

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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WILLIAM WESLEY CARNES, SR., INC.  
D/B/A WC WELDING SERVICES,  
Petitioner,

v.

SEABOARD INTERNATIONAL INC.  
D/B/A MATHENA, INC.,  
Patent Owner.

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Case IPR2019-00133  
Patent 8,784,545 B2

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Before JO-ANNE M. KOKOSKI, WESLEY B. DERRICK, and  
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

KOKOSKI, *Administrative Patent Judge*.

DECISION  
Denying Institution of *Inter Partes* Review  
35 U.S.C. § 314(a)

## I. INTRODUCTION

William Wesley Carnes, Sr. Inc. d/b/a WC Welding Services (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–16 and 28 of U.S. Patent No. 8,784,545 B2 (“the ’545 patent,” Ex. 1001). Paper 1 (“Pet.”). Seaboard International Inc. d/b/a Mathena, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”).

Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314; *see* 37 C.F.R. § 42.4. Upon consideration of the briefing and the evidence of record, we determine that Petitioner has not established a reasonable likelihood of prevailing with respect to the unpatentability of any of claims 1–16 and 28 of the ’545 patent. Accordingly, we deny the Petition and do not institute an *inter partes* review.

### A. *Related Proceedings*

Petitioner indicates that there are no related matters. Pet. 1. Patent Owner identifies as related matters “U.S. Patent No. 10,160,913, issued from U.S. Application No. 14/310,410, which is a continuation of U.S. Application No. 14,049,726, the application from which” the ’545 patent issued, and currently-pending U.S. Patent Application No. 16/176,758, which “claims priority to U.S. Application Nos. 14/310,410 and 14/049,726.” Paper 9, 1.

### B. *The ’545 Patent*

The ’545 patent, titled “Shale-Gas Separating and Cleanout System,” is directed to “the separation of shale, gas and fluid at a shale gas well.”

Ex. 1001, [57]. The '545 patent states that, “[w]hen using an air drilling process in a shale formation, shale cuttings, dust, gas and fluid/water create a volatile mixture of hard-to-handle debris; especially when encountering previously fractured formations.” *Id.* at 1:15–19. Although “[d]rilling operations and debris disposal account for the majority of volatility and fire risk during the drilling process,” the '545 patent states that “[t]here is no effective way to separate the shale cuttings, mute the dust, by-pass the fluid/water encountered, and control/burn the waste gas in the air portion of the drilling program.” *Id.* at 1:19–30. As a result, “there is a need for an apparatus to separate the shale-gas-water mixture into non-volatile components, and provide environmentally safe collection and disposal of the shale debris, fluid and formation gas burned a safe distance from wellbore.” *Id.* at 1:46–50.

To address these issues, the '545 patent describes a shale-gas separator in which “shale debris and water from a shale-gas well [are] tangentially communicated to a vessel where the cyclonic effect within the vessel facilitates the separation of the gas from the shale debris.” *Id.* at [57]. Figure 1 of the '545 patent is reproduced below:

