

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ENERGYSOURCE MINERALS, LLC,
Petitioner,

v.

TERRALITHIUM LLC,
Patent Owner.

IPR2019-01603
Patent 9,644,126 B2

Before HUBERT C. LORIN, GRACE KARAFFA OBERMANN, and
CHRISTOPHER G. PAULRAJ, *Administrative Patent Judges*.

LORIN, *Administrative Patent Judge*.

DECISION ON REQUEST FOR REHEARING
37 C.F.R. § 42.71

I. INTRODUCTION

EnergySource Minerals, LLC (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–20 of U.S. Patent No. 9,644,126 B2 (Ex. 1001, “the ’126 patent”). Paper 1 (“Pet.”). TerraLithium LLC (“Patent Owner”) did not file a Preliminary Response to the Petition.

On March 17, 2020, we instituted an *inter partes* review, pursuant to 35 U.S.C. § 314(a). Specifically, we instituted an *inter partes* review of claims 1–20 on all six asserted grounds of unpatentability. Paper 9 (“DI”).

After institution, Patent Owner filed a Patent Owner Response (Paper 14, “PO Resp.”); Petitioner filed a Reply (Paper 19, “Pet. Reply”); and Patent Owner filed a Sur-reply (Paper 23, “PO Sur-reply”).

On December 15, 2020, the parties presented arguments at oral hearing, the transcript of which is of record. Paper 30 (“Tr.”).

Upon consideration of the record, the Board concluded that Petitioner had not proven by a preponderance of the evidence that any challenged claim of the ’126 patent was unpatentable under any of the asserted grounds of unpatentability; that is, Petitioner had not proven by a preponderance of the evidence that

- claims 1–20 are anticipated by Christopher¹ (Ground I);
- claims 1–20 are anticipated by and/or would have been obvious over Christopher (Ground II);
- claims 1–20 would have been obvious over the combination of Christopher, Brown², Burrows³, and Wilkins⁴ (Ground III);

¹ D. H. Christopher, The Recovery and Separation of Mineral Values from Geothermal Brines, Bureau of Mines OFR 81-75 (Jun. 12, 1975) (“Christopher”) (Ex. 1006).

² U.S. Patent No. 5,358,700 to Brown (“Brown”) (Ex. 1005).

³ U.S. Patent Publication 2003/0026749 A1 to Burrows (“Burrows”) (Ex. 1007).

⁴ U.S. Patent No. 4,016,075 to Wilkins (“Wilkins”) (Ex. 1008).

- claims 1–20 are anticipated by Maimoni⁵ (Ground III);
- claims 1–20 are anticipated by and/or would have been obvious over Maimoni (Ground IV); and,
- claims 1–20 would have been obvious over the combination of Maimoni, Brown, Burrows, Wilkins, and Christopher (Ground VI).

Accordingly, on March 15, 2021, the Board issued a Final Written Decision determining that Petitioner had not demonstrated by a preponderance of the evidence that claims 1–18 are unpatentable. Paper 31 (“Dec.”; “Decision”).

On April 14, 2021, Petitioner filed a “Request for Rehearing” of the Decision. Paper 32 (“Req.”; “Request”).

On May 3, 2021, Patent Owner requested authorization to file a reply to the Request. Ex. 3001. We granted Patent Owner’s request and granted Petitioner authorization to file a sur-reply. Order of May 7, 2021, Paper 33. These were filed on May 21 and June 7, 2021, respectively. Paper 34 (“Req. Reply”) and Paper 35 (“Req. Sur-Reply”).

A request for rehearing must identify specifically all matters that the requesting party believes the Board misapprehended or overlooked. 37 C.F.R. § 42.71(d). When rehearing a decision on institution, the Board will review the decision for an abuse of discretion. 37 C.F.R. § 42.71(c).

The Request challenges our decision because:

- A. “[t]he Board violated Petitioner’s right to notice because the FWD construction of ‘treated’ is predicated on an argument PO first raised in the Sur-Reply” (Req. 2);

⁵ Arturo Maimoni, “A Cementation Process for Minerals Recovery from Salton Sea Geothermal Brines,” Lawrence Livermore Laboratory (Jan. 26, 1982) (“Maimoni”) (Ex. 1004).

