

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

LAITRAM, LLC,
Appellant

v.

ASHWORTH BROS., INC.,
Cross-Appellant

2022-1044, 2022-1045, 2022-1084

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2020-00593, IPR2020-00594.

Decided: May 15, 2023

LAUREN J. DREYER, Baker Botts LLP, Washington, DC, argued for appellant. Also represented by JENNIFER CARTER, LORI DING, MICHAEL HAWES, Houston, TX.

ROBERT FRANCIS ALTHERR, JR., Banner & Witcoff, Ltd., Washington, DC, argued for cross-appellant. Also represented by JOHN R. HUTCHINS, CHRISTOPHER ROTH.

Before LOURIE, TARANTO, and HUGHES, *Circuit Judges*.

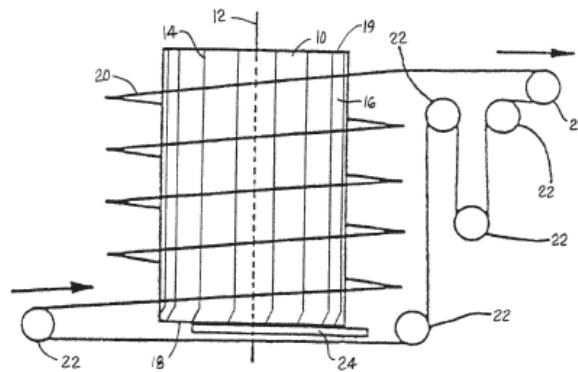
HUGHES, *Circuit Judge*.

Laitram, LLC appeals a decision from the Patent Trial and Appeal Board that claims 9 and 11–13 of U.S. Patent No. 10,023,388 and claims 1–4 of U.S. Patent No. 10,189,645 are unpatentable as obvious. Ashworth Bros., Inc. cross-appeals the Board’s decision that claim 10 of the ’388 patent is patentable over Roinestad and other prior art. As to the lead appeal, we affirm because the Board correctly construed the claims and because substantial evidence supports the Board’s factual findings. As to the cross-appeal, we vacate and remand for the Board to give proper weight to Ashworth’s arguments and evidence about Roinestad as a whole.

I

A

The ’388 and ’645 patents relate to spiral conveyor systems that include belts that move up and around a central tower like a spiral staircase. As shown in the side-view schematic below, the tower or drum (10) of the system spins around a central axis (12) such that the conveyor belt (20) is moved along the spinning tower in a spiral fashion.



’388 patent, Fig. 1.

The patents discuss two well-known types of spiral conveyors. The first is a friction spiral conveyor, or an

overdrive spiral conveyor. In this type of conveyor, the spinning central tower presses tightly against the side of the conveyor belt and the friction between the tower and the belt naturally pulls the belt forward as the tower spins. This design requires the tower to spin faster than the conveyor belt, and one known feature of a friction drive system is that the conveyor belt will sometimes “slip” along the tower. ’388 patent, 1:41–45.

The second type of spiral conveyor is a positive drive conveyor. Instead of pressing up against the tower itself, a positive drive conveyor has structures jutting out of the tower that grab onto a corresponding structure on the side of the belt. This type of engagement is like a bike chain and gear, where the bike chain is the pocket-like structure on the side of the belt and the gear is the tower with positive drive structures jutting out. While these positive drive systems do not experience the same “slip” as in friction drive systems, positive drive systems sometimes have difficulty “cleanly engaging the belt with and disengaging it from the drive structure” on the tower. *Id.* at 1:41–48.

The ’388 and ’645 patents claim positive drive spiral conveyor systems with structures called “ridges” that engage with the side of the conveyor belt. These ridges are vertical bars that extend from top to bottom of the central tower along similarly vertical drive members. The ridges have a distance from the vertical axis that varies from the bottom to the top of the tower. Such variations are achieved by what the patents call “taper[ing].” ’388 patent, 1:56–67.

Claim 9 of the ’388 patent below is representative of the claims at issue. Emphasis is added to highlight the disputed terms.

9. A spiral conveyor comprising:

a drive tower extending from a bottom to a top and rotating about a vertical axis;

a plurality of parallel drive members extending in length from the bottom to the top of the drive tower;

wherein each of the drive members includes an outwardly projecting ridge whose distance from the vertical axis varies from the bottom to the top of the drive tower; and

wherein each drive member includes a lower segment at the bottom of the drive tower and *wherein the ridge in the lower segment is tapered along a portion of its length;*

a conveyor belt positively driven without slip on a helical path around the drive tower by the ridges of the drive members engaging an inside edge of the conveyor belt.

