

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THE KINGSFORD PRODUCTS COMPANY, LLC,
Petitioner,

v.

CREATIVE SPARK, LLC,
Patent Owner.

Case IPR2016-01831
Patent 9,131,803 B2

Before KRISTINA M. KALAN, CHRISTOPHER M. KAISER, and
ELIZABETH M. ROESEL, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

INTRODUCTION

A. Background

The Kingsford Products Company, LLC (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–32 of U.S. Patent No. 9,131,803 B2 (Ex. 1001, “the ’803 patent”). Creative Spark, LLC (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”). On March 17, 2017, we instituted trial to review the patentability of claims 1–32. Paper 7 (“Inst. Dec.”). Subsequently, Patent Owner filed a Response (Paper 18, “PO Resp”), and Petitioner filed a Reply (Paper 22, “Reply”). We held an oral hearing on December 12, 2017, and a transcript of the hearing has been entered into the record of this proceeding. Paper 31 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. We conclude that Petitioner has established by a preponderance of the evidence that claims 1, 2, 4–12, 17, 19, 20, 21, 23, 24, and 26–32 of the ’803 patent are unpatentable. We also conclude that Petitioner has not established by a preponderance of the evidence that claims 3, 13–16, 18, 22, and 25 are unpatentable.

B. Related Matters

The ’803 patent has been asserted in *Creative Spark, LLC v. The Clorox Co.*, Case No. 1:16-cv-00432 (D. Del.).¹ Paper 5, 1.

¹ The Clorox Company is the parent company of Petitioner. Pet. 62.

C. The Instituted Grounds of Unpatentability

We instituted review of claims 1–32 of the ’803 patent based on the following grounds:

Statutory Ground	Basis	Challenged Claim(s)
§ 103(a)	Burke, ² Wulf, ³ and Peters ⁴	1–32
§ 102(b)	Saunders II ⁵	1–9 and 29

D. The ’803 Patent

The ’803 patent is directed to “[a] charcoal briquet having improved burning characteristics,” such as “a grooved pillow shaped briquet.” Ex. 1001, at [57]. According to the ’803 patent, conventional charcoal briquets are “hard to ignite” and spend “too much time . . . in the ignition phase prior to the cooking phase in which food is actually cooked over the ignited briquets.” *Id.* at 1:63–64, 2:7–12. The ’803 patent purports to have solved this problem by incorporating grooves into the surface of the briquets. *Id.* at 2:63–65. An embodiment is shown in Figures 21–24, which are reproduced below.

² Burke et al., U.S. Patent No. 5,762,656, issued June 9, 1998 (Ex. 1007, “Burke”).

³ Wulf, German Published Patent Application No. 1,138,019, published Oct. 18, 1962 (Ex. 1004, “Wulf”).

⁴ Peters, U.S. Patent No. 4,496,366, issued Jan. 29, 1985 (Ex. 1006, “Peters”).

⁵ Saunders et al., US 2004/0222117 A1, published Nov. 11, 2004 (Ex. 1009, “Saunders II”).

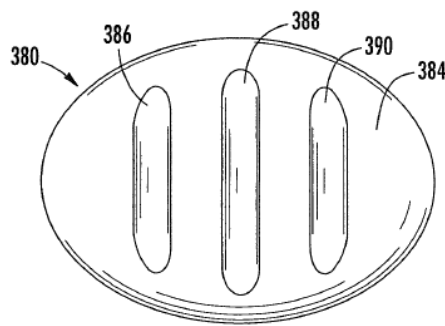


FIG. 22

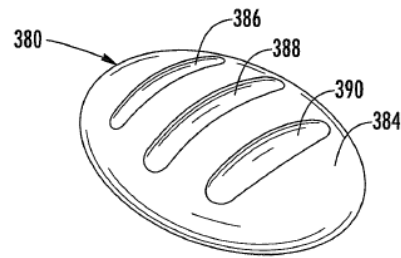


FIG. 21

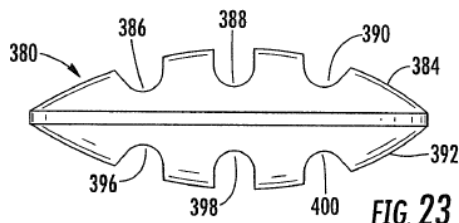


FIG. 23

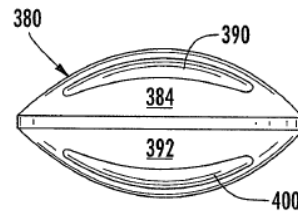


FIG. 24

Figures 21–24, reproduced above, depict a charcoal briquet according to the '803 patent. *Id.* at 3:61–67; *see also id.* at 4:15–21, Figs. 30–33 (another embodiment of grooved charcoal briquette). Briquet 380 “is pillow shaped with an elliptical periphery 382 when viewed from the top.” *Id.* at 11:4–6. The “convex curved top surface” of the briquet has “three deep grooves 386, 388, 390 extending across the short dimension of the top surface 384.” *Id.* at 11:6–9. The briquet is “symmetrical with respect to a horizontal plane passing through its center,” so “bottom surface 392 is also convex and there are three deep grooves 396, 398, 400 in the bottom surface 392.” *Id.* at 11:9–12. “At their deepest points, the individual grooves have a depth dimension of about 25% of the maximum depth dimension of the briquet.” *Id.* at 11:12–14. “The grooves are about as wide as their maximum depth.” *Id.* at 11:17–18.

E. Illustrative Claim

Petitioner challenges all the claims of the '803 patent. Claims 1, 9, 10, 20, 26, and 29–32 are independent. Ex. 1001, 19:54–24:36. Claim 1 is illustrative; it recites:

1. A pillow-shaped charcoal briquet having a total surface area measurable in square inches and a total volume measurable in cubic inches, the ratio of said total surface area to said total volume comprising a value in a range between approximately 13.7 to approximately 2.16;

wherein said briquet further comprises at least one groove formed in at least one surface thereof; and

wherein a depth of the at least one groove varies as a function of distance from an external periphery of the briquet;

wherein said briquet is configured to achieve a cooking temperature of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition and hold about said temperature for at least fifteen minutes thereafter when disposed relative to other similar briquets.

Id. at 19:54–63; *see also id.* at 40 (Certificate of Correction⁶).

ANALYSIS

A. Claim Construction

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144 (2016) (upholding the use of the broadest reasonable interpretation standard). Claim terms

⁶ Claim 1 was corrected via Certificate of Correction dated July 5, 2016, to add the final “wherein” clause of the claim. Ex. 1001, 40 (Certificate of Correction).

generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner proposes constructions for three terms: “charcoal briquet,” “the depth of the . . . grooves varies as a function of distance from an external periphery of the briquet,” and “means for enhancing the circulation of air around said briquet during combustion.” Pet. 23–25. Patent Owner does not dispute any of Petitioner’s proposed constructions. There is no discussion of the proper construction of these terms in either the Patent Owner Response or the Reply. See PO Resp. i–iii (Table of Contents); Reply *passim*.

In the Petition, Petitioner directs us to evidence of record to support its proposed construction of “charcoal briquet” as “a shaped piece of combustible fuel comprising carbonized organic matter.” Pet. 23 (citing Ex. 1001, 1:48–60, 1:58–60; Ex. 1002 ¶¶ 60–61). Petitioner also directs us to evidence to support its proposed construction of “the depth of the . . . grooves varies as a function of distance from an external periphery of the briquet” as “the depth of the groove varies either along its length or across its width.” *Id.* at 24–25 (citing Ex. 1002 ¶¶ 62–63). We have reviewed Petitioner’s intrinsic and extrinsic evidence concerning these two constructions, and determine that Petitioner’s proposed constructions are correct and supported by the cited evidence. Accordingly, we adopt Petitioner’s proposed constructions of these two terms.

In our Institution Decision, we construed “means for enhancing the circulation of air around said briquet during combustion,” used in claims 9

and 29, as “grooves on the outer surface of a briquet, a hole through the center of a briquet, and equivalents of these structures.” Inst. Dec. 6–7. None of the briefing in this case subsequent to that decision discusses the proper construction of this term. The construction we gave this term in the Institution Decision is supported by the evidence to which Petitioner directs us. Pet. 25 (citing Ex. 1001, 7:8–11, 7:51–53, 11:56–59, 17:48–52, Figs. 1–5). Therefore, we maintain the construction of “means for enhancing the circulation of air around said briquet during combustion” as grooves on the outer surface of a briquet, a hole through the center of a briquet, and equivalents of these structures.

B. Asserted Obviousness over Burke, Wulf, and Peters

Petitioner argues that claims 1–32 would have been obvious to a person of ordinary skill in the art in view of the teachings of Burke, Wulf, and Peters. Pet. 27–53.

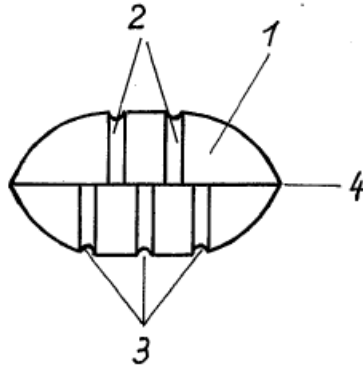
1. Burke

Burke is directed to “[a] solid fuel briquet, such as a charcoal briquet for cooking, which displays selected ignition and burn characteristics.” Ex. 1007, at [57]. In particular, Burke teaches “an ignition phase of less than about 18 minutes, preferably less than about 15 minutes and a burn phase of greater than about 35 minutes.” *Id.* Burke’s briquets are pillow-shaped. *Id.* at 4:21–25, Figs. 1–4. According to Burke, its ignition and burn times can be achieved with any briquet shape. *Id.* at 2:35–40.

2. Wulf

Wulf “relates to a briquette, particularly a[n] anthracite briquette, produced on roller presses, and intended to increase stability.” Ex. 1004, 1.

Wulf's briquets are generally pillow-shaped, and they contain grooves in their surface, as shown in Figure 1, reproduced below.



Id. at 1, Fig. 1. Figure 1 of Wulf, reproduced above, depicts pillow-shaped briquet 1 with two grooves 2 on one side and three grooves 3 on the other side; the “level between the two halves of the briquette is called [the press seam] 4.” *Id.* at 1.

3. *Peters*

Peters relates to “configur[ing]” “[a] charcoal briquet” “to provide a preselected ignition time and total burning time response.” Ex. 1006, at [57]. The briquets of Peters are pillow-shaped. *Id.* at 2:64–68, Figs. 1–3. Peters teaches that “it is desirable that the ignition phase be limited in time so that the briquets may be used for cooking without undue delay, and that the burn phase be extended to provide adequate cooking time for the use intended.” *Id.* at 1:44–48. This is accomplished in Peters by adjusting the “weight to surface area ratio” of the briquets. *Id.* at 2:24–42.

