of a particular element or teaching, the Board had no obligation to find a motivation to combine O'Brien and Nelson. While Realtime argues that the use of O'Brien as a single anticipatory reference would have been more

properly raised under § 102, it is well settled that "a disclosure that anticipates under § 102 also renders the claim invalid under § 103, for 'anticipation is the epitome of obviousness.'" *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) (quoting *In re Fracalossi*, 681 F.2d 792, 794 (CCPA 1982)); *cf. Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1278 n.3 (Fed. Cir. 2017) (noting the Board's conclusion that a prior art reference rendered certain claims obvious "by virtue of its anticipation of them"). The Board therefore did not err when it concluded that claim 1 was invalid under § 103 based on O'Brien alone.

For this same reason, we are not persuaded by Realtime's argument that the Board violated 35 U.S.C. § 312(a)(3) or other notice requirements by relying on O'Brien alone. Section 312(a)(3) requires a petition to identify "in writing and with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim." § 312(a)(3). And we have held that the Board may not rely on a basis for decision unless the party adversely affected by such reliance had notice of the basis and an adequate opportunity to address it. *See SAS Inst. Inc. v. ComplementSoft, LLC*, 825 F.3d 1341, 1351–52 (Fed. Cir. 2016) (citing authorities), *rev'd on other grounds*, *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348 (2018).

HP's petition identified O'Brien as disclosing every element of claim 1. The sole purpose for which HP relied on Nelson, to demonstrate that O'Brien disclosed a dictionary encoder, was conceded by Realtime. Realtime cannot now argue that its own admissions, which obviated the need for any of Nelson's teachings, deprived it of notice or otherwise foreclosed HP from arguing obviousness based on O'Brien's disclosures without Nelson. The Board's decision rested solely on the arguments and grounds proffered by HP in its petition, for which Realtime both

had notice and the opportunity to respond. Accordingly, we conclude that the Board did not violate § 312(a)(3) or other notice requirements.

In any event, even if the Board were required to make a finding regarding a motivation to combine O'Brien with Nelson, its finding in this case is supported by substantial evidence.[3] A motivation to combine may be found "explicitly or implicitly in market forces; design incentives; the 'interrelated teachings of multiple patents'; 'any need or problem known in the field of endeavor at the time of invention and addressed by the patent'; and the background knowledge, creativity, and common sense of the person of ordinary skill." *ZUP, LLC v. Nash Mfg., Inc.*, 896 F.3d 1365, 1371 (Fed. Cir. 2018) (quoting *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1343, 1354 (Fed. Cir. 2013)). The Board specifically noted that HP "brings in Nelson to provide a more explicit teaching of 'dictionary,'" *Hewlett-Packard*, 2017 WL 4349409, at *13, and that the motivation to combine was premised on "the rationale a person having ordinary skill in the art would have had to turn to Nelson after reading O'Brien when O'Brien allegedly teaches all the limitations of all claims challenged in Ground 1," *id.* at *9. The Board found that a person of ordinary skill in the art would have looked to Nelson because Nelson is "well known," the compression techniques taught in Nelson that were described as dictionary encoders "share striking similarities" to O'Brien's compression techniques, and O'Brien itself "suggests that a wide variety of adaptive compression algorithms could be used and encourages a person having ordinary skill in the art to turn to 'well known' algorithms such as Nelson's."

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[3] We limit our review to HP's primary obviousness argument, which uses O'Brien to disclose every element of claims 1–4, 8, and 28 and Nelson to demonstrate that O'Brien teaches a dictionary encoder.

Id. at *11. This is enough evidence to support a finding that a person of ordinary skill in the art would have turned to Nelson, a well-known data compression textbook, to better understand or interpret O'Brien's compression algorithms.

II

We now turn to whether the Board erred in finding that O'Brien disclosed the "maintaining a dictionary" limitation in independent claim 1. Realtime argues that the Board erroneously failed to construe the term "maintaining a dictionary" to include the requirement that the dictionary be retained during the entirety of the data compression unless and until the number of entries in the dictionary exceeds a predetermined threshold, in which case the dictionary is reset.

