United States Court of Appeals for the Federal Circuit

VIRTEK VISION INTERNATIONAL ULC,
Appellant

v.

ASSEMBLY GUIDANCE SYSTEMS, INC., DBA ALIGNED VISION,
Cross-Appellant

2022-1998, 2022-2022

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2021-00062.

Decided: March 27, 2024

JACOB DANIEL KOERING, Miller, Canfield, Paddock & Stone, PLC, Chicago, IL, argued for appellant. Also represented by GREGORY D. DEGRAZIA, ANITA CARLA MARINELLI, Detroit, MI.

WILLIAM ERIC HILTON, Gesmer Updegrove LLP, Boston, MA, argued for cross-appellant. Also represented by TODD A. GERETY.

Before MOORE, *Chief Judge*, HUGHES and STARK, *Circuit Judges*.

MOORE, *Chief Judge*.

Virtek Vision International ULC (Virtek) appeals an *inter partes* review final written decision of the Patent Trial and Appeal Board holding claims 1, 2, 5, 7, and 10–13 of U.S. Patent No. 10,052,734 are unpatentable. Assembly Guidance Systems, Inc. d/b/a Aligned Vision (Aligned Vision) cross-appeals the Board's holding that Aligned Vision failed to prove claims 3, 4, 6, 8, and 9 of the '734 patent are unpatentable. We reverse as to the appeal and affirm as to the cross-appeal.

BACKGROUND

Virtek owns the '734 patent, which discloses an improved method for aligning a laser projector with respect to a work surface. '734 patent at 1:15–19. Lasers are often used to project a template image onto a work surface to direct manufacturing processes. *Id.* at 1:23–28. To accurately project the template onto a three-dimensional work surface, there must be "precise calibration of the relative position between the work surface and the laser projector." *Id.* at 1:35–38. In other words, the laser projector must be aligned. In the prior art, laser projectors would be aligned "by locating reflective targets on the work surface, measuring the target coordinates relative to a three-dimensional coordinate system of the work surface, and then locating the position of the projector relative to the work surface." *Id.* at 1:38–52. This scanning process is periodically stopped "to check for variation in the projected pattern location due to a change in the position of the projector relative to the tool." *Id.* at 1:44–49. If any variation is detected, the targets are relocated and the laser projector must be realigned, rendering the process "slow and inefficient." *Id.* at 1:49–57.

In light of these deficiencies, the '734 patent discloses an improved two-part alignment method. *Id.* at 1:66–2:29.

In the first step, a secondary (i.e., non-laser) light source flashes a light onto the work surface to determine the pattern of targets on the work surface. *Id.* at 2:2–9, 3:52–56, 4:14–35. In the second step, a laser beam scans the targets as directed by the identified pattern and calculates the precise location of the targets to direct the laser projector where to project the laser template image. *Id.* at 2:9–15, 4:35–57. Claim 1, the only independent claim in the '734 patent, recites:

> 1. A method for aligning a laser projector for projecting a laser image onto a work surface, comprising the steps of:
>
> providing a laser projector assembly with a laser source for projecting a laser image onto a work surface, a secondary light source for illuminating the work surface, a photogrammetry device for generating an image of the work surface, and a laser sensor for sensing a laser beam;
>
> affixing reflective targets onto the work surface;
>
> transmitting light from the secondary light source toward the work surface and reflecting light toward the photogrammetry device from the reflective targets thereby *identifying a pattern of the reflective targets on the work surface in a three dimensional coordinate system*; and
>
> *after identifying the pattern of the reflective targets on the work surface in the three dimensional coordinate system*, scanning the targets with a laser beam generated by the laser source as directed by the identified pattern of the reflective targets for reflecting the laser beam toward the laser sensor and calculating a precise location of the

> targets from the reflected laser beam for directing the laser projector where to project the laser image onto the work surface.

Id. at 5:35–6:4 (emphases added).

Aligned Vision petitioned for *inter partes* review of all claims of the '734 patent, asserting four grounds of unpatentability. Specifically, Aligned Vision argued claims 1, 2, 5, 7, and 10–13 would have been obvious over Keitler and Briggs (Ground 1), and over Briggs and Bridges (Ground 3). It also argued claims 3–6 and 8–12 would have been obvious over Keitler, Briggs, and '094 Rueb (Ground 2), and over Briggs, Bridges, and '094 Rueb (Ground 4).

The Board instituted and issued a final written decision holding claims 1, 2, 5, 7, and 10–13 unpatentable and claims 3, 4, 6, 8, and 9 not unpatentable. *Assembly Guidance Sys., Inc. v. Virtek Vision Int'l ULC*, No. IPR2021-00062, 2022 WL 1463734 (P.T.A.B. May 6, 2022) (*Decision*). The Board held Aligned Vision had proven unpatentability based on Grounds 1 and 3 but failed to prove unpatentability based on Grounds 2 and 4. *Id.* at *7–24. Virtek appeals and Aligned Vision cross-appeals. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

Obviousness is a question of law based on underlying facts. *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1326 (Fed. Cir. 2016). We review the Board's ultimate determination of obviousness de novo and its underlying findings of fact for substantial evidence. *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 991 (Fed. Cir. 2017). Whether a skilled artisan would have been motivated to combine prior art references is a question of fact. *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1364 (Fed. Cir. 2015).