'388 patent, 8:10–24 (emphases added).

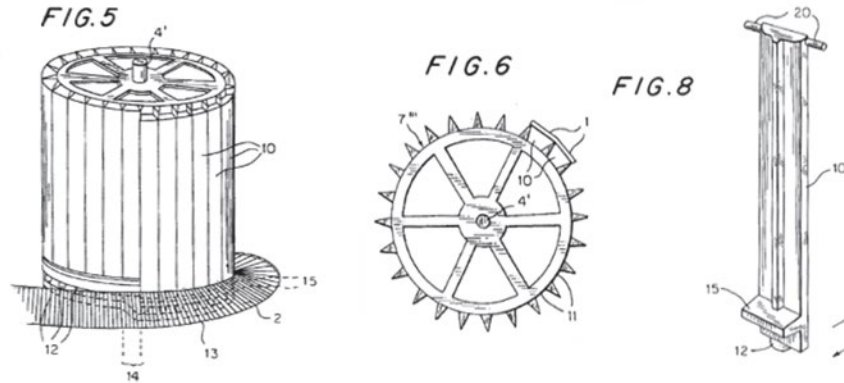
B

Both friction and positive drive spiral conveyors were well-known in the art before the priority date of the patents. Relevant here are three prior art references disclosing such systems: Pupp, Roinestad, and Roinestad '430.¹

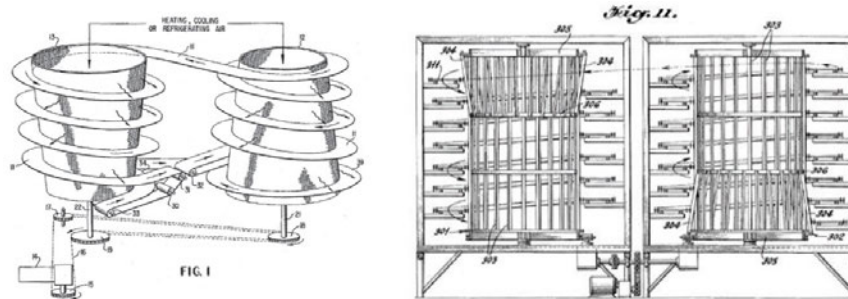
There is no dispute that Pupp discloses a spiral conveyor; the dispute is whether Pupp discloses a positively driven system. Relevant to this question are figures 5, 6, and 8 of Pupp (reproduced below). Figure 5 is a schematic of the drum with the conveyor belt, Figure 6 is a top view

¹ U.S. Pat. No. 6,062,375, issued May 16, 2000 (Pupp); U.S. Pat. No. 3,348,659, issued October 24, 1967 (Roinestad); U.S. Pat. No. 4,741,430, issued May 3, 1988 (Roinestad '430).

of the drum, and Figure 8 shows the “strips” that flank the side of the drum and contact the conveyor belt.



Similarly, there is no dispute that Roinestad discloses a friction drive spiral conveyor; the disputes involve the tapering in Figures 1 and 11 (reproduced below) and their applicability to a positive drive system. Figure 1 shows an embodiment where “[e]ach of the drums is tapered in the direction of belt travel axially of the drum.” Roinestad, 5:25–26. Figure 11 shows other possible embodiments including both the vertical driving bars and some tapering of the drum.



Finally, there is no dispute that Roinestad '430 discloses a “positive drive helical conveyor system,” J.A. 786; the dispute is whether Roinestad '430 discloses a positive drive conveyor *without slip*. As in the '388 and '645 patents, the Roinestad '430 system uses rods to engage with corresponding structures on the conveyor belts. These rods run

from the bottom to the top of a spinning central tower and are spaced around the circumference of the tower.

C

Ashworth filed two inter partes review petitions challenging claims 9–13 of the '388 patent and claims 1–4 of the '645 patent as unpatentable. The IPR proceedings raised many of the same issues, and the Board issued similar final written decisions in both IPRs. For the '388 patent, the Board found claims 9 and 11–13 unpatentable as obvious over Pupp and Roinestad, but the Board found that claims 9 and 10 were not obvious over Roinestad and Roinestad '430. Thus, claim 10 of the '388 patent survived. For the '645 patent, the Board found claims 1–4 unpatentable as obvious.

