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.

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