4. *Objective Indicia of Nonobviousness*

Patent Owner argues that the products covered by the challenged claims satisfied a long-felt but previously unmet need, as well as that this is evidence of the nonobviousness of the challenged claims. PO Resp. 48–54.

Patent Owner also argues that skepticism of the solution offered by the challenged claims is evidence of the nonobviousness of those claims. *Id.* at 55–58. Petitioner disputes both of these arguments. Reply 21–23.

a. Long-Felt but Unmet Need

Patent Owner argues that, before the priority date of the challenged claims, there was a long-felt but unmet need for “a charcoal briquet that achieved a cooking temperature of at least, about, or on the order of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition, and sustained that temperature for at least fifteen minutes thereafter.” PO Resp. 48. Establishing a long-felt but unmet need requires showing that the need was both persistent and recognized by those of ordinary skill in the art. *Orthopedic Equipment Co., Inc. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1382 (Fed. Cir. 1983); *In re Gershon*, 372 F.2d 535, 539 (CCPA 1967). The need must not have been satisfied before the invention of the challenged patent, and the invention of the challenged patent must satisfy the need. *Newell Companies v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988); *In re Cavanagh*, 436 F.2d 491, 496 (CCPA 1971).

As evidence of this need, Patent Owner directs us to portions of Peters and Burke. *Id.* at 49–51. Patent Owner also directs us to U.S. Patent No. 5,049,333 (Ex. 2005) and to a Clorox press release from 2006 (Ex. 2010). *Id.* at 50–52. Patent Owner cites two portions of Peters. First, Patent Owner cites the portion of Peters that provides: “[f]or maximum performance . . . it is desirable that the ignition phase be limited in time . . . and that the burn phase be extended to provide adequate cooking time.” *Id.* at 49 (citing Ex. 1006, 1:42–48). According to Patent Owner’s interpretation of this language, “Peters state[s] that it was desirable to provide a charcoal briquet

with a limited ignition time and an extended burning time.” *Id.* We disagree that this portion of Peters necessarily evidences an unmet need for “a charcoal briquet that achieved a cooking temperature of at least, about, or on the order of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition, and sustained that temperature for at least fifteen minutes thereafter.” PO Resp. 48. Instead, it suggests a generic need, whether met or not, for an ignition phase of “limited” duration and a burn phase that is “extended” and “provide[s] adequate cooking time.” Patent Owner does not direct us to evidence in Peters that supports a finding that there was an unmet need for achieving a cooking temperature within about fifteen minutes or for sustaining the cooking temperature for at least fifteen minutes. Patent Owner also does not direct us to evidence in Peters that suggests an attempt and failure to meet a need for any particular cooking temperature.

The second portion of Peters cited by Patent Owner states that “[t]here have been very [few] prior art developments related to design of solid fuel articles for desired combustion performance” and that these earlier developments “do not provide desired optimal ignition and burning characteristics.” Ex. 1006, 1:51–62; *see also id.* at 2:7–9 (increased surface area-to-volume ratio has not “provid[ed] optimal desired ignition and burning characteristics”). Again, this is not evidence of the unmet need for which Patent Owner argues: “a charcoal briquet that achieved a cooking temperature of at least, about, or on the order of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition, and sustained that temperature for at least fifteen minutes thereafter.” PO Resp. 48. Thus, we

are not persuaded that Peters supports the long-felt but unmet need for which Patent Owner argues.

The same is true of Burke. Patent Owner argues that Burke is evidence of a need for “charcoal briquets with a short ignition time and an extended burning time,” and this is supported by Burke’s statement that “[f]or maximum performance . . . it is desirable that the ignition phase be rapid . . . and that the burn phase be extended to provide adequate cooking time.” PO Resp. 50; Ex. 1007, 1:45–49. But this does not support a finding that there was a failed attempt to provide a briquet with a 1000-degree cooking temperature, an ignition time of less than 15 minutes, and a burn time of more than 15 minutes. Patent Owner also cites Burke’s statement that “[t]here have been very [few] prior art developments related to design of solid fuel articles for desired combustion performance” and that these earlier developments “do not provide desired optimal ignition and burning characteristics.” Ex. 1007, 1:52–62; *see also* Ex. 1006, 2:6–8 (increased surface area-to-volume ratio has not “provid[ed] optimal desired ignition and burning characteristics”). As discussed above with respect to the identical language in Peters, this may be evidence of some recognized generic need to optimize the “ignition and burning characteristics” of charcoal briquets, but it is not evidence of the long-felt but unmet need for which Patent Owner argues.

Next, Patent Owner directs us to U.S. Patent No. 5,049,333, which has language substantially identical to that in Peters and Burke. PO Resp. 50 (quoting Ex. 2005, 1:47–51 (“For maximum performance . . . it is desirable that the ignition phase be limited in time . . . and that the burn phase be extended to provide adequate cooking time.”), 1:55–61 (“There have been

very [few] prior art developments related to design of solid fuel compositions and articles for desired combustion performance,” and these “have not provided desired optimal ignition and burning characteristics.”)). As with Peters and Burke, this language supports a general need for a briquet with a relatively short ignition phase and a relatively long burn phase, but not a series of failed attempts to achieve “a charcoal briquet that achieved a cooking temperature of at least, about, or on the order of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition, and sustained that temperature for at least fifteen minutes thereafter.” PO Resp. 48.

Finally, Patent Owner directs us to a Clorox press release announcing the introduction of “Kingsford® charcoal briquets with Sure Fire Grooves™.” PO Resp. 51–52 (citing Ex. 2010, 1–2). In the press release, Clorox describes its new product as “briquets [that] are ready just 15 minutes after lighting – almost 25 percent faster than it would normally take for briquets to get ready for grilling.” Ex. 2010, 1. In addition, the press release quotes “Rick Rodgers, one of Bon Appetit magazine’s ‘Who’s Who in American Barbecue,’” as describing the new briquets as “the first significant advancement in charcoal.” *Id.* at 2. Patent Owner argues that this evidence “shows that previous charcoal briquets took longer than about fifteen minutes after ignition to be ready for cooking” and that “the long-felt need for charcoal briquets with superior ignition and burning characteristics was not solved by the prior art as of the priority date of the challenged claims.” PO Resp. 52. We agree that the Clorox press release supports a finding that there was a general desire among those skilled in the art to design better briquets, but this evidence does not support a finding that

persons skilled in the art tried but failed to achieve the time and temperature characteristics recited in the claims.

The evidence to which Patent Owner directs us is not sufficient to support a finding that those skill in the art recognized an unmet need for “a charcoal briquet that achieved a cooking temperature of at least, about, or on the order of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition, and sustained that temperature for at least fifteen minutes thereafter.” PO Resp. 48. Accordingly, we are not persuaded that the evidence of record supports a finding that there was a long-felt but unmet need for such a briquet.

b. Skepticism of Experts

“Evidence of industry skepticism weighs in favor of non-obviousness.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1335 (Fed. Cir. 2016). An example of such evidence is “evidence that an audience of over 200 people at an industry workshop . . . expressed shock when” the results achieved by the claimed invention were announced, or that people told the inventor that “it was impossible to produce” the claimed invention. *Id.* Other examples include evidence that experts in the field thought the claimed invention was “counterintuitive,” that the inventor was not allowed by authorities in the field to test the invention, and that the inventor had difficulty publishing the results achieved by the invention “in peer-reviewed journals.” *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1367 (Fed. Cir. 2012). Additionally, statements by experts that the claimed invention “simply doesn’t work” may constitute industry skepticism. *Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1365–66 (Fed. Cir. 2012). Further evidence of industry skepticism may include evidence that the

inventors of the prior art “expressed skepticism that [a prototype of the claimed invention] offered advantages over [the prior art].” *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 668 (Fed. Cir. 2000). Thus, relevant skepticism is expressed at the time of invention. *WBIP*, 829 F.3d at 1335 (skepticism in results achieved by invention, which obviously could not have been expressed before those results occurred); *Kinetic Concepts*, 688 F.3d at 1367 (skepticism in inventor not being allowed to test invention, which inventor could not have done until the invention was made).

Patent Owner’s proffered evidence of skepticism regarding the invention of the claims challenged here consists of two types of statements. PO Resp. 55–57. First, Patent Owner directs us to a book by Georg Franke titled “A Handbook of Briquetting,” which was translated from German into English in 1916 and published in English in 1917. Ex. 1011, 3, 5, 7. The translator characterizes Professor Franke as “undoubtedly [the] master of his subject.” *Id.* at 9. Patent Owner relies on Franke’s observation that “round indentations [placed] in the middle of each of the long narrow sides” of lignite briquets “are accompanied by not unimportant disadvantages such as premature crumbling during combustion.” *Id.* at 74–75; *see* PO Resp. 55. Although Franke’s observation applies only to lignite coal, Patent Owner’s declarant, Dr. Speight, testifies that the observation could be extended to charcoal briquets, because charcoal briquets “require a binder to hold their shape,” and the “binder breaks down during combustion.” PO Resp. 55–56 (citing Ex. 2021 ¶¶ 226–27).

We have considered Patent Owner’s arguments, but we are not persuaded that Franke’s statements, even as supplemented by the testimony of Dr. Speight, show skepticism regarding the invention of the challenged

claims. As discussed above, relevant skepticism is expressed at the time of the invention of the claims in question, and it is directed at the feasibility of the claimed invention itself or the results of that invention. Here, Professor Franke's statements were made before 1917. The application leading to the '803 patent was filed in 2011 and claims priority to applications filed as early as 2002. Ex. 1001, at [22], [63]. Thus, Professor Franke's statements were made at least 85 years before the invention of the '803 patent, not at or around the time of the invention. In addition, Professor Franke's statements were directed at briquets made of a different material than the briquets of the '803 patent—lignite coal, rather than charcoal. Furthermore, the briquets discussed by Professor Franke were made using technology available before 1917, not technology available in 2002 or 2011. Professor Franke's belief that grooved lignite briquets made using early 20th century technology were likely to crumble prematurely during combustion thus is not sufficiently pertinent to the '803 patent to persuade us that it represents a relevant skepticism on the part of experts in the field at the time of the invention of the '803 patent.

Patent Owner also relies on statements in Peters and Burke that the “provision of external surface discontinuities such as ribs, flutes, groups, slots or the like, and internal openings and passages of various configurations,” “may enhance commencement of ignition or overall combustion, but do[es] not provide desired optimal ignition and burning characteristics.” PO Resp. 56–57 (citing Ex. 1006, 1:53–62; Ex. 1007, 1:54–62).⁷

⁷ Patent Owner mistakenly cites the statement in Peters twice rather than citing both the statement in Peters and the identical statement in Burke.