- B. “[t]he Board failed to address Petitioner’s Christopher anticipation arguments based on claimed concentration ranges including ‘0’ and ‘less than’” (*id.* at 5);
- C. “[t]he Board misapprehended or overlooked Petitioner’s arguments and evidence that demonstrate how Christopher’s Table 3 or Figure 20 disclose iron concentrations within the claimed ranges” (*id.* at 6);
- D. “[t]he Board misapprehended or overlooked Petitioner’s argument and evidence that demonstrate that the challenged claims are obvious over Christopher” (*id.* at 9); and,
- E. “[t]he Board failed to address Petitioner’s Maimoni anticipation arguments based on claimed concentration ranges including ‘0’ and ‘less than’” (*id.* at 12).

II. ANALYSIS

A. *“The Board violated Petitioner’s right to notice because the FWD construction of ‘treated’ is predicated on an argument PO first raised in the Sur-Reply” (Req. 2)*

Petitioner argues that the Board predicated its construction of “treated” on an argument first raised in the PO Sur-Reply. Req. 2–5. We disagree.

The Board did not predicate its construction of “treated” on an argument first raised in the PO Sur-Reply.

It was Petitioner, in the Petition, who first “propose[d] that the terms ‘treated’ and ‘geothermal brine’ should be defined as indicated” in the ‘126 patent. Pet. 10. According to the ‘126 patent:

The term “treated” in reference to a brine (e.g., “treated brine” or “treated geothermal brine”) refers to brines that have been processed such that the concentration of at least one metal or elemental component has been reduced in the brine.

Ex. 1001, 8:8–14; Dec. 9. Although the Board (DI 8; Dec. 9) found it unnecessary to adopt Petitioner’s construction given that the ‘126 patent expressly defined the term “treated,” as used in the Decision, that definition was pointed out in the Petition, not in the PO Sur–Reply.

Thus, in arguing that Christopher describes a “treated” geothermal brine (Pet. 20; Dec. 9), Petitioner had to show that “the brine of Table 1 must ‘have been processed such that the concentration of *at least one metal or elemental component* has been reduced in the brine.’ Ex. 1001, 8:8–14.” Dec. 9–10 (emphasis added). As noted in our Decision:

In that regard, Petitioner contends that Christopher’s “aging process resulted in a reduction in ‘at least one *elemental component*’ (i.e., *silica*).” Pet. Reply 5–6 (emphasis added). However, this is not buttressed with any evidence.

Petitioner has not presented any evidence showing Christopher’s “aging” process reduces “the concentration of at least one ... *elemental component*” to support its contention that Christopher’s brine of Table 1 is a “treated” brine as claimed.

Accordingly, on this record, Petitioner has not shown that the “treated” brine of the claims reads on Christopher’s “aged” brine by a preponderance of the evidence.

Id. at 10 (emphasis added in our Decision).

According to Petitioner,

the Board seems to have [] relied on PO’s late argument by finding that “[s]ince Christopher’s ‘aging’ process reduces the silica concentration in the brine, and it is undisputed that silica is not a metal, Christopher’s ‘aging’ process must reduce the concentration of at least one ‘element component’ for the brine to meet the claims.” (FWD, 10, citing POSR 4; Ex. 1006, 8-9).

Req. 3.

That was not the case. It was Petitioner who argued that “Christopher’s ‘aged’ brine, which through the aging process resulted in a reduction in “at least one *elemental component*” (*i.e., silica*). Pet. Reply 5–6 (emphasis added); Dec. 10. We did not need to rely on any allegedly new argument by Patent Owner to assess whether a preponderance of the evidence supported Petitioner’s argument that the “treated” brine of the claims reads on Christopher’s “aged” brine. Since Petitioner had “not presented any evidence showing Christopher’s ‘aging’ process reduces ‘the concentration of at least one ... *elemental component*’ to support its contention that Christopher’s brine of Table 1 is a ‘treated’ brine as claimed” (*id.*), we determined that Petitioner had not satisfied its burden to show that Christopher describes a “treated” geothermal brine. Petitioner is correct that the Board cited “PO Sur–reply 4 [sic, 3]” (*id.* at 10) but it was not cited in support of adopting a different construction of “treated” but to indicate our agreement with statements made in the PO Sur–reply reiterating Petitioner’s burden to show that Christopher describes a “treated” geothermal brine as argued.