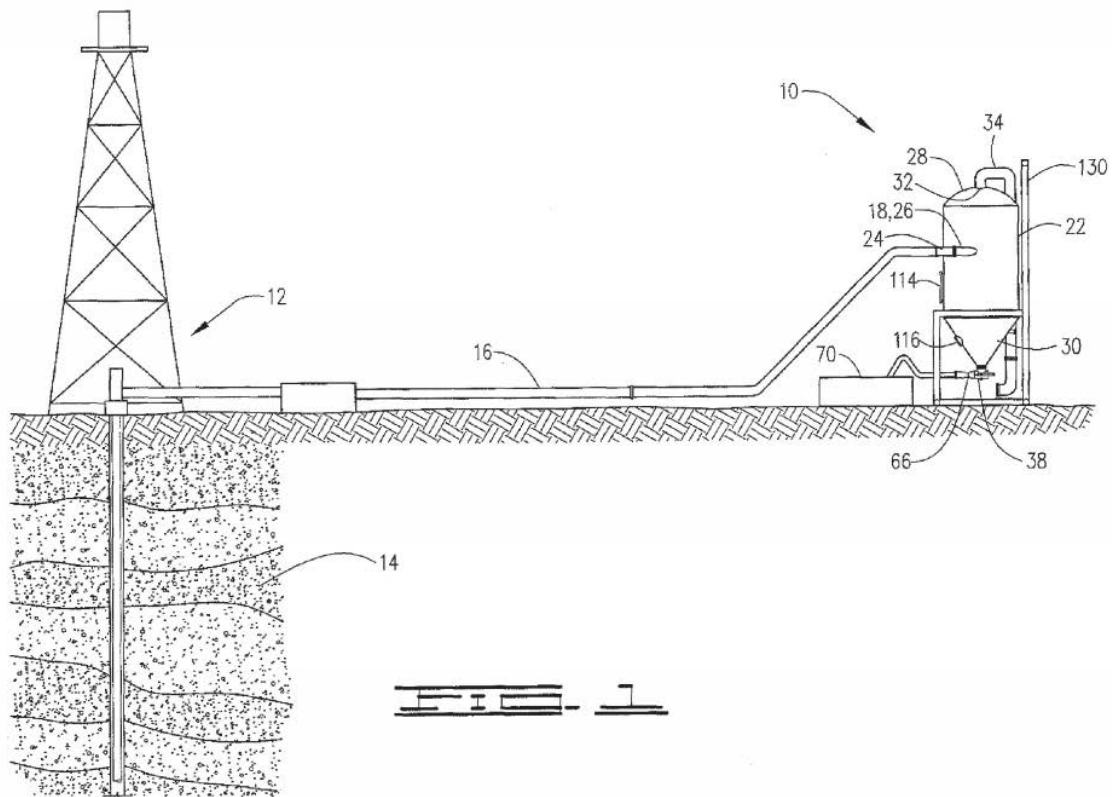


Figure 1 is “a simplified schematic elevational view of a wellsite in fluid communication with a shale-gas separator.” *Id.* at 2:27–28. Shale-gas separator 10 is associated with well 12, shale formations 14, and drilling strategies such as air drilling in shale formations. *Id.* at 3:15–18. Shale debris, dust, gas, and fluid (typically water, mist, foam, detergent, or aerated mud) is communicated to shale-gas separator 10 in pipe 16. *Id.* at 3:23–26. “Shale-gas separator 10 receives the shale-gas-fluid mixture at intake pipe 18,” which “flows into tangential input 26 through the sidewall 20 of vessel 22 and opens within vessel 22, thereby defining the tangential flow and initiating the cyclonic effect with vessel 22.” *Id.* at 3:26–28, 3:34–37.

“Vessel 22 is generally circumferential with domed top 28 and conical bottom 30,” with a port in domed top 28 that “functions as gas release vent 32, which is in fluid communication with flare stack feedline 34 and is

capable of communicating gas from vessel 22 to a flare (not shown) placed sufficiently far enough from the well to mitigate any threat of accidental ignition of gas.” *Id.* at 3:38–45. A port in conical bottom 30 is in fluid communication with jet assembly 38. *Id.* at 3:48–50.

In operation, a debris shield disposed between tangential input 26 and gas release vent 32 “receives the shale-gas-fluid mixture from intake pipe 18, and working in concert with the cyclonic effect communicated by intake pipe 18 and tangential input 26, causes the gas to separate from the shale-gas-fluid mixture.” *Id.* at 3:66–4:3. “The separated gas rises towards gas release vent 32 where it is communicated from vessel 22,” and the “shale debris and fluid fall towards conical bottom 30, where it is received by jet assembly 38.” *Id.* at 4:3–6. Jet assembly 38 has a first end with a jet connected thereto, and a second end. *Id.* at 4:29–31. The jet “is capable of receiving fluid, either liquid or air, which in turn provides the motive force to the shale debris and fluid to exit through the second end” of jet assembly 38. *Id.* at 4:41–43.

The ’545 patent further teaches that the shale-gas separator can also include: (1) an overflow line to communicate any excess fluid buildup within vessel 22 away from vessel 22 (*id.* at 6:23–37); (2) an internal aerated cushion system (“IACS”) pipe “positioned within vessel 22 to provide pressurized fluid to remove any debris buildup on wall 20 of conical bottom 30 down to port” that “provides a fluid cushion to mitigate the buildup of gas in jet assembly 38 and vessel 22” (*id.* at 5:31–36); and (3) a dust eliminator comprising an inlet, an outlet, a fluid jet, and a plurality of baffles that create a “spiraling flow action” that “causes the dust and fluid to mix, thereby reducing dust” (*id.* at 6:48–65).