Laitram appeals the Board's unpatentability conclusions for claims 9 and 11–13 of the '388 patent and claims 1–4 of the '645 patent. Ashworth cross-appeals the Board's conclusion that claims 9 and 10 of the '388 patent are non-obvious over Roinestad and Roinestad '430.

II

We set aside the Board's actions if they are “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law,” or “unsupported by substantial evidence.” 5 U.S.C. § 706(2). The Board's legal determinations are reviewed de novo, and its factual findings are reviewed for substantial evidence. *Arendi S.A.R.L. v. Google LLC*, 882 F.3d 1132, 1133 (Fed. Cir. 2018). Claim construction and obviousness are both questions of law that depend on underlying findings of fact, which are reviewed for substantial evidence. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 325–28 (2015); *In re Brandt*, 886 F.3d 1171, 1175 (Fed. Cir. 2018).

III

On appeal, Laitram makes three primary arguments: (1) the Board erred in construing and applying the “positively driven without slip” limitation, (2) the Board erred in construing and applying the “tapered along a portion of its length limitation,” and (3) the Board erred in finding motivation to combine the prior art.

We begin with the “positively driven without slip” limitation. Because the Board did not err in construing the claim, and because substantial evidence supports the Board’s findings that Pupp and Roinestad ’430 disclose this limitation, we affirm.

A

We consider the Board’s claim construction *de novo*, giving the claim language its plain and ordinary meaning in light of a skilled artisan’s understanding of the specification and prosecution history. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). Here, the Board properly construed “without slip” to have its plain and ordinary meaning: “a system in which there is essentially no slip between the conveyor belt and the drive tower.” J.A. 15. Here, the Board’s construction captures both the plain and ordinary meaning of “without slip,” and the meaning used in the specification and prosecution history. *See* ’388 patent, 1:41–45 (“Because there is positive engagement between regularly spaced drive structure on the cage and regularly spaced edge structure on the inside edge of the belt, *there is no slip as in overdrive systems.*”) (emphasis added); ’645 patent, 1:55–59 (same); *see also* J.A. 531 (’388 Patent Notice of Allowability) (“The prior art does not teach or disclose a *non-slip* spiral conveyor” (emphasis added)). Thus, we agree with the Board’s construction.

Laitram argues the Board erred because this is a new construction raised *sua sponte* by the Board for the first

time in its final written decisions. We disagree. A slight difference in wording does not amount to a difference in construction. *See, e.g., Hamilton Beach Brands, Inc. v. freal Foods, LLC*, 908 F.3d 1328, 1338–39 (Fed. Cir. 2018) (“[T]he Board’s final adopted construction of the nozzle terms, while not identical to those proposed by freal, are similar enough to freal’s proposed constructions so as to not constitute changing theories midstream in violation of the APA.”). Here, although the Board slightly varied its wording in the final written decisions, in effect the Board’s construction remained the same. In the institution decisions, the Board applied the plain and ordinary meaning of this term given the intrinsic record, phrasing that meaning as “a system in which there is no slip between the conveyor belt and the drive tower.” J.A. 827. In the final written decisions, the Board continued to apply the plain and ordinary meaning based on the same intrinsic record and reiterated that same meaning: “a system in which there is essentially no slip between the conveyor belt and the drive tower.” J.A. 15. The Board’s addition of “essentially” simply clarified that the plain and ordinary meaning of “without slip” is not stringent enough to mean there is no slip at all in any part of the system. Rather, the plain and ordinary meaning of “without slip” is met where there is no slip in the system *overall*, even if an individual piece within that system experiences slip. This understanding is just as true under the wording “no slip” as it is under “essentially no slip.”

Laitram also argues the Board erred by construing “positive drive” as necessarily having no slip. We disagree. Expert testimony makes clear that the plain and ordinary meaning of a “positively driven” system means that the system necessarily does not experience slip, and this understanding is expressly supported by the patent specifications. *See, e.g., ’645 patent*, 1:55–59 (“Because there is positive engagement between regularly spaced drive structure on the cage and regularly spaced edge

structure on the inside edge of the belt, *there is no slip* as in overdrive systems.” (emphasis added)); ’388 patent, 1:41–45 (same); *see also* J.A. 1974 at 67:17–20 (“Q. But if you’re using positive engagement, you’re not going to have any slip, are you? A. Correct.”); J.A. 975 ¶ 11.