Regarding Petitioner’s assertion that “[d]uring these proceedings, Petitioner has submitted that when Christopher reduces silica, it necessarily also reduces the elemental components of silicon (Si) and oxygen (O₂)” (Req. Sur–Reply 1), this is not a position that Petitioner had previously taken. Rather, Petitioner’s position was only that “Christopher states the silica concentration is reduced.” Pet. 27; *cf.* Pet. Reply 8–9. A rehearing request is not an opportunity to raise new arguments. We could not have overlooked or misapprehended an argument not raised prior to our decision.

The Board was not persuaded that Petitioner had shown that Christopher describes a brine having a concentration of silica in the claimed range. As we explained, Petitioner relied on Table 3 and Figure 20 as describing a brine having a concentration of silica in the claimed range but “acknowledge[d] that Table 3 and Figure 20 of Christopher have ‘no reported silica concentration.’ Pet. 23–23; Ex, 1006, 42.” Dec. 15. Nonetheless, Petitioner argued that Figure 20 shows Christopher’s process reducing the iron concentration and the silica concentration would necessarily reduce along with it. *Id.* at 15–16. In support, Petitioner “relie[d] on (a) statements and Examples 2, 7-9 from the ‘126 patent (Ex. 1001, 20:35–21:59, 42:31–50:51) and (b) ¶¶ 168–175 of Dr. Gallup’s declaration (Ex. 1003) “to show that Christopher’s process necessarily reduces silica concentration as iron concentration reduces. Pet. 29–30.” *Id.* at 16. Regarding (a), we determined it “d[id] not sufficiently support Petitioner’s position that Christopher’s process would necessarily reduce the concentration of silica in the brine in the brine to a level that is within the claimed range.” *Id.* at 16. Regarding (b), we determined it “prove[d] there is a difference between what Christopher describes and what is claimed.” *Id.* at 17. In this way, in contrast to Petitioner’s suggestion (Req. 2), the Board addressed whether Christopher describes a brine having a concentration of silica in the claimed range as Petitioner had argued. We find no error in these determinations that would warrant reconsideration of our Decision.

B. *“The Board failed to address Petitioner’s Christopher anticipation arguments based on claimed concentration ranges including ‘0’ and ‘less than’” (Req. 5)*

Petitioner argues that Board failed to address certain arguments raised by Petitioner on pages 11–12, 17–19 and 27 of the Petition and pages 3–4 of the Reply with respect to its contention that the claims are anticipated by Christopher. Req. 5.

The Board did not fail to address an argument raised by Petitioner with respect to its contention that the claims are anticipated by Christopher (Dec. 7–21).

Pages 11–12 and 17–19 of the Petition and pages 3–4 of the Reply do not raise arguments in support of its contention that the claims are anticipated by Christopher. They argue that the claimed constituent components should be construed as optional.

Specifically, pages 11–12 of the Petition pertain to the concentration ranges for constituent components which, according to the claims, include “0” as a lower limit. Based on Petitioner’s interpretation of, *inter alia*, *Titanium Metals Corat of America v. Banner*, 778 F.2d 775 (Fed. Cir. 1985), Petitioner proposed that “each constituent component that is either described as having a concentration range of ‘less than’, or a lower concentration limit of ‘0 mg/kg’ must be construed as an optional constituent component.” Pet. 12.

Pages 17–19, in a section entitled “Introductory Arguments,” argue, *inter alia*, that once the claimed constituent components are construed as optional, claim 1 “simply requires a ‘treated geothermal brine composition, the composition comprising a treated geothermal brine...comprising recoverable amounts of one or more metals selected from the group

consisting of lithium, manganese, rubidium, lead, [] and cesium or mixtures thereof.” *Id.* at 18.

But the Board *did* fully address these arguments. See DI 14–17 (section entitled “*Petitioner’s Introductory Arguments*” where, for the reasons discussed, “we decline[d] to disregard the components in the claims in evaluating the sufficiency of Petitioner’s arguments as to the patentability of the claimed compositions over the cited prior art.”) Petitioner’s Reply (Pet. Reply 4) requested we reconsider our view of the matter but it was unnecessary to do so because Petitioner did not argue that Christopher anticipated the claimed composition on the ground that the claimed components are optional components in the claimed brine. Rather, Petitioner argued that Christopher *did* describe a brine with the components in the concentrations claimed. See, e.g., Pet. 20–23.