*C. Challenged Claims*

Petitioner challenges claims 1–16 and 28 (“the challenged claims”) of the ’545 patent. Claims 1, 16, and 28 are independent; claim 1 is representative of the challenged claims, and is reproduced below.

1. A shale-gas separator, comprising:
  - a vessel into which a shale-gas-liquid mixture is adapted to be communicated;
  - a first port adapted to communicate from the vessel a gas;
  - a second port adapted to communicate from the vessel a shale debris and fluid separated from the shale-gas-liquid mixture; and
  - a first jet adapted to provide a motive force to the shale debris and fluid separated from the shale-gas-liquid mixture.

Ex. 1001, 8:36–45.

*D. The Asserted Grounds of Unpatentability*

Petitioner challenges the patentability of claims 1–16 and 28 of the ’545 patent on the following grounds:

<b>Reference(s)</b>	<b>Basis</b>	<b>Challenged Claim(s)</b>
Erwin <sup>1</sup>	§ 102(b)	1–3, 5, 16
Burnham ’113 <sup>2</sup>	§ 102(b)	1, 5
Griffin <sup>3</sup>	§ 102(b)	1, 5, 8–11
Burnham ’927 <sup>4</sup>	§ 102(b)	1, 5
Burnham ’927 and Mathena ’811 <sup>5</sup>	§ 103(a)	6, 7, 12–14
Burnham ’113 and Mathena ’811	§ 103(a)	6, 7, 12–14
Griffin and Mathena ’811	§ 103(a)	7, 12–14

<sup>1</sup> U.S. 2,748,884, issued June 5, 1956 (Ex. 1002).

<sup>2</sup> U.S. 3,481,113, issued Dec. 2, 1969 (Ex. 1003).

<sup>3</sup> U.S. 3,325,974, issued June 20, 1967 (Ex. 1004).

<sup>4</sup> U.S. 3,895,927, issued July 22, 1975 (Ex. 1005).

<sup>5</sup> U.S. 8,641,811 B2, issued Feb. 4, 2014 (Ex. 1006).

Reference(s)	Basis	Challenged Claim(s)
Erwin and Mathena '811	§ 103(a)	7, 12–14
Burnham '113 and Griffin	§ 103(a)	8–11
Burnham '927 and Griffin	§ 103(a)	8–11
Griffin and Erwin	§ 103(a)	4
Griffin, Erwin, and Mathena '811	§ 103(a)	15, 28

## II. ANALYSIS

### A. *Level of Ordinary Skill in the Art*

Petitioner contends that a person having ordinary skill in the art (“POSITA”) would have had “a bachelor’s degree as a petroleum or mechanical engineer,” or “5 or more years work experience in the oil and gas exploration industry in a position such as well-site supervisor, driller, oil rig manager, solids control technician, oil or gas separator service welders.” Pet. 10–11. Petitioner further contends that “[a]dditional education or oil and gas industry experience could compensate for a deficit in one of” these requirements. *Id.* at 11. Patent Owner does not propose a level of ordinary skill in its Preliminary Response. Accordingly, for purposes of this Decision, we adopt Petitioner’s assessment of the level of ordinary skill in the art, which is consistent with the level of ordinary skill in the art at the time of the invention as reflected in the prior art in this proceeding. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2011).

### B. *Claim Interpretation*

We interpret claims of an unexpired patent using the “broadest reasonable construction in light of the specification of the patent in which

[the claims] appear[.]” 37 C.F.R. § 42.100(b) (2017).<sup>6</sup> Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Only those terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner states that, “for the purposes of this *inter partes* review only,” the claim terms “take on the customary and ordinary meaning that the terms would have to one of ordinary skill in the art in view of the specification of” the ’545 patent. Pet. 6. Patent Owner proposes constructions for the terms “adapted to” and “shale-gas-liquid mixture,” and argues that the term “shale-gas separator” that appears in the preamble of the claims is a limitation of the claims. Prelim. Resp. 16–24. Based on the record before us, for purposes of this Decision, we need only address

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<sup>6</sup> The Office recently changed the claim construction standard applicable to an *inter partes* review. *See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51,340 (Oct. 11, 2018). The rule changing the claim construction standard, however, does not apply to this proceeding because Petitioner filed its Petition before the effective date of the final rule, i.e., November 13, 2018. *Id.* at 51,340 (rule effective date and applicability date), 51,344 (explaining how the Office will implement the rule).



whether the term “shale-gas separator” used in the preamble of all the challenged claims is a limitation of the claims.