Laitram argues that the Board’s construction is incorrect because it renders “without slip” superfluous and that “without slip” must have independent meaning because it is not used in all claims that use “positive drive.” We find neither argument persuasive. Our preference for avoiding superfluous language is not an inflexible rule—we must still consider all other principles of claim construction, including how a skilled artisan would have understood the term and how it is used in the specification. *SimpleAir, Inc. v. Sony Ericsson Mobile Commc’ns AB*, 820 F.3d 419, 429 (Fed. Cir. 2016). Here, the plain and ordinary meaning of “positively driven” is supported by the specification and reinforced by expert testimony. We decline to use the superfluous language canon to arrive at a conflicting conclusion.

Similarly, our claim differentiation doctrine is not a rigid rule and should not be used to overcome the specification’s description of a term. *Wi-Lan USA, Inc. v. Apple Inc.*, 830 F.3d 1374, 1391 (Fed. Cir. 2016). This is particularly true here. Laitram argues that “without slip” must have independent meaning because “positive drive without slip” is used in claim 9 but only “positive drive” is used in claim 11. But claim 11 does not *only* drop the “without slip” language. It also has a more specific requirement about the distance between the ridges and the axis of the tower that is not present in claim 9. Given that there is more than one meaningful difference between claims 9 and 11, we decline to apply the claim differentiation doctrine to conclude that “without slip” has an independent meaning that contradicts how positive drive is described in the specification.

Thus, the Board did not err by concluding that a positively driven system necessarily has no overall slip.

B

Substantial evidence also supports the Board's finding that Roinestad '430 discloses "a conveyor belt positively driven without slip." As discussed above with respect to claim construction, the evidence relied on by the Board in finding that a skilled artisan would have understood that a positive drive system necessarily has no slip includes expert testimony, the disclosure of Roinestad '430, and admissions in the patents' disclosures. J.A. 139–43. The Board also relied on Roinestad '430 and expert testimony in finding that Roinestad '430 discloses a positive drive system. J.A. 217–19. The Board's conclusion that Roinestad '430 discloses this limitation is thus supported by substantial evidence.

Laitram does not contest the finding that Roinestad '430 discloses a positively driven conveyor belt. Rather, Laitram argues that Roinestad '430 does not disclose the "without slip" portion of the limitation. Laitram points to the following passage in Roinestad '430 to argue that the Roinestad '430 system experiences slip:

Miniscule variances in the speed of the cage 21 relative to the supplemental drives can be tolerated by *occasional slippage of individual rod ends 14 from engagement with one of the channel legs 48 or 49. Said occasional slippage does not interfere with the positive character of the drive. When slippage at one of the driving bars occurs, the positive driving engagement of all or most of the remaining bars is maintained.*

Roinestad '430, 8:42–50 (emphases added).

First, Laitram did not make this argument until its sur-reply, and so it is forfeited. *See, e.g., General Access Sols., Ltd. v. Sprint Spectrum L.P.*, 811 F. App'x 654, 658

n.2 (Fed. Cir. 2020) (citing *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1319 (Fed. Cir. 2006) (“Our law is well established that arguments not raised in the opening brief are waived.”)). Second, even if this argument were not forfeited, the Board relied on substantial evidence in finding that the “occasional slippage” of individual *rods* in Roinestad ’430 does not mean that Roinestad ’430 experiences “slip” as used in the patents. The Board reviewed the language of Roinestad ’430 and correctly found that, when Roinestad ’430 uses the term “slippage,” it is not doing so to convey the same type of “slip” between the conveyor belt and the drive tower described in the patents. Rather, Roinestad ’430 explains that *even if* individual rod ends disengage from or slip out of individual pockets on the conveyor belt, the system *overall* does not experience slip. We agree with this reading of Roinestad ’430 and thus agree that Roinestad ’430 discloses “without slip,” as construed in subsection III.A.

C

Substantial evidence also supports the Board’s finding that Pupp discloses “a conveyor belt positively driven without slip.” The Board relied on expert testimony and the disclosures of Pupp to support its finding that Pupp discloses positive drive. *E.g.*, J.A. 42–51 (citing, *e.g.*, Pupp, 1:30–33, 3:3–8, 4:14–36, Figs. 5 and 8; O’Keefe Decl. ¶¶ 13, 58, 79–81, 83). For example, the Board credited Ashworth’s expert when finding “one of ordinary skill in the art would view Pupp’s Figure 8 as implicitly describing ‘positive engagement’ or, as phrased in element 9F, ‘positive[] drive[].’” J.A. 44 (citing O’Keefe Decl. ¶¶ 58, 79–81, 83). This constitutes substantial evidence supporting the Board’s finding that Pupp discloses a positive drive system. And, as discussed above in subsection III.A, the Board properly construed the limitation such that a positive drive system is necessarily “without slip.” Thus, the Board did not err by concluding

that Pupp discloses “a conveyor belt positively driven without slip.”