Page 27 reiterates Petitioner’s earlier–argued construction of the claimed ranges; that is, “the concentrations of silica, iron and [] are set forth as **optional** components in the treated brine composition of Claim 1.”

Pages 3–4 of the Reply reargues construing the components in the claims as optional but does not otherwise raise an argument that Christopher anticipates the claimed composition based on construing the claimed constituent components as optional.

Accordingly, the Board did not fail to address certain arguments raised by Petitioner on pages 11–12, 19–21 and 27 of the Petition and pages 3–4 of the Reply with respect to its contention that the claims are anticipated by Christopher.

C. “The Board misapprehended or overlooked Petitioner’s arguments and evidence that demonstrate how Christopher’s Table 3 or Figure 20 disclose iron concentrations within the claimed ranges” (Req. 6)

Claim 1 calls for “a concentration of iron ranging from 0 to 300mg/kg.” Petitioner had argued that Table 3 and Figure 20 of Christopher describes a brine having a concentration of iron in the claimed range. Dec. 19 (referring to discussion regarding zinc concentration on 11–14).

Table 3 (Req. 6–8)

Petitioner had argued that Table 3 shows a brine having “iron concentrations of 0.0053 g/L (4.5 mg/kg)” which falls within the claimed range. Pet. 28 (citing Ex. 1006, 12); Dec. 19. We stated that “[t]o ascertain whether Table 3 describes [iron] having a concentration in the range claimed, the [0.0053 g/L] value must be converted to mg/kg and that entails knowing the density of the geothermal brine associated with Table 3.” Dec. 13. In that regard, “[t]he density value that Petitioner uses, i.e., 1.18kg/L, is unsupported by evidence.” *Id.*

Petitioner now argues that “the Board misapprehended or overlooked the arguments and evidence that demonstrate Petitioner’s 1.18 kg/L density was supported by sufficient evidence.” Req. 6–7.

According to Petitioner, the 1.18 kg/L density

is supported by Dr. Gallup’s extensive experience in the geothermal industry and his personal analysis of Salton Sea geothermal brines from over 15 different wells. (Petition, fn. 3; Reply, 3; Ex. 2025, 337:5-9). He testified that the Sinclair No. 4 brine of Christopher would have had an equivalent density, namely “very close to 1.18 based on the averages across the field” or 1.18 ± 0.02 . (*Id.*, 337:5-13).

Req. 6.

Petitioner cites footnote 3 [sic. 1] in the Petition but it merely states “mg/kg=(g/L*1000)/1.18kg/L due to the density of Salton Sea geothermal brines.” There is no evidence cited to support it.

Petitioner cites “Reply, 3; Ex. 2025, 337:5-9” and “337:5-13” (Req. 6) but the Reply does not cite to those lines in Dr. Gallup’s Declaration. See Pet. Reply 3 (“Ex. 2025, 336:3-5-337:2”). We were unable to locate these lines of testimony in the Reply.

The Board could not have misapprehended or overlooked evidence demonstrating Petitioner’s 1.18 kg/L density that was not before it.

Petitioner further argues that even if the density of the brine of Table 3 was that of pure water (1.0 kg/L) the iron concentration in the brine would be at most 5.3 mg/kg. Req. 7. According to Petitioner, “[m]athematically, any density greater than 1 drops the mg/kg concentrations even further.” *Id.* Thus, according to Petitioner, “[t]he only way the 0.0053 g/L of iron recited in Table 3 could have a concentration greater than 5.3 mg/kg [the upper end of the claimed range] would be if the highly saline Salton Sea geothermal brine had a density *less than pure water.*” *Id.*

Petitioner does not identify where this argument was previously raised (37 C.F.R. § 42.71(d)) nor have we been able to locate it. This argument was not before us. Accordingly, we could not have misapprehended or overlooked it.

Figure 20 (Req. 8–9)

Petitioner also relied on Figure 20. See Pet. 28 (“1.0 ppm in Figure 20”); Dec. 19. We determined that “Petitioner ha[d] not shown that Christopher describes a brine necessarily having iron in the claimed concentration range by a preponderance of the evidence.” Dec. 19.