Patent Owner contends that “[s]hale-gas separator’ is a fundamental characteristic of the claimed invention of the ’545 patent.” Prelim. Resp. 18. In support of its contention, Patent Owner states that “[e]ach claim requires that the apparatus separate ‘shale debris and fluid . . . from the shale-gas-liquid mixture.” *Id.* Patent Owner also points to claim 1, which “specifies that the recited vessel is one in which ‘shale-gas-liquid mixture’ is adapted to be communicated, that a second port is adapted to communicate shale debris and fluid separated from the shale-gas mixture, and that a first jet is adapted to provide a motive force to the shale debris” that is separated from the shale-gas-liquid mixture. *Id.*

On the current record, and for purposes of this Decision, we agree with Patent Owner that the preamble of the challenged claims is limiting. The preamble recitation that the claim is directed to a shale-gas separator “is necessary to give life, meaning, and vitality” to the claims. *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (internal quotation omitted). The function of the apparatus, and what its constituent parts are adapted to accomplish, reasonably reflect that the claim is directed to a shale-gas separator. The title of the ’545 patent is “Shale-Gas Separating and Cleanout System.” Ex. 1001, [54]. The Abstract refers to “the separation of shale, gas and fluid at a shale-gas well.” *Id.* at [57]. The Summary of the Invention states that “the following invention provides for a shale-gas separator.” *Id.* at 1:54–55; *see also id.* at 1:65–66 (“a shale-gas separator is provided”), 2:10–11 (“a shale-gas separator dust eliminator is provided”). Every described embodiment and drawing in the specification

is directed to a shale-gas separator. *See id.* at 2:25–3:7 (describing the drawings as depicting a shale-gas separator or components thereof), 3:11–12 (“Referring to FIGS. 1–3, the inventive shale-gas separator is illustrated and generally designated by the number 10.”). Patent Owner represents that “[t]he term ‘shale-gas separator’ is used 25 times in the specification and 53 times in the ’545 patent.” Prelim. Resp. 19. Accordingly, we are persuaded that the preamble term “shale-gas separator” “describes a ‘fundamental characteristic of the claimed invention’ that informs one of skill in the art as to the structure required by the claim,” and does not merely state a name or use for the claimed system. *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1358 (Fed. Cir. 2012) (quoting *Poly-Am, L.P. v. GSE Lining Tech., Inc.*, 383 F.3d 1303, 1310 (Fed. Cir. 2004)). We additionally determine that, for purposes of this Decision, “shale-gas separator” does not require express construction, and should be given its plain and ordinary meaning.

*C. Overview of the Prior Art*

*1. Erwin*

Erwin is directed to an apparatus for treating drilling mud. Ex. 1002, 1:15–16. In particular, Erwin describes an apparatus to “continuously and conveniently remove all or nearly all the entrained or dissolved gases and light liquid hydrocarbons from all the drilling mud in an oil or gas well drilling operation as it comes from the well and prior to its circulation back to the well.” *Id.* at 2:27–32. Figure 1 of Erwin is reproduced below.