Laitram argues that, because Pupp does not expressly state that it is a positive drive system, the Board improperly found that positive drive is *inherently* disclosed in Pupp. We disagree. A reference need not use the explicit words required by the claim for the Board to find that a limitation is disclosed. Instead, the proper inquiry is whether a skilled artisan, reading Pupp, would have understood the reference to disclose positive drive. The Board, relying on expert testimony and the disclosures of Pupp, properly found that this limitation was disclosed.

We have considered Laitram’s remaining arguments about “a conveyor belt positively driven without slip” and find them unpersuasive. For the reasons above, we affirm the Board’s claim construction and decision that Roinestad ’430 and Pupp disclose “a conveyor belt positively driven without slip.”

IV

Next, we address the “tapered along a portion of its length” limitation, which is relevant only to claims 9 and 10 of the ’388 patent. Again, because we agree with the Board’s claim construction, and because substantial evidence supports the Board’s finding that Roinestad discloses this limitation, we affirm.

The Board properly construed “the ridge in the lower segment is tapered along a portion of its length,” to mean “*at least* including a change in the distance from the outer surface of the ‘ridge’ to the axis of rotation of the drive tower along *at least* a portion of the ridge’s length.” J.A. 33 (emphases added). This construction reflects the plain and ordinary meaning of “taper” given the ’388 patent’s entire disclosure.

The term “taper” is used broadly in the ’388 patent to refer to *at least* varying the distance from the ridge to the

vertical axis. For example, the '388 patent explains that “[e]ach of the drive members has an outwardly projecting ridge whose distance from the vertical axis varies from the bottom to the top of the drive tower.” ’388 patent, 1:56–58. The summary also lists three ways in which this variation in distance can be achieved: (1) with “a skirt portion tapered outwardly away from the vertical axis,” (2) with a “ridge in the upper segment [that] tapers down toward the top of the drive tower,” and (3) with a “ridge in the lower segment [that] is tapered along a portion of its length.” *Id.* at 1:58–67. “Taper” is used in all three examples, suggesting there are multiple ways to achieve tapering.

The claim language does not specify which type of tapering is required. It merely recites that “the ridge in the lower segment is tapered along a portion of its length.” This language then, should be read to include all types of lower portion tapering that are described in the '388 patent. This does not *only* include the example of tapering in Figures 2A and 2B, where the tapering is achieved by varying the height of the ridge. It also includes the example in Figures 17 and 18, where tapering is achieved by varying the shape of the tower. Thus, it was proper for the Board to construe this limitation broadly, requiring “*at least* including a change in the distance from the outer surface of the ‘ridge’ to the axis of rotation of the drive tower along *at least* a portion of the ridge’s length.” J.A. 33 (emphases added).

Laitram argues for a narrower construction that would limit claim 9 to only the first example of tapering, as shown in Figures 2A and 2B. Under that construction, Figures 17 and 18 would not fall under a “ridge in the lower segment is tapered along a portion of its length.” This disregards our longstanding precedent that a claim should not be construed as limited to a single embodiment absent some clear indication that a claim relates only to that embodiment. *See, e.g., Arlington Indus., Inc. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246, 1254 (Fed. Cir. 2011). Here, nothing ties claim 9 to the single embodiment in Figures 2A and 2B.

Thus, the Board was correct not to narrow the claim language to that embodiment.

Laitram also argues that the Board was wrong to cite portions of the specification that refer to tapering in the context of components other than the ridges themselves. But the ridges are affixed to these other components of the system. If the skirt portions in Figures 17 and 18 taper away from the vertical axis, then the ridges necessarily also taper away from the vertical axis because they are attached to the outside of the skirt portion and follow the same angular trajectory. Thus, the Board did not err in considering how the specification uses the term “taper,” and it arrived at the correct construction.

Under the Board’s proper construction, substantial evidence supports the Board’s finding that Roinestad discloses “tapered along a portion of its length.” The Board relied on Figure 1, which shows a conical central tower, rather than a cylindrical central tower. J.A. 41 (referring to “the *purely conical* drive tower” of Roinestad as meeting this limitation); J.A. 30–31 (focusing on Figure 1 of Roinestad, which is the purely conical tower). Because of this conical shape, the distance from the outside of the ridges to the cone’s axis increases from top to bottom, including in the lower segment of the cone. This is substantial evidence to support the Board’s finding that Roinestad discloses this limitation.