It is [] possible that the “1.0 ppm” recited in Figure 20 refers to weight instead of volume. But a case of inherency cannot resort to relying on mere possibilities and probabilities.

Id.

Petitioner now argues that “the ppm concentrations recited in Figure 20 *must* refer to ppm by weight.” Req. 8 (emphasis added). In support, Petitioner directs our attention to the discussion on page 5 of the Reply. *Id.* Page 5 includes a section entitled “D. ‘ppm’ and ‘parts per million’” which states that “[i]t is undisputed that the general convention for ppm is weight based. (EX 1011, 110:8-111:4; Ex. 2025, 120:13-121:3).” Pet. Reply 5.

The argument “the ppm concentrations recited in Figure 20 must refer to ppm by weight” (Req. 8) was not before us, therefore, we could not have overlooked it. Nevertheless, even if we take account of this new argument, the discussion on page 5 of the Reply does not support Petitioner’s position that one ordinary skill in the art reading Christopher would have no other choice but to understand “1.0” “PPM” (Ex. 1006, 42) to mean parts–per–weight. This is so because Petitioner concedes that “ppm *can generally* be reported as either by weight or by volume.” Req. 8. This is consistent with Dr. Gallup’s testimony. See Dec. 13:

According to Patent Owner, “Dr. Gallup explained [that] ppm may be reported as ppm by weight or ppm by volume. (Ex. 2025, 119:16-25).” *Id.* [PO Resp. 18–19]

Because we are directed to no evidence contradicting it, we credit Dr. Gallup’s testimony that ppm can be reported by weight or by volume. Given this, one of ordinary skill in the art reading that iron is at a concentration of [“1.0 ppm”] for stream 3 in Figure 20 may understand it to refer to ppm by volume.

Notwithstanding the discussion on page 5 of the Reply that the “general convention” for ppm is that it is weight based, the evidence before us showed, as Petitioner concedes, that ppm can “generally be reported” (Req. 8) by weight or volume. Thus, as we determined, it is *possible* that one of ordinary skill in the art may understand “ppm” in Figure 20 to “refer[] to weight instead of volume” (Dec. 19).

Accordingly, the Board did not misapprehend Petitioner’s argument regarding Figure 20.

D. “The Board misapprehended or overlooked Petitioner’s arguments and evidence that demonstrate that the challenged claims are obvious over Christopher” (Req. 9)

Petitioner argues that we failed to address various arguments in the context of its obviousness challenge.

The Board appears to have misapprehended or overlooked that Petitioner’s “tuning” arguments also support its challenge that the claims are obvious over Christopher (Reply, 12-14). Similarly, Petitioner’s other arguments regarding the molar correlation between silica and iron also appear to have been misapprehended or overlooked in connection with supporting Petitioner’s obviousness challenge over Christopher. (FWD, 17).

Req. 10. We again disagree. There can be no dispute that the Board addressed the “tuning” and molar correlation argument, albeit in the context of anticipation. Dec. 17.

As Petitioner notes, we stated in the Decision that “[a]s for the challenge based on obviousness, other than asserting it would have been obvious over Christopher, we are given little to go on.” Dec. 20; Req. 9. Petitioner does not explain how its obviousness challenge is adequately presented.

The Petition discusses Grounds I and II on pages 27–30 of the Petition. Ground I challenges the patentability of claims 1–20 as anticipated by Christopher and Ground II challenges the patentability of claims 1–20 as anticipated and/or obvious over Christopher. Reading pages 27–30 it is plainly evident that it is focused on making the case that Christopher discloses all that is claimed. It is devoid of any reasoning with respect to the obviousness of the claims over Christopher. The *Graham* factors are not addressed. See *Graham v. John Deere Co.*, 383 U.S. 1 (1966). The differences between the claimed invention and Christopher are not identified and no rationale as to why one of ordinary skill would have been led to modify Christopher to reach the claimed subject matter is provided. Rather, the entire discussion goes to explaining why, in fact, Christopher discloses all that is claimed. The Board was consistent with that position.