These statements could be interpreted, as Patent Owner suggests they should be, as meaning that the named “surface discontinuities” and “internal openings and passages” were thought to be incapable of ever delivering “desired optimal ignition and burning characteristics.” But they also could be interpreted as meaning that, up to that point in time, although it was acknowledged that such attempts enhanced commencement of ignition or overall combustion, none of the named “surface discontinuities” and “internal openings and passages” had yet succeeded in providing “desired optimal ignition and burning characteristics.” On the record developed during this proceeding, we find the latter meaning is the better view. The statements in Peters and Burke occur in the middle of sections titled “Background of the Invention.” Ex. 1006, 1:4–2:21; Ex. 1007, 1:3–2:27. In Burke, the statement is in a subsection titled “Brief Statement of the Related Art.” Ex. 1007, 1:23–2:27. This indicates that the statements summarize the then-current art, rather than opine on the impossibility of future developments. Further, the paragraphs from which the statements in question are drawn both begin with the statement that “There have been very [few] prior art developments related to design of solid fuel articles for desired combustion performance,” which strongly suggests that those paragraphs are focused on the features of and results achieved by the prior art, not on the possibilities of future development. Ex. 1006, 1:51–62;⁸ Ex.

⁸ The paragraph break that precedes this sentence in Burke is missing from Peters, so the relevant paragraph in Peters begins “Thereafter [i.e., after ignition] the briquets are typically spread under a grill or the like for cooking, and they continue to burn with an intense heat throughout a ‘burn phase.’” Ex. 1006, 1:41–43. This implies even more strongly that the paragraph in question is discussing the performance of typical briquets at the

1007, 1:52–62. As discussed above, industry skepticism consists of statements that the claimed device is impossible, counterintuitive, shocking, or in some way unexpected, not of statements that the results achieved by the claimed device have not been achieved previously. *WBIP*, 829 F.3d at 1335; *Santarus*, 694 F.3d at 1365–66; *Kinetic Concepts*, 688 F.3d at 1367; *Ruiz*, 234 F.3d at 668.

Moreover, the sentences in question both begin with the statement that “There has been some work at ornamental configuration of fuel briquets, as well as geometrical configuration of briquets to enhance ignition or burning by enhancing air supply.” Ex. 1006, 1:53–57; Ex. 1007, 1:54–57. Only after this statement do Peters and Burke identify the named “surface discontinuities” and “internal openings and passages” as examples of the “ornamental” or “geometric configuration” of briquets. Ex. 1006, 1:57–62; Ex. 1007, 1:57–62. This suggests that the reported failure to “provide desired optimal ignition and burning characteristics” is a description of results achieved to date in the prior art, rather than a statement about what might be possible in the future. Thus, we are not persuaded that the preponderance of the evidence made of record in this proceeding supports a finding that experts in the field were skeptical of the invention of the ’803 patent in any way that suggests the nonobviousness of that invention.

5. *Reason to Combine Burke, Wulf, and Peters*

a. Petitioner’s Arguments

Petitioner argues that a person of ordinary skill in the art would have had a reason to combine the teachings of Burke, Wulf, and Peters. Pet. 27–

time, not the outer envelope of what is possible in the field of charcoal briquet technology.

28. Specifically, Petitioner argues that a person of ordinary skill in the art would have started with Burke's briquets because those briquets "achieved an ignition time of preferably less than fifteen minutes and a burn time of greater than about 35 minutes, regardless of briquet shape." *Id.* at 27 (citing Ex. 1002 ¶ 89; Ex. 1007, 2:35–40). Petitioner argues that the person of ordinary skill in the art would have known that the addition of grooves, such as those taught by Wulf, to the surface of a briquet "would have 'enhance[d] commencement of ignition and/or overall combustion' through 'enhancing air supply.'" *Id.* (quoting Ex. 1007, 1:54–61 (alteration in original)) (citing Ex. 1002 ¶ 94; Ex. 1006, 1:53–60). Further, Petitioner argues that the person of ordinary skill in the art would have known that enhancing "commencement of ignition and/or overall combustion" was beneficial, because "Peters teaches that 'it is desirable that the ignition phase be limited in time so that the briquets may be used for cooking without undue delay, and that the burn phase be extended to provide adequate cooking time for the use intended.'" *Id.* (quoting Ex. 1006, 1:44–48). Because briquets with the surface area-to-volume ratios ("SAVRs") taught by Peters achieved the beneficial result of decreasing ignition time and increasing burn time, Petitioner argues that the person of ordinary skill in the art would have sought to make briquets with those SAVRs. Pet. 28 (citing Ex. 1002 ¶¶ 95, 106; Ex. 1006, 1:44–48). Thus, Petitioner argues that a person of ordinary skill in the art would have sought to achieve Peters's results of decreased ignition time and increased burn time by modifying Burke's briquets, which already had relatively short ignition time and relatively long burn time that were not dependent on briquet shape, to have Wulf's grooves, thereby causing the briquets to have the SAVRs taught by Peters. *Id.* (citing Ex.

1002 ¶¶ 95, 97, 100). Patent Owner does not dispute any of this evidence but, as discussed below, argues for a number of reasons that, despite this evidence, a person of ordinary skill in the art would not have combined the teachings of Burke, Wulf, and Peters in the manner Petitioner suggests.

b. Patent Owner's Arguments

Against Petitioner's evidence, Patent Owner argues (i) that both Burke and Peters teach away from using grooved charcoal briquets; (ii) that a person of ordinary skill in the art would have been discouraged from pressing Wulf's grooves into Burke's briquets because the person would have known that doing so would have led to crumbling, broken briquets; and (iii) that Petitioner's reason-to-combine theory is based on hindsight. PO Resp. 7–22. We address each of these arguments in turn, below.

(1) Teaching Away

Patent Owner argues that Burke and Peters teach away from using grooved briquets, relying on the statements in Burke and Peters that “provision of external surface discontinuities such as ribs, flutes, groups, slots, or the like . . . may enhance commencement of ignition or overall combustion, but do not provide desired optimal ignition and burning characteristics.” *Id.* at 8 (quoting Ex. 1006, 1:53–62; Ex. 1007, 1:54–62) (emphases omitted). We are not persuaded that this language teaches away from the use of either surface discontinuities generally or grooves specifically. A reference does not teach away unless it criticizes, discredits, or otherwise discourages the claimed solution. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). As discussed herein with respect to skepticism of experts, we find that these statements in Burke and Peters describe the unsatisfactory results achieved to date in the prior art, not the limited

potential for future investigation. Thus, when the statements in Burke and Peters are interpreted properly in light of the text that surrounds them, as discussed herein, they do not criticize, discredit, or discourage any potential use of grooves or other surface discontinuities.

(2) Microfractures

Patent Owner's second argument is that a person of ordinary skill in the art would have been discouraged from pressing Wulf's grooves into Burke's briquets because doing so would have caused microfractures that would have led to crumbling, broken briquets. PO Resp. 11–19. Patent Owner offers evidence that using rollers to press grooves like those taught by Wulf into charcoal briquets would create microfractures. *Id.* at 12–13 (citing Ex. 1004, 1 (Wulf teaches roller-pressing grooves into anthracite, lignite, or ore briquets, not charcoal briquets); Ex. 2021 ¶ 96 (applying compressive forces to charcoal causes the charcoal to develop microcracks or microfractures), ¶ 97 (charcoal is particularly susceptible to microfractures when the compressive force is applied in a line); Ex. 2023, 137:7–11 (Petitioner's declarant admitting that pressing grooves into a charcoal briquet could cause microfractures)). Patent Owner also offers evidence that the presence of microfractures makes briquets crumble prematurely during combustion and makes briquets less likely to survive handling, packaging, transport, and storage intact. *Id.* at 14–19 (citing Ex. 1001, 1:61–63, 2:2–5; Ex. 1006, 1:67–2:1; Ex. 1007, 1:66–2:1, 5:47–50, 5:56–6:7, 6:12–16, Table V; Ex. 1011, 27, 39, 75; Ex. 2011, 2–4; Ex. 2013, 9; Ex. 2016, 3; Ex. 2017, 12; Ex. 2018, 1:52–66, 3:18–19, 3:41–44; Ex. 2021 ¶¶ 58, 59, 61–64, 99–112; Ex. 2023, 87:24–89:7, 91:13–17, 99:2–10, 137:23–138:5, 145:21–25; 320:15–17).

The question here is not solely whether microfractures could occur in the briquets resulting from the combination of Burke, Wulf, and Peters, nor whether those microfractures could lead to deleterious results. Instead, the question is whether a person of ordinary skill in the art would have combined the teachings of Burke, Wulf, and Peters in the manner claimed in the '803 patent with a reasonable expectation of success. On this point, we have considered Dr. Speight's testimony that

[a] person of ordinary skill in the art would have understood that using roller pressing to press grooves into a charcoal briquet as described in Wulf would have led to an unacceptably structurally weak charcoal briquet, subject to premature crumbling during combustion and likely to shatter during shipping, handling, and use.

Ex. 2021 ¶ 89;⁹ *see* PO Resp. 11–19. Dr. Speight's testimony is unsupported by additional objective evidence and, therefore, as discussed below, outweighed by Petitioner's evidence that a person of ordinary skill in the art would have wanted to use grooved briquets in order to provide improved ignition and combustion characteristics by enhancing air flow around the briquet. Ex. 1002 ¶ 94; Ex. 1006, 1:53–60; Ex. 1007, 1:54–61. In addition to the testimony of Petitioner's declarant, Ex. 1002 ¶ 94, both Burke and Peters state that the “provision of external surface discontinuities such as . . . slots or the like” is a way of “enhanc[ing] ignition or burning by enhancing air supply,” providing objective evidence that a person of ordinary skill in the art would have pursued grooves as a way of enhancing air supply to a charcoal briquet. Ex. 1006, 1:53–60; Ex. 1007, 1:54–61.

⁹ Patent Owner mistakenly cites paragraph 88 of Dr. Speight's declaration instead of paragraph 89, where this statement is made.

On this issue, in addition to directing us to objective evidence of the benefits of adding grooves to charcoal briquets, Petitioner directs us to the testimony of Donald Swatling, who “has worked in the commercial charcoal briquetting field since 1999, has direct, personal experience using roller presses to make grooved charcoal briquets before 2004, and has supported the technical aspects of the commercial production of grooved charcoal briquets using roller presses.” Reply 15 (citing Ex. 1030 ¶¶ 4–9) (emphasis removed). In his testimony, Mr. Swatling, a fact witness who approximates a person of ordinary skill in the relevant art, “states that he was never aware of any concern that the standard roller presses used to manufacture charcoal briquets would cause structural weaknesses that would lead to premature crumbing during combustion if used to produce grooved briquets” or any concern that “roller pressing would cause a charcoal briquet to be unacceptably susceptible to breakage under normal shipping, storage, handling or use conditions.” *Id.* at 15–16 (citing Ex. 1030 ¶¶ 10–15). This is significant evidence that a person of ordinary skill in the art was not troubled by the microfracture concerns Dr. Speight raises, or at least that a person of ordinary skill in the art was not so troubled that he would have been persuaded not to pursue roller-pressed grooves as an option in briquet design and production.