We have considered Laitram’s remaining arguments about the “tapered along a portion of its length” limitation and find them unpersuasive. For the reasons above, we

affirm the Board's conclusion that Roinestad discloses the "tapered along a portion of its length" limitation.

V

Third, we address Laitram's argument that substantial evidence does not support the Board's motivation to combine findings. We disagree and thus affirm.

The Board found that a skilled artisan would have been motivated to combine the conical shape of Roinestad with the positive drive system of Roinestad '430 because doing so "would provide lower belt tension and reduce the amount of stress on the belt." J.A. 111. In doing so, the Board relies on the references themselves and expert testimony that supports this finding. J.A. 111 (citing e.g., O'Keefe Decl. ¶ 168). This constitutes substantial evidence.

Similarly, the Board found "that an ordinarily skilled artisan would have been motivated to make a system in which the belt may be smoothly and economically driven under low tension," as disclosed by the conical shape of Roinestad. J.A. 57. In doing so, the Board relied on Ashworth's expert testimony that a skilled artisan would have been motivated to combine the positive drive system of Pupp with the conical shape disclosed in Roinestad because the Pupp system adds the benefit of reduced circumferential friction as compared to friction systems and the shapes disclosed in Roinestad achieve a smoother and more economical result. J.A. 57–58 (citing e.g., O'Keefe Decl. ¶ 66; Roinestad, 1:11–18). This constitutes substantial evidence.

We have considered Laitram's remaining arguments about motivation to combine and find them unpersuasive. For the reasons above, we affirm the Board's conclusion that a skilled artisan would have been motivated to

combine Pupp with Roinestad and Roinestad with Roinestad '430.

Thus, we affirm the Board's conclusion that claims 9 and 11–13 of the '388 patent and claims 1–4 of the '645 patent are unpatentable as obvious over the prior art.

VI

Finally, we address Ashworth's cross-appeal. Ashworth's primary argument on cross-appeal is that the Board applied the wrong legal standard by requiring Ashworth to reconcile Figures 1 and 11 of Roinestad and ignoring the arguments and evidence presented in the petition. We agree. Because the Board did not give proper weight to Ashworth's evidence about how a skilled artisan would have understood Roinestad as a whole, we vacate and remand for the Board to consider all the evidence given the correct legal standard.

The Board understood Ashworth as relying on Figure 1 to show tapering for claim 9 but relying on Figure 11 to meet the added tapering limitation in dependent claim 10. Because it thought Ashworth to be relying on two figures, the Board held that Ashworth was required to "reconcile" Figure 1 with Figure 11 when relying on Figure 11 for claim 10. But Ashworth did not rely solely on the conical shape in Figure 1 to meet the tapering limitation in claim 9. Rather, it argued with respect to claim 9 that a skilled artisan would have understood Roinestad to disclose a limited number of shapes for the drive tower, including in Figure 11. J.A. 315–16. Ashworth argued that it would have been obvious to a skilled artisan to use any of these shapes, or a combination of these shapes, because doing so would be a simple design choice. J.A. 311–15. It also argued that these various shapes would have solved a known problem in the art by routine optimization. J.A. 314–15. Ashworth then applied that same logic to the added tapering limitation in claim 10. J.A. 322–33.

Given Ashworth's arguments, the appropriate obviousness analysis is not whether the conical shape of Figure 1 can be physically combined or "reconciled" with the non-conical shape of Figure 11. Rather, the correct legal standard is whether a skilled artisan, considering Roinestad as a whole, would have arrived at the claimed shapes. To the extent arriving at the claimed shapes would require a combination of elements, the motivation to combine analysis does not require the Board to "seek out precise teachings directed to the specific subject matter of the challenged claim," because the Board "can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)). Ashworth presented evidence to this effect in the petition, but the Board ignored this evidence because it focused only on whether the exact shape of Figure 1 would work with the exact shape of Figure 11. Thus, the Board erred by failing to consider whether a skilled artisan, considering Roinestad for all that it teaches, would have arrived at the claimed shapes.

We have considered Laitram's arguments on cross-appeal and find them unpersuasive. Accordingly, we vacate and remand for the Board to properly consider Ashworth's arguments and evidence that a skilled artisan would have arrived at the shapes in claims 9 and 10 based on the teachings of Roinestad as a whole.

**AFFIRMED-IN-PART AND VACATED AND
REMANDED-IN-PART**

COSTS

No costs.