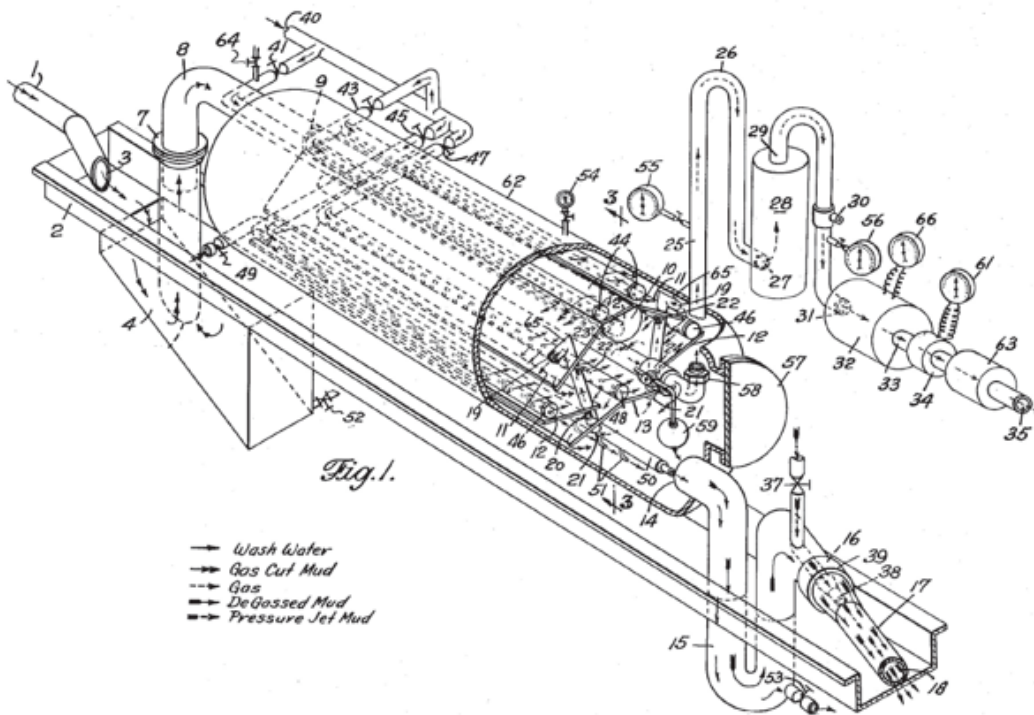


Figure 1 is a perspective view of the combined mud degasser and hydrocarbon logging device that Erwin describes. *Id.* at 4:5–7. Gas cut mud from source 1 enters mud trough 2 through outlet 3 prior to entry into mud degasser tank 62. *Id.* at 4:17–19. The gas cut mud is picked up by vacuum from sump 4 through suction pipe inlet 5, pulled into the top portion of mud degasser tank 62 through cut-a-way overflow pipe 9, then passed down over a pair of downwardly and outwardly inclined cascade plates 11. *Id.* at 4:28–40. Cascade plates 11 “spread the mud out into a thin sheet of considerable area, thus, subjecting the mud to eight or ten inches of vacuum by means of which entrained and dissolved gases are removed,” and “any highly volatile liquid hydrocarbons such as distillates will be vaporized and flashed.” *Id.* at 4:40–45.

The degassed mud passes through discharge pipe 15 and into reducing jet housing 17 at point 16, and is pulled from mud degassing tank 62 by

means of jet nozzle 38. *Id.* at 4:52–62. The degassed mud “is expanded through jet nozzle 38, pulling out degassed mud and re-entering” mud trough 2 at point 18, and, “[f]rom here the degassed mud passes, conventionally, to a cuttings removing shale shaker” and then to one or more mud tanks or pits for return to the drilling well. *Id.* at 4:69–75.

2. *Burnham ’113*

*Burnham ’113* is directed to “a system for the degassification of drilling mud in a continuous manner as the drilling mud is being circulated to and from a well head.” Ex. 1003, 2:51–53. The system described in *Burnham ’113* “includes a vacuum tank having a portion defining a drilling mud receiving area with means operatively connected to the vacuum tank for drawing a vacuum therefrom,” with a baffle means “provided within the tank for dividing the mud introduced into the tank into a plurality of thin layers and descending curtains which move in a predetermined flow pattern through the tank.” *Id.* at 2:54–62. Degassed mud is evacuated from the vacuum tank by an ejector apparatus that “includes a venturi structure defining a flow passage in communication with an outlet conduit and means such as an ejector nozzle operatively associated with said venturi structure for ejecting degassed mud under pressure and creating a high velocity flow of degassed mud” in order to “pull the mud from the mud receiving area of the vacuum tank into the venturi structure and push the mud through the outlet conduit.” *Id.* at 2:63–3:2. *Burnham ’113*’s system also includes a pressure relief valve means coupled with a gas outlet conduit, which can be selectively opened and closed for venting gas from the vacuum tank directly to the atmosphere. *Id.* at 3:26–34.