In contrast to Petitioner’s evidence that a person of ordinary skill in the art would not be concerned enough with the possibility of microfractures to avoid obtaining the advantages attributed to grooves by Burke and Peters, Patent Owner’s evidence takes the form of unsupported and speculative expert testimony relating only to the issue of whether microfractures would or could occur. Dr. Speight testifies that “compressive force *can* cause a

briquet to fracture or break” and that “compressive force well short of the force required to break a charcoal briquet completely *can* nonetheless cause microfractures or microcracks in a briquet.” Ex. 2021 ¶ 96 (citing Ex. 2011, 3) (emphases added). This evidence is speculative in that it focuses on the possibility that microfractures might form, not whether they actually would form under the conditions necessary to apply Wulf’s grooves to Burke’s briquets. Moreover, it supports, at most, only a finding that microfractures might occur, not a finding that a person of ordinary skill in the art would have recognized that possibility or a finding that the person of ordinary skill in the art would have been led away from adding grooves to a briquet because of that recognition. Similarly, Dr. Speight testifies that “a point load on a charcoal briquet will cause more extensive microfracturing in a charcoal briquet than a surface load of the same magnitude,” without showing that the greater microfracturing caused by pressing Wulf-style grooves into a briquet was known to be such a problem that those grooves should be avoided. Ex. 2021 ¶ 97 (citing Ex. 2012, 9–10). As for Dr. Speight’s evidence that premature crumbling was known to occur in certain shapes of brown coal bricks made using the technology available in 1917, Ex. 2021 ¶¶ 101–102 (citing Ex. 1011, 73–76), this still does not support a finding that a person of ordinary skill in the art was aware of a microfracturing problem with pressing grooves into charcoal briquets made using technology available at the time of the invention of the ’803 patent and would have been led away by that awareness from the benefits of using those grooves.

Thus, Petitioner directs us to record evidence that there was a known benefit to making charcoal briquets with grooves in their surfaces and that a

person of ordinary skill in the art was not so concerned with the possibility of weakening the briquets through the creation of microfractures as to forgo the known benefits of including grooves. Against this evidence, Patent Owner provides supported expert testimony only that pressing grooves into charcoal briquets could—not would—cause microfractures and that similar products made using century-old technology were known to crumble prematurely. Dr. Speight’s conclusion that “adding Wulf’s roller-pressed grooves to the charcoal briquets described in Burke and Peters would have produced an unacceptably weak briquet,” Ex. 2021 ¶ 112, does not follow from this evidence. Nor does his conclusion that “[a] person of ordinary skill in the art would not have modified Burke’s and Peters’ briquets to include roller-pressed grooves as taught by Wulf.” *Id.* In short, we are persuaded that Petitioner’s evidence of a motivation to combine the teachings of Burke, Wulf, and Peters by providing roller-pressed grooves in charcoal briquet outweighs Patent Owner’s evidence relating to microfractures.

(3) Hindsight

Patent Owner argues that Petitioner’s reason-to-combine theory is based on hindsight. PO Resp. 19–22. This argument is supported by three separate points made by Patent Owner. First, Patent Owner argues that Petitioner disparaged grooved charcoal briquets in its earlier patent filings and therefore should not be permitted to argue now that a person of ordinary skill in the art would have pursued the option of grooved briquets based on the combined teachings of the prior art. *Id.* at 19–20. As discussed above, however, we are not persuaded that Burke and Peters, Petitioner’s earlier patent filings, disparage the use of grooved charcoal briquets. Instead, they

merely report the disappointing nature of the results achieved to date using surface discontinuities such as grooves.

Next, Patent Owner argues that adding grooves to the briquets of Burke and Peters would have defeated the objective of those references to provide an extended cooking time, because adding grooves to the surface of a briquet decreases the length of the cooking phase. PO Resp. 20–21. Patent Owner directs us to evidence that a long cooking time was desirable. Ex. 1006, 1:43–48, 2:10–14; Ex. 1007, 1:45–49, Ex. 2023, 186:15–22, 187:9–12. Patent Owner also cites evidence suggesting that adding grooves to a briquet can decrease the cooking time that briquet provides. Ex. 2023, 190:6–25. The evidence of record, however, persuades us that a person of ordinary skill in the art would have been motivated to design a briquet to achieve both a fast ignition phase and an extended cooking phase and that he would have viewed grooves as one way to achieve both of these goals, without unduly compromising either one. First, there is evidence suggesting that adding grooves to a briquet may not necessarily result in a shortened cooking phase at all, because other changes could be made to the briquet to increase the length of the cooking phase. *Id.* at 191:1–192:6 (Dr. Smith testifying that “there [are] several other things that affect the burn phase, or the cooking time,” such as composition or how the charcoal is configured). Second, as discussed above, Petitioner relies on Burke to teach the briquet to which a person of ordinary skill in the art would add grooves to adjust the surface area-to-volume ratio of the briquet. Pet. 27 (citing Ex. 1002 ¶ 89; Ex. 1007, 2:35–40). Burke’s briquets “provide[] . . . a desired burn phase of greater than about 35 minutes . . . with respect to *any* desired briquet shape,” Ex. 1007, 2:35–40 (emphasis added), suggesting that changing the shape of

Burke's briquets by adding grooves would not result in a decrease of the cooking phase below 35 minutes.

Finally, Patent Owner argues that the length of time between the publication of Burke, Wulf, and Peters and the invention of the '803 patent shows that the combination of those references must be a matter of hindsight, because, if the combination really were obvious, it would not have taken so long for someone to try combining the teachings of the references. PO Resp. 21–22. We note first that, generally, “the mere passage of time without the claimed invention is not evidence of nonobviousness.” *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (citing *In re Wright*, 569 F.2d 1124, 1127 (CCPA 1977)). However, in some cases, a long time between the publication of prior-art references and the invention of a challenged claim can be evidence of nonobviousness, such as when there is also a showing of long-felt need or the failure of others. *Id.* In *Leo Pharm. Prods., Ltd. v. Rea*, an interval of fourteen years between the last-published reference in a combination and the invention of the claim at issue was considered evidence of non-obviousness, but not simply because of the passage of time. 726 F.3d 1346, 1357 (Fed. Cir. 2013). There was additional evidence that “the problem [solved by the invention] was not known, the possible approaches to solving the problem were not known or finite, and the solution was not predictable.” *Id.* at 1356–1357.

Here, the latest of Petitioner's references, Burke, was issued in 1998. Ex. 1007, at [45]. Patent Owner alleges that the priority date of the challenged claims is June 1, 2004. PO Resp. 21. This interval of six years is much less than the fourteen years in *Leo*. Moreover, Patent Owner has not pointed us to evidence of a lack of expectation of a successful result or the

failure of the prior art to provide direction regarding the addition of grooves in the briquette. Thus, we are persuaded that Petitioner has met its burden to prove obviousness without relying on impermissible hindsight, notwithstanding a six-year gap between the publication of Burke and the invention of the '803 patent.

c. Conclusion with Respect to Reasons to Combine

Petitioner has shown by a preponderance of the evidence that a person of ordinary skill in the art would have sought to achieve the results of decreased ignition time and increased burn time reported by Peters by modifying Burke's briquets, which already had a relatively short ignition time and a relatively long burn time independent of briquet shape, to have Wulf's grooves, causing the briquets to have the surface area-to-volume ratios taught by Peters. As discussed above with respect to Petitioner's arguments, there is significant evidence to support Petitioner's position, and Patent Owner does not contest any of Petitioner's evidence. We determine that Petitioner's evidence outweighs the evidence cited in support of Patent Owner's counterarguments, including that Burke and Peters teach away from the use of grooved charcoal briquets, that a person of ordinary skill in the art would have avoided roller-pressed grooves due to the risk of microfractures, and that Petitioner's obviousness theory is based on hindsight. Accordingly, we find that the person of ordinary skill in the art would have had a reason to combine the teachings of Burke, Wulf, and Peters.

6. *Analysis of Independent Claims*

Claims 1, 9, 10, 20, 26, and 29–32 of the '803 patent are independent. Petitioner argues that each of these claims would have been obvious to a

person of ordinary skill in the art given the teachings of Burke, Wulf, and Peters. Pet. 27–49. We have determined that a person of ordinary skill in the art would have had a reason to combine the teachings of Burke, Wulf, and Peters. Below, we consider whether the evidence of record supports a finding that the combination of Burke, Wulf, and Peters teaches or suggests the limitations of these claims, including the overall scope of each claim.

a. Claim 1

Petitioner argues that the combination of Burke, Wulf, and Peters teaches or suggests all the limitations of claim 1. Pet. 29–38. Patent Owner disagrees, arguing that this combination of references would not have taught a person of ordinary skill in the art a briquet configured to achieve a cooking temperature of at least 1000 °F within 15 minutes of ignition and to maintain that cooking temperature for at least 15 minutes. PO Resp. 22–39.

Peters teaches or suggests pillow-shaped charcoal briquets with surface area-to-volume ratios in the range of 2.87 to 6.23, which is encompassed by the range recited in claim 1. Pet. 29–30 (citing Ex. 1006, Table I, Table III). Wulf teaches or suggests at least one groove formed in at least one surface of a briquet. Pet. 29 (citing Ex. 1004, 1). In addition, Wulf teaches or suggests U-shaped grooves whose depth varies within the groove as a function of distance from the external periphery of the briquet. Pet. 32–33 (citing Ex. 1004, 1–2; Ex. 1002 ¶¶ 98–99).

As noted above, the parties dispute whether the prior art teaches or suggests the claim 1 limitation “wherein said briquet is configured to achieve a cooking temperature of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition and hold about said temperature for at least fifteen minutes thereafter when disposed relative to other similar

briquets.” Burke teaches achieving a cooking temperature within 15 minutes and maintaining that temperature for at least 15 minutes. Pet. 33–34 (citing Ex. 1007, at [57], 2:35–40, 4:4–12). Patent Owner argues that Petitioner has not shown that the prior art teaches or suggests a cooking temperature of 1000 °F. PO Resp. 23–39. According to Patent Owner, Peters and Wulf do not discuss cooking temperatures at all. Ex. 1004; Ex. 1006. And Burke teaches cooking temperatures of much less than 1000 °F. Ex. 1007, 4:42–56 (cooking temperatures of 275 to 480 °F), 8:13–35 (highest peak temperature of 439.5 °F).