I. GROUNDS 1 AND 3

In the primary appeal, Virtek challenges the Board's determinations that claims 1, 2, 5, 7, and 10–13 would have

been obvious over Keitler and Briggs (Ground 1), and over Briggs and Bridges (Ground 3). Virtek argues the Board's findings that a skilled artisan would have been motivated to combine Keitler and Briggs (Ground 1), and Briggs and Bridges (Ground 3) are not supported by substantial evidence. We agree.

Claim 1 recites "identifying a pattern of the reflective targets on the work surface in a three dimensional coordinate system." *See* '734 patent at 5:47–52. Neither Keitler (Ground 1) nor Bridges (Ground 3) discloses identifying targets in a *3D coordinate system* as claimed. Instead, both references disclose determining an angular direction of each target. J.A. 707–08 ¶ 80 (Keitler); J.A. 737 at 17:20–39 (Bridges). Aligned Vision relied on Briggs' disclosure of determining the 3D coordinates of targets to supply this missing element for both Grounds 1 and 3. J.A. 194–96, 214–16 (Petition).

With respect to both grounds, the Board found a skilled artisan would have been motivated to use the 3D coordinate system disclosed in Briggs instead of the angular direction systems in Keitler or Bridges. *Decision*, 2022 WL 1463734, at *9, *18–19. The Board reasoned this combination would have been obvious to try because Briggs discloses both 3D coordinates and angular directions. *Id.*

We conclude that the Board erred as a matter of law with regard to the motivation to combine. It does not suffice to meet the motivation to combine requirement to recognize that two alternative arrangements such as an angular direction system using a single camera and a 3D coordinate system using two cameras were both known in the art. Briggs discloses a laser projector system with different embodiments of laser tracker systems—one that uses two cameras to determine the 3D coordinates of a target, J.A. 757 ¶ 49, and another that uses one camera to determine angular measurements of a target, J.A. 758 ¶ 51. Briggs discloses these two measurement options "may be applied to any computer controlled aiming system." J.A.

754 ¶ 42. These disclosures, however, do not provide any reason why a skilled artisan would use 3D coordinates instead of angular directions in a system. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) ("[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.").

The mere fact that these possible arrangements existed in the prior art does not provide a reason that a skilled artisan would have substituted the one-camera angular direction system in Keitler and Bridges with the two-camera 3D coordinate system disclosed in Briggs. There was no argument in the petition regarding why a skilled artisan would make this substitution—other than that the two different coordinate systems were "known to be used." J.A. 194–96, 214–16. The petition does not argue Briggs articulates any reason to substitute one for another or any advantages that would flow from doing so. Nor does Dr. Mohazzab, Aligned Vision's expert, articulate any reason why a skilled artisan would combine these references. In his declaration, he testified "it would have been obvious" to use the 3D coordinates instead of angular measurements because "both such measurement systems were known." J.A. 815 ¶ 51; J.A. 837 ¶ 93.[1] Moreover, he stated eleven

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[1] The parties appear to dispute whether the Board relied on Dr. Mohazzab's declaration in support of its motivation to combine findings. *See* Oral Arg. at 3:31–4:50, 13:38–57, 23:55–24:57, https://oralarguments.cafc.uscourts.gov/default.aspx?fl=22-1998_12052023.mp3. The Board explained that its motivation to combine findings were based on "the support provided in the Petition." *Decision*, 2022 WL 1463734, at *9 (citing J.A. 194–96); *id.* at *19 (citing J.A. 210, 215–16). There is no dispute the petition relied upon Dr. Mohazzab's declaration. J.A. 194–96, 210, 215–16; Oral Arg. at 4:12–20.

times that he did not provide any reason to combine the references in his expert declaration. *See* Mohazzab Dep. Tr. at 53:15–20 (testifying "I'm not sure I can find" a reason to combine Briggs and Keitler in declaration), 89:24–90:5 (testifying "I do not state any reasons" to combine Bridges and Briggs in declaration), 56:6–10, 59:25–60:21, 62:1–5, 62:12–16, 64:1–11, 65:4–11, 88:25–89:4, 91:19–24, 93:9–14; *cf. id.* at 55:15–17 (testifying "[y]ou don't have to combine" Keitler and Briggs), 88:11–89:15 (testifying Briggs "[d]oesn't need to be combined" with Bridges).[2]

KSR provides an important understanding of the circumstances in which limitations from different references can be combined to conclude that a claimed invention would have been obvious. In *KSR*, the Supreme Court explained, "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). "If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense." *Id.* *KSR* did not do away with the requirement that there must exist a motivation to combine various prior art references in order for a skilled artisan to make the claimed invention.