Petitioner cites page 12–14 of the Reply as evidence that an obviousness challenge was presented. We disagree. The Reply does not add anything significant to the obviousness challenge presented in the Petition. The Reply is likewise devoid of any reasoning with respect to the obviousness of the claims over Christopher. It repeats that “Christopher *teaches* using air oxidation and pH modification to selectively precipitate silica, iron, and other heavy metals from a Salton Sea geothermal brine” (Reply 13, emphasis added), where “a POSITA could readily ‘tune’ these parameters to produce the desired results if such were not obtained immediately.” *Id.* The Board addressed that argument. See Dec. 17.

Petitioner further argues that “[a]t page 17 in the FWD, the Board misapprehended or overlooked ¶¶ 107-110 of Dr. Gallup’s uncontested Declaration (EX 1003).” Req. 10. We have searched the Petition and Reply

but have been unable to locate said passages. The Board could not have misapprehended or overlooked evidence that was not before it.

Petitioner argues that

the Board misapprehended or overlooked that while the “exact molar correlation between silica and iron will vary based on temperature, pH, and agitation”, the molar correlation is still “*at least* a 1-to-1 iron to silica mole ratio if not less than, for example, a 1:2 iron to silica mole ratio or a 1:4 iron to silicon mole ratio, for example.” (Reply, 7-8, citing Ex. 2025, 242 [sic, 243]:4-8) (emphasis added).

Req. 11.

We addressed this. See Dec. 17:

Petitioner’s other arguments are similarly undermined. For example, Petitioner argues that according to Dr. Gallup there is a 1:1 correlation between silica and iron based on his experience. Pet. Reply 7–8. Yet the “exact molar correlation between silica and iron will vary based on temperature, pH, and agitation.” *Id.*

Lastly, Petitioner argues that the Board misapprehended or overlooked that Ex. 2019. Req. 11. But we have been unable to locate said exhibit in the Petition and Reply. The Board could not have misapprehended or overlooked evidence that was not before it.

E. “The Board failed to address Petitioner’s Maimoni anticipation arguments based on claimed concentration ranges including ‘0’ and ‘less than’” (Req. 12)

Petitioner argues that “to the extent Steam No. 18 and No. 21 of Maimoni are interpreted as ‘disparate disclosures of the brine compositions’, the Board failed to specifically analyze either Stream No. 18 or No. 21 pursuant to Petitioner’s anticipation argument under the *Titanium Metals* and *Ineos*” cases. Req. 12. Petitioner cites pages 11-12, 17-19, and 46-47 as having “explained that both Stream Nos. 18 and 21 of Maimoni disclose ...

[the claimed] 0 mg/kg concentrations under *Titanium Metals* and *Ineos*.” *Id.* at 13. Petitioner “submits that the Board appears to have misapprehended or overlooked the applicability of *Titanium Metals* and *Ineos*, and as a result, abused its discretion in the FWD by failing to address those arguments.” *Id.*

As we noted earlier with respect to this argument as applied to Christopher, pages 11-12 and 17-19 pertain to the concentration ranges for constituent components which, according to the claims, include “0” as a lower limit. Pages 17–21 in particular were addressed in the Institution Decision. See DI 14–17 (section entitled “Petitioner’s Introductory Arguments.” These pages are not part of Petitioner’s Maimoni anticipation arguments.

Pages 46–47 of the Petition do not present an argument that Stream Nos. 18 and 21 of Maimoni disclose a treated brine based on an argument that iron, silica and arsenic components are optional. Rather, these pages repeat, without amplification, Petitioner’s earlier–argued construction of the claimed ranges; that is, “the concentration of zinc, iron and silica are set forth as **optional** components in the treated brine composition of Claim 1” (*id.* at 46). We fully addressed this proposed construction in the Institution Decision. See DI 14–17. It was unnecessary to then further address whether Maimoni anticipated the claimed composition based on silica, arsenic, and iron being optional because it was not argued.

In sum, these arguments are raised for the first time by Petitioner in its request for rehearing. We could not have misapprehended or overlooked an argument that was not before us.

No other arguments having been raised, Petitioner's rehearing request of evidence and arguments Petitioner argues we have misapprehended and overlooked is denied for the foregoing reasons.

IV. CONCLUSION

Petitioner's Request for Rehearing is *denied*.

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