Although we agree with Patent Owner that Burke mentions cooking temperatures that are much less than 1000 °F, Burke’s temperatures “were measured by thermocouples placed over the burn vessel.”¹⁰ *Id.* at 7:57–58. Comparing Burke’s temperatures, which were “measured by thermocouples placed over the burn vessel,” directly with the 1000 degrees Fahrenheit recited in the ’803 patent is not appropriate, because the temperature recited in the ’803 patent is intended to be measured using a thermocouple inserted into a pile of burning briquets. Ex. 1029, 17:17–22:7 (discussing the method used to measure temperatures in the ’803 patent). Notwithstanding the different manner of measuring temperatures used in Burke, we note that the ’803 patent states that “conventional standard charcoal briquets” reach 1000

¹⁰ Although Burke also suggests that its reported “Peak Temperature” was the “maximum temperature reached at the surface of the briquet,” *id.* at 8:34–35, the evidence of record in this proceeding shows that charcoal does not even ignite at temperatures as low as 480 °F, so we understand this definition of peak temperature to be an error. Ex. 2014, 23 (charcoal ignites at 800 to 1000 °F, depending on the way the charcoal is carbonized); Ex. 2015, 380–81 (charcoal may ignite at temperatures as low as 644 °F, depending on how the charcoal is made).

°F, and it describes this temperature as a “ready-to-cook temperature.” Ex. 1001, 7:54–66. Accordingly, in the absence of any disclosure in Burke regarding the temperature that would have been measured inside the pile of burning briquets, a person of ordinary skill in the art would have expected the briquets to have reached a temperature of 1000 °F when they were ready to cook. Because the combination of Burke, Wulf, and Peters teaches or suggests every limitation of claim 1 except the 1000-degree cooking temperature, and because the record establishes that a 1000-degree cooking temperature is “conventional,” Ex. 1001, 7:54–66, we conclude that Petitioner has shown by a preponderance of the evidence that claim 1 is obvious over the combination of Burke, Wulf, and Peters.

b. Claim 9

Claim 9 is similar to claim 1, but with the groove-related limitations replaced with a limitation reciting “wherein said briquet further comprises at least one means for enhancing the circulation of air around said briquet during combustion.” Ex. 1001, 20:46–64. In addition, claim 9 is not limited to a “pillow-shaped briquet.” *Id.* Patent Owner does not argue the patentability of claim 9 separately. PO Resp. 22–47. As discussed above, we construe the means-plus-function term as grooves on the surface of the briquet, a hole through the center of the briquet, and equivalents of these structures. Accordingly, the discussion above of claim 1 with respect to the limitations having to do with grooves applies equally to the means-plus-function limitation of claim 9. For the reasons discussed above with respect to claim 1, Petitioner has shown by a preponderance of the evidence that claim 9 is obvious over the combination of Burke, Wulf, and Peters.

c. Claim 10

Claim 10 is similar to claim 1, but additionally recites “a convex upper surface, a convex lower surface, and a plurality of grooves extending across a majority of both said convex [surfaces].” Ex. 1001, 20:65–21:16. Moreover, claim 10 does not recite the surface area-to-volume limitation or the depth-versus-distance-from-the-periphery limitation of claim 1. *Id.* Patent Owner does not argue the patentability of claim 10 separately. PO Resp. 22–47. Regarding the convex surface limitations, Petitioner has shown by a preponderance of the evidence that Burke, Wulf, and Peters teach or suggest convex upper and lower surfaces. Pet. 45 (citing Ex. 1004, Fig. 1; Ex. 1006, Figs. 2, 3; Ex. 1007, Figs. 3, 4). Although Petitioner does not address the plurality-of-grooves limitation of claim 10 expressly, Petitioner does discuss “the briquet’s grooves,” Pet. 45, and Wulf does teach more than a single groove that extends across a majority of each surface. Ex. 1004, Fig. 1. For these reasons, and for the reasons discussed above with respect to claim 1, Petitioner has shown by a preponderance of the evidence that claim 10 is obvious over the combination of Burke, Wulf, and Peters.

d. Claim 20

Claim 20 is similar to claim 10 but additionally recites “wherein a depth of the grooves varies as a function of distance from an external periphery of the briquet.” Ex. 1001, 21:45–59. Patent Owner does not argue the patentability of claim 20 separately. PO Resp. 22–47. As discussed above with respect to claims 1 and 10, Petitioner has shown by a preponderance of the evidence that this limitation is taught or suggested by the combination of Burke, Wulf, and Peters. Accordingly, for the reasons

discussed above with respect to claims 1 and 10, Petitioner has shown by a preponderance of the evidence that claim 20 is obvious over the combination of Burke, Wulf, and Peters.

e. Claim 26

Claim 26 is similar to claim 20, but it additionally recites “a width of at least a portion of each of the grooves at the convex upper surface is greater than a width of the same portion of the same groove at a prescribed depth below the convex upper surface within said briquette.” Ex. 1001, 22:13–39. Patent Owner does not argue the patentability of claim 26 separately. PO Resp. 22–47. Petitioner argues that “Wulf’s ‘U’ shaped grooves are wider at the convex surface than . . . below the convex surface of the briquet.” Pet. 46 (citing Ex. 1004, Fig. 1). Although Petitioner relies on Wulf’s Figure 1, which is not drawn to scale, the limitation of claim 26 that requires that the “width of at least a portion of each of the grooves at the convex upper surface [be] greater than a width of the same portion of the same groove at a prescribed depth below the convex upper surface within said briquette” recites a qualitative relationship between two widths of the groove, not a quantitative one. Claim 26 does not require that the width at the top of the groove be any particular amount greater than the width at a prescribed depth within the groove, only that the former be greater than the latter. Ex. 1001, 22:13–39. Figures that are not drawn to scale may be relied upon to disclose qualitative relationships between measured quantities, even though they may not be relied upon to disclose precise quantitative relationships between those same quantities. *In re Wolfensperger*, 302 F.2d 950, 955–56 (CCPA 1962) (relying on not-to-scale drawings to disclose “a radial width smaller than the radial width of said

chamber”). Accordingly, and as discussed above with respect to claims 1, 10, and 20, Petitioner has shown by a preponderance of the evidence that claim 26 is obvious over the combination of Burke, Wulf, and Peters.

f. Claim 29

Claim 29 is similar to claim 9, but it additionally recites that the value of the surface area-to-volume ratio “is selected so that said achieving a cooking temperature within about fifteen minutes after ignition and holding at least said temperature for at least fifteen minutes thereafter is substantially unaffected by or irrespective of a composition of the briquet.” Ex. 1001, 22:47–23:4. Patent Owner does not argue the patentability of claim 29 separately. PO Resp. 22–47. Petitioner has shown by a preponderance of the evidence that this limitation is taught or suggested by Burke and Peters, which both teach achieving their “ignition and burning characteristics over a variety of . . . compositions.” Pet. 44 (citing Ex. 1006, 2:24–27; Ex. 1007, 2:31–40). Accordingly, and for the reasons discussed above with respect to claims 1 and 9, Petitioner has shown by a preponderance of the evidence that claim 29 is obvious over the combination of Burke, Wulf, and Peters.

g. Claim 30

Claim 30 is similar to claim 10 but (like claim 29) also recites that the configuration and depth of the grooves “cooperate” to enable the achievement of the recited time and temperature limitations to be “substantially unaffected by or irrespective of a composition of the briquet.” Ex. 1001, 23:5–26. Patent Owner does not argue the patentability of claim 30 separately. PO Resp. 22–47. For the reasons discussed above with respect to claims 1, 10, and 29, Petitioner has shown by a preponderance of

the evidence that claim 30 is obvious over the combination of Burke, Wulf, and Peters.

h. Claim 31

Claim 31 is similar to claim 30, but it does not require a pillow-shaped briquet and does require the briquet to be made of “a burnable composition.” Ex. 1001, 23:27–24:15. In addition, claim 31 requires that the shape of the briquet be configured to enable the achievement of the time and temperature limitations “for any of a plurality of burnable compositions.” *Id.* Patent Owner does not argue the patentability of claim 31 separately. PO Resp. 22–47. Petitioner has directed us to evidence of record supporting the obviousness of both of these limitations. Pet. 44 (citing Ex. 1006, 2:24–27; Ex. 1007, 2:31–40), 48 (citing Ex. 1004, 1). Accordingly, and for the reasons discussed above with respect to claims 1, 10, 29, and 30, Petitioner has shown by a preponderance of the evidence that claim 31 is obvious over the combination of Burke, Wulf, and Peters.

i. Claim 32

Claim 32 is similar to claim 31, but rather than requiring that the use of multiple compositions be enabled by the shape alone, it requires that the “plurality of grooves” and the “shape” cooperate to enable this. Ex. 1001, 24:16–36. Patent Owner does not argue the patentability of claim 32 separately. PO Resp. 22–47. For the reasons discussed above with respect to claims 30 and 31, Petitioner has shown by a preponderance of the evidence that claim 32 is obvious over the combination of Burke, Wulf, and Peters.

7. Analysis of Dependent Claims

Claims 2–8, 11–19, 21–25, 27, and 28 of the ’803 patent are dependent claims. Petitioner argues that each of these claims would have been obvious to a person of ordinary skill in the art given the teachings of Burke, Wulf, and Peters. Pet. 38–53. We incorporate herein, where applicable, our prior analysis regarding the reasons to combine Burke, Wulf, and Peters in reaching our conclusions as to the dependent claims.

a. Claim 2

Claim 2 of the ’803 patent depends from claim 1 and adds limitations requiring first that “said at least one groove comprises a plurality of substantially parallel grooves extending across a majority of said upper surface” and second that “each of said grooves comprises a width and a depth, said width comprising a relationship to said depth.” Ex. 1001, 19:64–20:3. Patent Owner does not argue the patentability of claim 2 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are taught by Wulf; we are persuaded by Petitioner’s presentation of the evidence. Pet. 39–40 (citing Ex. 1004, Fig. 1). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 2 is obvious over the combination of Burke, Wulf, and Peters.

b. Claim 3

Claim 3 depends from claim 2 and requires that the relationship between groove width and groove depth “comprises said width being substantially equal to said depth over at least a portion of said groove.” Ex. 1001, 20:4–6. Petitioner argues that Figure 1 of Wulf depicts U-shaped grooves with “widths . . . substantially equal to the depth of the grooves over at least a portion of the grooves.” Pet. 39–40 (citing Ex. 1002 ¶ 120; Ex.