We review the ultimate question of the proper construction of a patent de novo, with any underlying fact findings reviewed for substantial evidence. *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 838 (2015); *Praxair Distrib., Inc. v. Mallinckrodt Hosp. Prods. IP Ltd.*, 890 F.3d 1024, 1031 (Fed. Cir. 2018) (citing *HTC Corp. v. Cellular Commc'ns Equip., LLC*, 877 F.3d 1361, 1367 (Fed. Cir. 2017)). While the words of a claim "are generally given their ordinary and customary meaning," a claim term is read "not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). Those claim construction principles are important even in an inter partes review proceeding like this one, in which the claims were properly given the "broadest reasonable interpretation" con-

sistent with the specification.[4] *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1279 (Fed. Cir. 2015), *aff'd sub nom. Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131 (2016). The Board is required to construe "only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy." *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

The Board did not expressly construe the phrase "maintaining a dictionary," but found that O'Brien satisfied this limitation because it disclosed all of the steps in dependent claim 4. As noted above, claim 4 depends from claim 1 and recites:

> 4. The method of claim 1, wherein the step of maintaining a dictionary comprises the steps of:
>
> > dynamically generating a new code word corresponding to a built data block string, if the built data block string does not match a unique data block string in the dictionary; and
> >
> > adding the new code word in the dictionary.

'812 patent col. 17 ll. 17–23. In other words, the Board found that the steps outlined in dependent claim 4 were sufficient to satisfy the "maintaining a dictionary" limitation in independent claim 1.

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[4] This standard has recently changed. For petitions filed on or after November 13, 2018, the Board will apply the *Phillips* claim construction standard. *See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51340 (Oct. 11, 2018) (to be codified at 37 C.F.R. pt. 42).

The Board's interpretation is supported by both the claim language itself and the specification. The term "maintaining a dictionary" is not defined in claim 1, and dependent claim 4 is the first of the claims to lend meaning to the phrase. More tellingly, the language of claim 4 directly mimics the portion of the specification that teaches that:

> *the dictionary is dynamically maintained and updated during the encoding process by* generating a new code word corresponding to a built data block string, if the built data block string does not match a unique data block string in the dictionary; and then adding the new code word in the dictionary.

Id. at col. 3 ll. 31–36 (emphasis added). This passage, with its "by" language, strongly suggests that the steps outlined in claim 4 are one way of "maintaining a dictionary," as the Board concluded.

Realtime does not contest that O'Brien discloses these steps, but instead argues that because the claim recites the word "comprising," it does not foreclose the possibility of additional unstated limitations in the interpretation of "maintaining a dictionary." Realtime notes that "'[c]omprising' is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim." *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997). Thus, Realtime argues, the Board erred by failing to consider its proposed construction, which would add further requirements to satisfy the "maintaining a dictionary" limitation.

The word "comprising" does not mean that the claim can be read to require additional unstated elements, only that adding other elements to the device or method is not incompatible with the claim. *Id.* Realtime points to no law undermining the Board's view in this case that the

claim elements introduced in dependent claim 4 with "comprising" language are properly understood as giving details sufficient to constitute a particular embodiment of the more general "maintaining a dictionary" term of independent claim 1. That view, as already noted above, is strongly supported by the specification.

Realtime's other arguments in support of its proposed construction do not alter our conclusion. Realtime points to the portion of the specification that teaches that "[i]n yet another aspect of the present invention, the dictionary is initialized during the encoding process if the number of code words (e.g., dictionary indices) in the dictionary exceeds a predetermined threshold." '812 patent col. 3 ll. 37–40. We note that the specification contemplates initializing (starting a new dictionary) only as a possible embodiment. Nowhere does the specification state or imply that this step is a mandatory part of the step of "maintaining a dictionary." This is confirmed by dependent claim 5, which states:

> 5. The method of claim 4, wherein the step of maintaining the dictionary further comprises the step of initializing the dictionary if the number of code words exceeds a predetermined threshold.

Id. at col. 17 ll. 24–27. The fact that claim 5 "further" adds this step indicates that this step was neither a necessary element of claim 4 nor required in the step of "maintaining a dictionary" in independent claim 1. *See Phillips*, 415 F.3d at 1315 ("[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim."). Because the intrinsic evidence does not support Realtime's proposed construction, Realtime has not demonstrated that the Board committed legal error by failing to adopt it.

CONCLUSION

We conclude that the Board did not err in concluding that the claims would have been obvious in view of a single reference. Additionally, the Board did not err in finding that O'Brien disclosed the "maintaining a dictionary" limitation in independent claim 1. We therefore affirm.

AFFIRMED