3. *Griffin*

Griffin is directed to drilling mud degassers for oil wells. Ex. 1004, 1:16–17. Griffin’s mud degasser apparatus includes a vertically disposed degasser tank “containing a set of vertically spaced baffles over which the mud flows in a cascading manner to facilitate and expedite the degassing thereof,” and a mechanical vacuum actuated pump means “for causing the flow of mud through the degasser tank.” *Id.* at 1:33–45. The gases released from the mud in the degasser tank enter the lower end of a tube that extends to a three-way valve (which includes a port that communicates with the atmosphere) mounted on top of the degasser tank cover. *Id.* at 3:41–50. The lower end of the tank is connected to a discharge pipe that communicates with a degassed mud tank, the discharge pipe being provided with a jet “for propelling the degassed mud therethrough and simultaneously causing mud to be drawn into” the degasser tank from the tank that holds the mud before degassing occurs. *Id.* at 2:36–43.

4. *Burnham ’927*

Burnham ’927 “relates to a system for the degassification of drilling mud used in a drilling mud recirculation system at the well head.” Ex. 1005, 1:10–12. “The system includes a vacuum tank having a series of baffles upon which gas-entrained drilling mud is deposited in order to facilitate the gas separation.” *Id.* at 2:10–13. Burnham ’927’s system pulls contaminated mud “into the vacuum tank in response to the vacuum level therein, and is removed as degassified mud from the lower portion of the vacuum tank by” a dual ejector apparatus that eliminates the need for a separate vacuum pump. *Id.* at 2:13–18. Burnham ’927 explains that the “dual ejector apparatus includes a single venturi structure defining a flow passage in

communication with an outlet conduit, means for utilizing a portion of the degassed drilling mud as the motivating fluid for the dual ejector, and two ejector inlets.” *Id.* at 2:18–23.

Burnham ’927 teaches that “[d]egassified drilling mud and the gas removed from the mud” can be exhausted through a common conduit “and then easily separated in means such as a cyclone separator because once the gas is extracted, it would take great pressures, temperatures and agitation to re-entrain the gas within the mud, and such are not present in the dual ejector and the outlet conduit.” *Id.* at 4:3–10. The separated gas is vented to the atmosphere, and the degassified mud drops through a hopper into a degassified mud tank “from which a portion of it is again extracted for use as a motivating fluid for the dual ejector, while the major portion is recirculated through the well head.” *Id.* at 6:65–7:7.

5. *Mathena ’811*

Mathena ’811 “provides an ecologically improved system to capture a mud-gas mixture and to safely dispose of waste gas from a wellbore.” Ex. 1006, 1:66–2:1. “The system comprises a gas vent line which is in fluid communication with both the wellbore and a flare stack,” which “transports waste gas to the flare stack.” *Id.* at 2:18–21. The system also includes “at least one input line in fluid communication with a wellbore and a vessel,” and overflow line to carry “any excess mud-gas mixture from the vessel to a catch tank.” *Id.* at 2:21–24. Mathena ’811 also describes a cleanout port that allows direct access to the input line that communicates with the vessel in order to prevent the buildup of residual mud within the elbow joint of the input line. *Id.* at 8:14–16, 8:47–49.

*D. Anticipation Grounds*

Petitioner contends that (1) claims 1–3, 5, and 16 are anticipated by Erwin (Pet. 14–18); (2) claims 1 and 5 are anticipated by Burnham ’113 (*id.* at 19–23); (3) claims 1, 5, and 8–11 are anticipated by Griffin (*id.* at 23–29); and (4) claims 1 and 5 are anticipated by Burnham ’927 (*id.* at 29–33). As described above, each of Erwin, Burnham ’113, Griffin, and Burnham ’927 is directed to mud-gas separators and the degassification of drilling mud. *See supra* Section II.C.1–4.

A reference cannot be said to anticipate a claimed invention unless that reference “discloses within the four corners of the document not only the limitations claimed, but also all of the limitations arranged or combined in the same way as recited in the claim.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). The challenged claims all recite a “shale-gas separator” in their preambles, which, as set forth above, we determined is a limitation of the claims. *See supra* Section II.B. None of Erwin, Burnham ’113, Griffin, or Burnham ’927 discloses any apparatus identified as a shale-gas separator, and Petitioner provides no sound basis for any disclosed apparatus being a shale-gas separator. Accordingly, Petitioner has not established that any of Erwin, Burnham ’113, Griffin, or Burnham ’927 describes “every element of the claimed invention, either expressly or inherently.” *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000).