1004, Fig. 1); *see* Reply 19. Patent Owner responds that “Wulf provides no measurements and no dimensions for its grooves” and that it is improper to rely on measurement of a drawing that is not described as being to scale. PO Resp. 41. We agree with Patent Owner. “Absent any written description in the specification of quantitative values, arguments based on measurement of a drawing are of little value.” *Wright*, 569 F.2d at 1127. The relationship between the width and the depth of the grooves in claim 3 is a quantitative relationship that Petitioner would need to establish with quantitative evidence. But Petitioner and its expert rely entirely on the depiction of grooves in Figure 1 of Wulf, and Figure 1 is not described in Wulf as to scale. “[P]atent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue,” because “figures in a patent are not drawn to scale unless otherwise indicated.” *Hockerson-Halberstadt, Inc. v. Avia Group Int’l, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000). Moreover, even if Figure 1 of Wulf were to scale, both parties’ experts agree that “the ‘nadir of the concave portion of the groove’ . . . may not represent the maximum depth of the grooves” of Wulf. PO Resp. 47 (citing Ex. 2021 ¶¶ 185–86; Ex. 2023, 122:10–19). Accordingly, Petitioner has not shown by a preponderance of the evidence that claim 3 is obvious over the combination of Burke, Wulf, and Peters.

c. Claim 4

Claim 4 depends from claim 1 and adds a limitation requiring that “said at least one groove comprises a plurality of grooves disposed across [the] upper surface and a lower surface, said plurality of grooves aiding combustion by providing air circulation around said briquet, and between

said briquet and at least another said briquet within a pile of briquets.”

Ex. 1001, 20:7–13. Patent Owner does not argue the patentability of claim 4 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that this limitation is taught by Wulf and Peters; we are persuaded by Petitioner’s presentation of the evidence. Pet. 40 (citing Ex. 1004, Fig. 1; Ex. 1006, 1:53–61). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 4 is obvious over the combination of Burke, Wulf, and Peters.

d. Claim 5

Claim 5 depends from claim 1 and adds a limitation requiring that said at least one groove comprises at least two grooves disposed on at least one of said upper surface and said lower surface, said at least two grooves extending substantially from one side of a periphery of said briquet to an opposing side of said periphery for aiding combustion by providing air circulation around and along at least a portion of said periphery and between said briquet and at least another said briquet within a pile of briquets.

Ex. 1001, 20:14–22. Patent Owner does not argue the patentability of claim 5 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that this limitation is taught by Wulf; we are persuaded by Petitioner’s presentation of the evidence. Pet. 40 (citing Ex. 1004, 1, Fig. 1). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 5 is obvious over the combination of Burke, Wulf, and Peters.

e. Claim 6

Claim 6 depends from claim 1 and adds limitations requiring that the upper and lower surfaces be “substantially symmetrical with respect” to the periphery of the briquet and that the upper and lower surfaces each have “at

least one groove extending respectively across said upper surface and said lower surface, said grooves having a depth thereby providing an increased surface area to volume ratio.” Ex. 1001, 20:23–32. Patent Owner does not argue the patentability of claim 6 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are taught by Burke and Wulf; we are persuaded by Petitioner’s presentation of the evidence. Pet. 39–40 (citing Ex. 1004, 1, Fig. 1; Ex. 1007, Figs. 1–3). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 6 is obvious over the combination of Burke, Wulf, and Peters.

f. Claim 7

Claim 7 depends from claim 1 and adds limitations requiring that “said at least one groove comprises a first groove disposed on said upper surface and a second groove disposed on said lower surface respectively,” that “at least one of said grooves extend[] substantially from one side of a periphery of said briquet to an opposing side of said periphery,” and that “said upper surface and said lower surface are configured to allow close contact between said briquet and one or more adjacent briquets while said grooves provide air circulation around at least a portion of said periphery.” Ex. 1001, 20:33–43. Patent Owner does not argue the patentability of claim 7 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are taught by Wulf and Peters; we are persuaded by Petitioner’s presentation of the evidence. Pet. 39–40 (citing Ex. 1004, 1, Fig. 1; Ex. 1006, 1:53–61). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 7 is obvious over the combination of Burke, Wulf, and Peters.

g. Claim 8

Claim 8 depends from claim 1 and adds limitations requiring that the “briquet ha[ve] four sides” and that the “briquet ha[ve] . . . a generally square periphery.” Ex. 1001, 20:44–45. Patent Owner does not argue the patentability of claim 8 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are taught by Peters; we are persuaded by Petitioner’s presentation of the evidence. Pet. 41 (citing Ex. 1006, 2:24–34, Fig. 1). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 8 is obvious over the combination of Burke, Wulf, and Peters.

h. Claim 11

Claim 11 depends from claim 10 and adds a limitation requiring that the briquet “further comprise[] a substantially elliptical periphery.” Ex. 1001, 21:18–20. Patent Owner does not argue the patentability of claim 11 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that this limitation is taught by Burke, Wulf, and Peters; we are persuaded by Petitioner’s presentation of the evidence. Pet. 49 (citing Ex. 1004, 1, Fig. 1; Ex. 1006, Fig. 2; Ex. 1007, Fig. 3). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 11 is obvious over the combination of Burke, Wulf, and Peters.

i. Claim 12

Claim 12 depends from claim 10 and adds a limitation requiring that the depth of the grooves in the surface of the briquet be “no deeper than approximately 25% of a maximum depth dimension of the briquet.” Ex. 1001, 21:21–23. Patent Owner does not argue the patentability of claim 12 separately. PO Resp. 22–47. Petitioner contends that Wulf Figure

1 shows grooves having the depth dimension limitation of claim 12. Pet. 49–50 (citing Ex. 1004, Fig. 1). Petitioner also argues that a person of ordinary skill in the art would have had a reason to optimize the depth of the grooves in order “to achieve faster ignition and burning times.” Pet. 50. We agree with Petitioner. Wulf discloses that its grooves are not limited to any particular depth. Ex. 1004, 1 (“the size [of the area of compression] also depend[s] on the depth and shape of the grooves”). Dr. Smith testifies that “it would have [been] well-within the skill set of a POSA to vary the depth of the grooves to achieve faster ignition and burning times” and that “a POSA could have arrived at the claimed depth through routine optimization.” Ex. 1002 ¶ 160. Patent Owner does not direct us to any evidence to the contrary. Accordingly, the preponderance of the evidence supports a finding that a person of ordinary skill in the art could have found the optimum groove depth through routine optimization and that a person of ordinary skill in the art would have done so in order to achieve faster ignition and burning times. Thus, Petitioner has shown by a preponderance of the evidence that claim 12 is obvious over the combination of Burke, Wulf, and Peters.

j. Claim 13

Claim 13 depends from claim 12 and adds a limitation requiring that “at least a portion of the grooves [be] substantially symmetrical with respect to a horizontal plane passing through the center of the briquet.” Ex. 1001, 21:24–26. Petitioner argues that “Figure 1 of Wulf shows mirror-images of grooves on both the upper and lower surface.” Pet. 51 (citing Ex. 1002 ¶¶ 161, 169; Ex. 1004, Fig. 1). Patent Owner responds that the symmetry shown in Figure 1 of Wulf is not symmetry with respect to a horizontal

plane, as required by claim 13. Petitioner replies that the text of Wulf “discloses that ‘[b]riquettes of prior art may show *two or three identical grooves on both halves* of the briquette.’” Reply 20 (quoting Ex. 1004, 1) (alteration and emphasis in original).

We agree with Petitioner that the grooves depicted in Figure 1 of Wulf are symmetrical about a plane passing from the top of the figure to the bottom of the figure between the two grooves on the top surface and through the middle of center groove on the bottom surface. Figure 1 of Wulf is reproduced below:

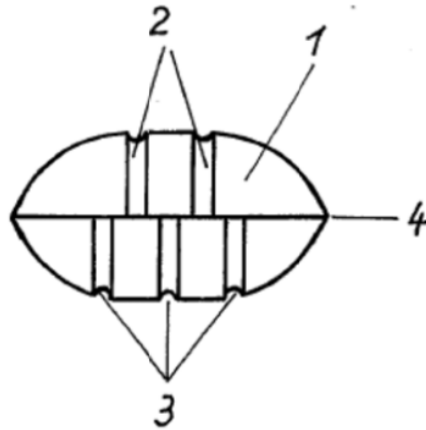


Figure 1 of Wulf, reproduced above, depicts a charcoal brick according to the teachings of Wulf. Two grooves are placed on the upper surface of the briquet, with one groove on each side of, and equidistant from, a plane passing vertically from the top of the figure to the bottom of the figure. Three grooves are placed on the bottom of the briquet, with one groove on each side of the same vertical plane and one groove straddling the plane. As Petitioner argues, Pet. 51, Figure 1 of Wulf shows grooves that are mirrored across the vertical plane passing from the top of the figure to the bottom of the figure through the middle of the briquet.

But the evidence of record does not support a finding that a person of ordinary skill in the art would have considered this plane to be “a horizontal plane passing through the center of the briquet.” Ex. 1001, 21:24–26. As Patent Owner argues, the evidence of record shows that both parties’ experts agree that a “horizontal plane passing through the center of the briquet” is the plane along seam 4 of Wulf’s Figure 1, which lies orthogonal to the plane of symmetry identified by Petitioner. PO Resp. 43–44 (citing Ex. 2021 ¶¶ 179–80; Ex. 2023, 125:17–127:10, 129:12–19). Figure 1 of Wulf does not depict grooves that are symmetrical with respect to the plane that both parties’ experts agree is a horizontal plane. Although the text of Wulf describes the possibility of placing the same number of grooves on each half of the briquet, it does not describe those grooves being placed symmetrically with respect to a horizontal plane passing through the center of the briquet. Ex. 1004, 1. Accordingly, Petitioner has not shown by a preponderance of the evidence that claim 13 is obvious over the combination of Burke, Wulf, and Peters.

k. Claim 14

Claim 14 depends from claim 13 and adds a limitation requiring that the depth of the grooves “var[y] as a function of distance from an external periphery of the briquet.” Ex. 1001, 21:27–29. Because Petitioner has not shown by a preponderance of the evidence that claim 13 is obvious over the combination of Burke, Wulf, and Peters, Petitioner also has not shown by a preponderance of the evidence that claim 14 is obvious over the combination of Burke, Wulf, and Peters.

l. Claim 15

Claim 15 depends from claim 14 and adds a limitation requiring that the “width of each of the grooves at the convex upper surface [be] greater than a width of the same groove at said prescribed depth within said briquet.” Ex. 1001, 21:30–32. Because Petitioner has not shown by a preponderance of the evidence that claim 14 is obvious over the combination of Burke, Wulf, and Peters, Petitioner also has not shown by a preponderance of the evidence that claim 15 is obvious over the combination of Burke, Wulf, and Peters.