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[2] Virtek appeals the Board's denial of its motion to exclude Dr. Mohazzab's expert declaration. We need not decide whether the Board abused its discretion in declining to exclude the declaration because the conclusory assertions in Dr. Mohazzab's declaration do not provide substantial evidence for finding a motivation to combine.

Here, there was no argument about common sense in the petition or in Dr. Mohazzab's declaration.[3] *See* J.A. 194–96, 214–16; J.A. 815 ¶ 51; J.A. 837 ¶ 93. There was no evidence that there are a finite number of identified, predictable solutions. There is no evidence of a design need or market pressure. In short, this case involves nothing other than an assertion that because two coordinate systems were disclosed in a prior art reference and were therefore "known," that satisfies the motivation to combine analysis. That is an error as a matter of law. It does not suffice to simply be known. A reason for combining must exist.

For the foregoing reasons, we conclude substantial evidence does not support the Board's motivation to combine findings for both Grounds 1 and 3. We reverse the Board's obviousness determination with respect to claims 1, 2, 5, 7, and 10–13 of the '734 patent.

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[3] Dr. Mohazzab attempted to present an argument about common sense during his deposition. *See, e.g.*, Mohazzab Dep. Tr. at 154:5–16 (testifying "the person who is skilled in the art would have all the knowledge around this, this technique[] to put them together and make a system" and "would know, specifically, as a matter of choice, what kind of design to choose"). Even assuming Dr. Mohazzab articulated a sufficient motivation to combine at his deposition, a petitioner may not, in its reply and accompanying expert declaration, rely "on an entirely new rationale to explain why one of skill in the art would have been motivated to combine." *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016). The same restriction must apply to expert depositions that take place after the service of the reply and declaration. Moreover, neither party has argued the Board's motivation to combine findings are supported by Dr. Mohazzab's deposition testimony.

II. GROUNDS 2 AND 4

In its cross-appeal, Aligned Vision challenges the Board's determinations that it failed to prove dependent claims 3, 4, 6, 8, and 9 would have been obvious over Keitler, Briggs, and '094 Rueb (Ground 2), and over Briggs, Bridges, and '094 Rueb (Ground 4).[4] In its petition, Aligned Vision argued '094 Rueb disclosed the additional limitations in the dependent claims. *See, e.g.*, J.A. 205–06 (pointing to '094 Rueb as disclosing a camera with a multi megapixel sensor as recited in claim 3). The Board found Aligned Vision failed to show a motivation to combine '094 Rueb with the remaining references. *Decision*, 2022 WL 1463734, at *17–18.

Aligned Vision argues the Board's finding of no motivation to combine is not supported by substantial evidence. According to Aligned Vision, because the additional elements in the dependent claims are disclosed in '094 Rueb and are used for their intended purposes, a skilled artisan would have been motivated to combine the references as a matter of "common sense."

Aligned Vision never argued before the Board that it would have been common sense to combine the references as claimed. Nor did it offer any evidence regarding common sense. Aligned Vision's argument, both before the Board and on appeal, is instead grounded in the fact that the claim elements are known in the prior art. *See, e.g.*, J.A. 445–46 (Petitioner's Reply) (arguing the dependent claim elements "were commonly known and would have been obvious to combine as indicated"). But this alone does not show a motivation to combine. *See KSR*, 550 U.S. at 418 ("[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements

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[4] Aligned Vision raises the same arguments with respect to Grounds 2 and 4. For simplicity, we address Ground 2 as representative.

was, independently, known in the prior art. . . . [I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.").

The only evidence presented by Aligned Vision in support of a motivation to combine was the testimony of Dr. Mohazzab. With respect to claim 3, Dr. Mohazzab testified '094 Rueb discloses a camera with a multi megapixel sensor and a skilled artisan "would also have known to use a camera with a multi megapixel sensor in mid-2016." J.A. 825–26 ¶ 72. This conclusory testimony fails to address why or whether a skilled artisan would have been motivated to combine the camera disclosed in '094 Rueb with Keitler and Briggs. Aligned Vision similarly failed to present any evidence as to why a skilled artisan would have been motivated to combine the teachings of '094 Rueb with the other references to meet the subject matter of claims 4, 6, 8, and 9.

We conclude substantial evidence supports the Board's findings that Aligned Vision failed to show a motivation to combine for both Grounds 2 and 4. We affirm the Board's determination that Aligned Vision failed to prove claims 3, 4, 6, 8, and 9 of the '734 patent would have been obvious.

CONCLUSION

We reverse the Board's determination that claims 1, 2, 5, 7, and 10–13 of the '734 patent would have been obvious. We affirm the Board's determination that Aligned Vision failed to prove claims 3, 4, 6, 8, and 9 would have been obvious.

AFFIRMED IN PART AND REVERSED IN PART

COSTS

Costs awarded to Virtek.