m. Claim 16

Claim 16 depends from claim 10 and adds a limitation requiring that “the grooves [be] substantially symmetrical with respect to a horizontal plane passing through the center of the briquet.” Ex. 1001, 21:33–35. Petitioner argues that “Figure 1 of Wulf shows mirror-images of grooves on both the upper and lower surface.” Pet. 51 (citing Ex. 1002 ¶¶ 161, 169; Ex. 1004, Fig. 1). Patent Owner responds that the symmetry shown in Figure 1 of Wulf is not symmetry with respect to a horizontal plane, as required by claim 16. Petitioner replies that the text of Wulf “discloses that ‘[b]riquettes of prior art may show *two or three identical grooves on both halves* of the briquette.’” Reply 20 (quoting Ex. 1004, 1) (alteration and emphasis in original). As discussed above with respect to claim 13, we find that Petitioner has not shown that the prior art teaches or suggests the symmetrical-groove limitation of this claim. Accordingly, Petitioner has not shown by a preponderance of the evidence that claim 16 is obvious over the combination of Burke, Wulf, and Peters.

n. Claim 17

Claim 17 depends from claim 10 and adds a limitation requiring that the “width of each of the grooves at the convex upper surface [be] greater than a width of the same groove at said prescribed depth within said briquet.” Ex. 1001, 21:36–38. Patent Owner does not argue the patentability of claim 17 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are taught by Wulf; we are persuaded by Petitioner’s presentation of the evidence. Pet. 51 (citing Ex. 1004, Fig. 1). As discussed above with respect to claim 26, reliance on the not-to-scale Figure 1 is appropriate for a qualitative limitation like that of claim 17. Accordingly, Petitioner has shown by a preponderance of the evidence that claim 17 is obvious over the combination of Burke, Wulf, and Peters.

o. Claim 18

Claim 18 depends from claim 10 and adds a limitation requiring that the “width of at least a portion of the grooves [be] about as wide as said depth.” Ex. 1001, 21:40–41. Petitioner argues that Figure 1 of Wulf depicts U-shaped grooves “such that the width of at least a portion of the grooves is about as wide as the depth.” Pet. 50 (citing Ex. 1002 ¶¶ 160, 166; Ex. 1004, Fig. 1); see Reply 19. Patent Owner responds that “Wulf provides no measurements and no dimensions for its grooves” and that it is improper to rely on measurement of a drawing that is not described as being to scale. PO Resp. 41. We agree with Patent Owner. “Absent any written description in the specification of quantitative values, arguments based on measurement of a drawing are of little value.” *Wright*, 569 F.2d at 1127. Because Petitioner’s argument relies entirely on the depiction of grooves in Figure 1

of Wulf, and because Figure 1 is not described in Wulf as to scale, Petitioner has not shown by a preponderance of the evidence that claim 18 is obvious over the combination of Burke, Wulf, and Peters.

p. Claim 19

Claim 19 depends from claim 10 and adds a limitation requiring that “the depth of the grooves var[y] as a function of distance from an external periphery of the briquet.” Ex. 1001, 21:42–44. Patent Owner does not argue the patentability of claim 19 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are taught by Wulf and Peters; we are persuaded by Petitioner’s presentation of the evidence. Pet. 32–33, 50 (citing Ex. 1004, 1, Fig. 1; Ex. 1006, Fig. 3). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 19 is obvious over the combination of Burke, Wulf, and Peters.

q. Claim 21

Claim 21 depends from claim 20 and adds a limitation requiring that “the grooves each have a maximum prescribed depth that is no deeper than 25% of a maximum depth dimension of the briquet[], yet which is sufficiently deep to provide said air circulation.” Ex. 1001, 21:60–63. Petitioner argues that “Figure 1 of Wulf shows that the nadir of the concave portion of the [groove] extends no more than 25% into the briquet.” Pet. 50 (citing Ex. 1004, Fig. 1). Petitioner also argues that a person of ordinary skill in the art would have had a reason to optimize the depth of the grooves in order “to achieve faster ignition and burning times.” Pet. 50 (citing Ex. 1002 ¶¶ 160, 166). Wulf discloses that its grooves are not limited to any particular depth. Ex. 1004, 1 (“the size [of the area of compression] also depend[s] on the depth and shape of the grooves”). Dr. Smith testifies that

“it would have [been] well-within the skill set of a POSA to vary the depth of the grooves to achieve faster ignition and burning times” and that “a POSA could have arrived at the claimed depth through routine optimization.” Ex. 1002 ¶ 160. Although Patent Owner takes issue with Petitioner’s argument that Figure 1 of Wulf depicts grooves that are less than 25% then depth of the briquet, PO Resp. 46–47, Patent Owner does not direct us to any evidence contradicting Petitioner’s argument that a person of ordinary skill in the art could and would have optimized the depth of the grooves to achieve faster ignition and burning. Accordingly, the preponderance of the evidence supports a finding that a person of ordinary skill in the art could have found the optimum groove depth through routine optimization and that a person of ordinary skill in the art would have done so in order to achieve faster ignition and burning times. Thus, Petitioner has shown by a preponderance of the evidence that claim 21 is obvious over the combination of Burke, Wulf, and Peters.

r. Claim 22

Claim 22 depends from claim 20 and adds a limitation requiring that the “width of at least a portion of the grooves [be] about as wide as said depth.” Ex. 1001, 21:64–65. Petitioner argues that Figure 1 of Wulf depicts U-shaped grooves “such that the width of at least a portion of the grooves is about as wide as the depth.” Pet. 50 (citing Ex. 1002 ¶¶ 160, 166; Ex. 1004, Fig. 1); see Reply 19. Patent Owner responds that “Wulf provides no measurements and no dimensions for its grooves” and that it is improper to rely on measurement of a drawing that is not described as being to scale. PO Resp. 41. We agree with Patent Owner. “Absent any written description in the specification of quantitative values, arguments based on measurement of

a drawing are of little value.” *Wright*, 569 F.2d at 1127. Because Petitioner’s argument relies entirely on the depiction of grooves in Figure 1 of Wulf, and because Figure 1 is not described in Wulf as to scale, Petitioner has not shown by a preponderance of the evidence that claim 22 is obvious over the combination of Burke, Wulf, and Peters.

s. Claim 23

Claim 23 depends from claim 20 and adds a limitation requiring that the “width of each of the grooves at the convex upper surface [be] greater than a width of the same groove at said prescribed depth within said briquet.” Ex. 1001, 21:66–22:3. Patent Owner does not argue the patentability of claim 23 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are taught by Wulf; we are persuaded by Petitioner’s presentation of the evidence. Pet. 51 (citing Ex. 1004, Fig. 1). As discussed above with respect to claim 26, reliance on the not-to-scale Figure 1 is appropriate for a qualitative limitation like that of claim 23. Accordingly, Petitioner has shown by a preponderance of the evidence that claim 23 is obvious over the combination of Burke, Wulf, and Peters.

t. Claim 24

Claim 24 depends from claim 23 and adds a limitation requiring that the “plurality of grooves enable[] both (i) said achievement of a cooking temperature of at least 1000 degrees Fahrenheit within about fifteen minutes after ignition, and (ii) said holding of said about 1000 degrees Fahrenheit for at least fifteen minutes thereafter.” Ex. 1001, 22:4–9. Patent Owner does not argue the patentability of claim 24 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that these limitations are

taught by Wulf and Peters; we are persuaded by Petitioner's presentation of the evidence. Pet. 51–52 (citing Ex. 1004, 1; Ex. 1006, 1:53–61, Tables I–III). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 24 is obvious over the combination of Burke, Wulf, and Peters.

u. Claim 25

Claim 25 depends from claim 24 and adds a limitation requiring that “at least a portion of the grooves [be] substantially symmetrical with respect to a horizontal plane passing through the center of the briquet.” Ex. 1001, 22:10–12. Petitioner argues that “Figure 1 of Wulf shows mirror-images of grooves on both the upper and lower surface.” Pet. 51 (citing Ex. 1002 ¶¶ 161, 169; Ex. 1004, Fig. 1). Patent Owner responds that the symmetry shown in Figure 1 of Wulf is not symmetry with respect to a horizontal plane, as required by claim 25. Petitioner replies that the text of Wulf “discloses that ‘[b]riquettes of prior art may show *two or three identical grooves on both halves* of the briquette.’” Reply 20 (quoting Ex. 1004, 1) (alteration and emphasis in original). As discussed above, we agree with Petitioner that the grooves depicted in Figure 1 of Wulf are symmetrical about a plane passing from the top of the figure to the bottom of the figure between the two grooves on the top surface and through the middle of center groove on the bottom surface. Pet. 51; Reply 19–20. This would be, in effect, a vertical plane passing through the center of the briquet depicted in Wulf. But the evidence of record does not support a finding that a person of ordinary skill in the art would have considered this plane to be “a horizontal plane passing through the center of the briquet.” Ex. 1001, 22:10–12. As Patent Owner argues, the evidence of record shows that both parties' experts agree that a “horizontal plane passing through the center of the briquet” is

the plane along seam 4 of Wulf's Figure 1, which lies orthogonal to the plane of symmetry identified by Petitioner. PO Resp. 43–44 (citing Ex. 2021 ¶¶ 179–80; Ex. 2023, 125:17–127:10, 129:12–19). Figure 1 of Wulf does not depict grooves that are symmetrical with respect to the plane that both parties' experts agree is a horizontal plane. Although the text of Wulf describes the possibility of placing the same number of grooves on each half of the briquet, it does not describe those grooves being placed symmetrically with respect to a horizontal plane passing through the center of the briquet. Ex. 1004, 1. Accordingly, Petitioner has not shown by a preponderance of the evidence that claim 25 is obvious over the combination of Burke, Wulf, and Peters.

v. Claim 27

Claim 27 depends from claim 26 and adds a limitation requiring that “the briquet comprise[] at least a weight and a surface area, the surface area being approximately 150 percent of that of an ungrooved briquet of the same weight.” Ex. 1001, 22:40–43. Patent Owner does not argue the patentability of claim 27 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that a person of ordinary skill in the art would have been motivated and able to vary the surface area of a briquet to optimize the burning characteristics of the briquet, as well as evidence that “the 150% increase in surface area is not disclosed as critical to achieving the claimed ignition and cooking times and temperature.” Pet. 52–53 (citing Ex. 1002 ¶ 172; Ex. 1004, 1, Fig. 1; Ex. 1006, 1:53–61, 2:24–34, Table I, Table III); *see Abbott Labs. v. Sandoz, Inc.*, 544 F.3d 1341, 1379 (Fed. Cir. 2008) (“[T]he long standing precedent of this court and our predecessor . . . is that ‘discovery of an optimum value of a variable’ in a known process or

composition is ‘usually obvious.’”); *Antonie*, 559 F.2d at 620 (determination of optimum or workable value of a result-effective variable is routine experimentation). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 27 is obvious over the combination of Burke, Wulf, and Peters.

w. Claim 28

Claim 28 depends from claim 26 and adds a limitation requiring that “the briquet comprise[] a substantially four-sided shape having a length of approximately 2.39 inches per side.” Ex. 1001, 22:44–46. Patent Owner does not argue the patentability of claim 28 separately. PO Resp. 22–47. Petitioner directs us to evidence of record showing that a person of ordinary skill in the art would have been motivated and able to vary the surface area of a briquet to optimize the burning characteristics of the briquet, as well as evidence that the challenged patent “assigns no criticality to the length recited in claim [28] for achieving the claimed time and temperature limitations.” Pet. 53 (citing Ex. 1002 ¶¶ 172–74; Ex. 1006, Fig. 1, Tables I–III; Ex. 1007, Fig. 2); see *Sandoz, Inc.*, 544 F.3d at 1379; *Antonie*, 559 F.2d at 620. Accordingly, Petitioner has shown by a preponderance of the evidence that claim 28 is obvious over the combination of Burke, Wulf, and Peters.

C. Asserted Anticipation by Saunders II

Petitioner argues that Saunders II anticipates claims 1 and 9. Pet. 61–62.

1. Saunders II

Saunders II relates to “[a]n improved charcoal briquet having combustion aiding surfaces,” such as “a grooved pillow shaped briquet.”

Ex. 1009, at [57]. It discloses pillow-shaped charcoal briquets having grooves on their surfaces. *Id.* at Figs. 21–24, 30–33. The grooves on the surfaces of the briquets are U-shaped. *Id.* Saunders II discloses charcoal briquets that have a surface area of 13.7 square inches and a volume of 2.16 cubic inches. *Id.* ¶ 74. The briquets in Saunders II are disclosed as reaching a temperature of 1000 °F within 15 minutes of ignition and as remaining above a temperature of 929 °F for 15 minutes thereafter. *Id.* at Table 1, Fig. 14.

2. Analysis

Petitioner argues that all limitations of claims 1 and 9 are disclosed by Saunders II. Pet. 61–62. Patent Owner argues that Saunders II is not prior art to these claims. PO Resp. 59–63.

a. Prior Art Status of Saunders II

Saunders II is a published patent application. Ex. 1009, at [12]. Published on November 11, 2004, Saunders II was originally filed as application number 10/858,224 (“the ’224 application”) on June 1, 2004. *Id.* at [21], [22], [43]. Patent Owner argues that Saunders II is not prior art to claims 1 and 9 of the ’803 patent because the ’803 patent claims priority to the ’224 application that was published as Saunders II. PO Resp. 59–63.

The ’803 patent claims priority to the ’224 application as follows: “Continuation of application No. 11/651,056, filed on Jan. 8, 2007, now Pat. No. 8,118,887, which is a continuation-in-part of application No. 11/054,242, filed on Feb. 9, 2005, now Pat. No. 7,575,609, which is a continuation-in-part of application No. 10/858,224, filed on Jun. 1, 2004” Ex. 1001, at [63].

For claims 1 and 9 to be entitled to priority based on the '224 application, which was published as Saunders II, Saunders II must provide sufficient disclosure under 35 U.S.C. § 112, ¶ 1, to support the subject matter of those claims. 35 U.S.C. § 120. Each of claims 1 and 9 recites a limitation requiring that the claimed briquet have a surface area-to-volume ratio “in a range between approximately 13.7 to approximately 2.16.” Ex. 1001, 19:54–20:64, 22:47–23:4. Patent Owner argues that this limitation finds written-description support in claim 51 of Saunders II, which discloses “[a] charcoal briquet having a total surface area measurable in square inches and a total volume measurable in cubic inches, the ratio of said total surface area to said total volume being about 13.7 to about 2.16.” PO Resp. 59–63 (citing Ex. 1009, claim 51).

The language in question in claim 51 of Saunders II is “the ratio . . . being about 13.7 to about 2.16.” Ex. 1009, claim 51. This language is ambiguous when considered without reference to the specification of Saunders II. It could be interpreted to refer a single ratio of “about 13.7” to “about 2.16” (i.e., about 13.7 divided by about 2.16, or about 6.34), or it could be interpreted to refer to a range of ratios with a minimum value of “about 2.16” and a maximum value of “about 13.7.” The language of claim 51 itself does not conclusively resolve the ambiguity. As Patent Owner argues, there is evidence of record that surface area-to-volume ratio is typically expressed as a single number for charcoal briquets, so the expression of a single ratio as “about 13.7 to about 2.16” rather than as “about 6.34” would be unusual. PO Resp. 60 (citing Ex. 2021 ¶ 238). Also, “about 13.7 to about 2.16,” when used to express a single ratio, has two instances of the word “about,” even though only a single use of “about” is

necessary, rendering the second instance of “about” redundant. *Id.* (citing Ex. 2021 ¶¶ 237, 239–41). But it is not clear that either particular interpretation of the language of claim 51 is made necessary by the claim language itself.

The ambiguity of the language of claim 51 itself must be resolved by looking at the specification of Saunders II. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (“[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” (internal citation omitted)). The specification of Saunders II describes a preferred embodiment of a charcoal briquet, and this embodiment has a surface area of 13.7 square inches and a volume of 2.16 cubic inches. Ex. 1009 ¶ 74. No other embodiments of Saunders II’s invention are described in the specification.¹¹

¹¹ The specification of Saunders II does disclose a second discrete embodiment, albeit a non-inventive one. In addition to the disclosure of a preferred embodiment with a surface area of 13.7 square inches and a volume of 2.16 cubic inches, Saunders II also describes a conventional (i.e., non-inventive) briquet with “a volume of 2.12 cubic inches,” “a surface area of 8.98 square inches,” and a resulting ratio of about 4.24 reciprocal inches. Ex. 1009 ¶ 74. Although these two discrete embodiments might provide written-description support for a ratio of about 4.24 and for a ratio of about 6.34, we are not persuaded that they provide support for the entire range of 2.16 to 13.7 that is recited in claims 1 and 9 of the ’803 patent. *In re Lukach*, 442 F.2d 967, 969 (CCPA 1971) (subgenus not entitled to priority where parent application contained disclosure of broad genus and specific example within subgenus range). Thus, to the extent that Saunders II provides written-description support for claims 1 and 9, it must do so through the language of claim 51, not through the embodiments described in the specification.

In our view, a person of ordinary skill in the art would understand claim 51 of Saunders II as directed to the disclosed embodiment having a surface area of 13.7 square inches and a volume of 2.16 cubic inches, rather than as directed to a range of ratios whose endpoints purely coincidentally have the same values as the single surface area and volume described in the specification. *See, e.g.*, Tr. 37:11–24. In other words, we find that a person of ordinary skill in the art would understand claim 51 as referring to a single ratio of 13.7 square inches divided by 2.16 cubic inches, or about 6.34 reciprocal inches, rather than as referring to a range of ratios with a minimum value of 2.16 reciprocal inches and a maximum value of 13.7 reciprocal inches. Accordingly, we determine that Saunders II does not provide sufficient written description to support the range of ratios claimed in the '803 patent, and claims 1 and 9 cannot claim priority to the application that was published as Saunders II. *Lukach*, 442 F.2d at 969 (a single value within a range does not provide support for the entire range). Thus, Saunders II is prior art to claims 1 and 9.

b. Claim 1

Petitioner argues, and Patent Owner does not dispute, that Saunders II discloses all limitations of claim 1. Pet. 61; PO Resp. 59–63. Saunders II discloses a pillow-shaped charcoal briquet that has grooves on its surface and has a surface area-to-volume ratio of about 6.34, which is within the claimed range of “approximately 13.7 to approximately 2.16.” Ex. 1009 ¶ 74, Figs. 21–24, 30–33. Because the grooves are U-shaped, their depth “varies as a function of distance from an external periphery of the briquet.” *Id.* In addition, Saunders II discloses that its briquets achieve a temperature of over 1000 °F within 15 minutes of ignition and fall only to 929 °F within

15 minutes of achieving 1000 °F. *Id.* at Table 1, Fig. 14. Saunders II describes this fall in temperature as follows: “the briquets of the present invention hold their ready-to-cook temperature of about 1000 [°F] reasonably constantly.” *Id.* ¶ 83. Accordingly, we find by a preponderance of the evidence that Saunders II anticipates claim 1.

c. Claim 9

Claim 9 is an independent claim similar to claim 1, but it recites “at least one means for enhancing the circulation of air around said briquet during combustion” instead of claim 1’s “at least one groove formed in at least one surface thereof.” *Compare* Ex. 1001, 20:46–64, with Ex. 1001, 40 (Certificate of Correction). Petitioner argues, and Patent Owner does not dispute, that Saunders II discloses all limitations of claim 9. Pet. 61; PO Resp. 59–63. Saunders II discloses a pillow-shaped charcoal briquet that has grooves on its surface and has a surface area-to-volume ratio of about 6.34, which is within the claimed range of “approximately 13.7 to approximately 2.16.” Ex. 1009 ¶ 74, Figs. 21–24, 30–33. As discussed above, we construe “means for enhancing the circulation of air around said briquet during combustion” to include grooves like those disclosed by Saunders II. In addition, Saunders II discloses that its briquets achieve a temperature of over 1000 °F within 15 minutes of ignition and fall only to 929 °F within 15 minutes of achieving 1000 °F. *Id.* at Table 1, Fig. 14. Saunders II describes this fall in temperature as follows: “the briquets of the present invention hold their ready-to-cook temperature of about 1000 [°F] reasonably constantly.” *Id.* ¶ 83. Accordingly, we find by a preponderance of the evidence that Saunders II anticipates claim 9.

CONCLUSION

Upon consideration of the arguments and evidence submitted by Petitioner and Patent Owner, including the Petition, the Response, the Reply, the observations on cross-examination, the response to the observations on cross-examination, the transcript of the oral hearing, and the exhibits of record, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 4–11, 17, 19, 20, 23, 24, and 26–32 of the '803 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Burke, Wulf, and Peters. We also determine that Petitioner has shown by a preponderance of the evidence that claims 1 and 9 of the '803 patent are unpatentable under 35 U.S.C. § 102(b) as anticipated by Saunders II. Finally, we determine that Petitioner has not shown by a preponderance of the evidence that claims 3, 12–16, 18, 21, 22, and 25 of the '803 patent are unpatentable.

ORDER

It is hereby

ORDERED that claims 1, 2, 4–12, 17, 19, 20, 21, 23, 24, and 26–32 of U.S. Patent No. 9,131,803 have been proven unpatentable;

FURTHER ORDERED that claims 3, 13–16, 18, 22, and 25 of U.S. Patent No. 9,131,803 have not been proven unpatentable; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 318(b), upon expiration of the time for appeal of this decision, or the termination of any such appeal, a certificate shall issue canceling claims 1, 2, 4–12, 17, 19, 20, 21, 23, 24, and 26–32 and confirming the patentability of claims 3, 13–16, 18, 22, and 25 of U.S. Patent No. 9,131,803 B2;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2016-01831
Patent 9,131,803 B2

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