Accordingly, based on the record before us, we determine that Petitioner does not establish a reasonable likelihood of prevailing in showing that independent claims 1 and 16, and claims 2, 3, 5, and 8–11 that depend,

directly or indirectly, from claim 1, are unpatentable as anticipated by any of Erwin, Burnham '113, Griffin, or Burnham '927.

*E. Obviousness Grounds*

Petitioner contends that (1) claims 6, 7, and 12–14 would have been obvious over the combined teachings of Burnham '927 and Mathena '811 and the combined teachings of Burnham '113 and Mathena '811 (Pet. 33–42); (2) claims 7 and 12–14 would have been obvious over the combined teachings of Griffin and Mathena '811 and the combined teachings of Erwin and Mathena '811 (*id.* at 42–47); (3) claims 8–11 would have been obvious over the combined teachings of Burnham '113 and Griffin and the combined teachings of Burnham '927 and Griffin (*id.* at 48–54); (4) claim 4 would have been obvious over the combined teachings of Erwin and Griffin (*id.* at 55); and (5) claims 15 and 28 would have been obvious over the combined teachings of Griffin, Erwin, and Mathena '811 (*id.* at 56–57).

Claims 4 and 6–15 depend, directly or indirectly, from claim 1. Petitioner relies on its previous arguments that Erwin, Burnham '113, Griffin, and Burnham '927 disclose all the elements of claim 1. *See, e.g.*, Pet. 35 (“As discussed in Ground 4, Burnham '927 discloses all of the elements of claims 1 and 5.”), 40 (“Burnham '113 discloses all of the elements of claim 1, as discussed above in Ground 2.”), 43 (“Griffin discloses all the elements of claim 1 as discussed in Ground 3.”), 46 (“Erwin discloses all the elements of claim 1, as discussed in Ground 1.”), 48, 52–53. Independent claim 28 also recites a “shale-gas separator,” and Petitioner relies on its arguments with respect to claim 1 to meet the similar limitations in claim 28. *Id.* at 56–57. As set forth above, we determine that Petitioner has not demonstrated a reasonable likelihood that it would prevail in



showing that any of Erwin, Burnham '113, Griffin, or Burnham '927 discloses a shale-gas separator. Petitioner does not rely on Mathena '811 to remedy the deficiencies in Erwin, Burnham '113, Griffin, and Burnham '927 with respect to this limitation in independent claims 1 and 28.

Rather, Petitioner contends that “[m]ud-gas separators and shale-gas separators accomplish the same objective using the same process” (Pet. 11), and that “a POSITA would have been motivated to use mud gas separators for shale gas separation” (*id.* at 14). To the extent that Petitioner is arguing that these alleged similarities would have provided a POSITA with a reason to modify the mud-gas separators described in Erwin, Burnham '113, Griffin, or Burnham '927 to separate shale-liquid-gas mixtures, that argument is not persuasive.

In particular, Petitioner does not provide any objective evidence to support its argument, explain how or why a mud-gas separator could be used to separate a shale-gas-liquid mixture, or explain what, if any, modifications a POSITA would have had to make to the disclosed mud-gas separators in order to separate a shale-gas-liquid mixture as described in the challenged claims. Petitioner’s conclusory statement that a POSITA would have used mud-gas separators for shale-gas separation does not constitute an articulated reasoning with rationale underpinning sufficient to support a motivation to modify the prior art teachings. *See KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”)).

Moreover, with respect to the proposed combinations, Petitioner argues that because the references address common problems in oil and gas exploration and drilling, a POSITA could have combined the references in a way that encompasses the challenged claims. Pet. 33 (“Because both references address the common problem encountered in oil and gas exploration and drilling fields of safely disposing of materials encountered during drilling operations, a POSITA could have combined Burnham ’927 and Mathena ’811 in a way that encompasses claims 6, 7 and 12–14 and would have seen the benefits of doing so.”), 38 (“Because both references are in the oil and gas exploration and drilling fields, a POSITA could have combined Burnham ’113 and Mathena ’811 in a fashion encompassed by claims 6, 7, and 12–14 and would have seen the benefits of doing so.”), 42 (“Because [Griffin and Mathena ’811] are in the oil and gas exploration and drilling fields, a POSITA could have combined the references in a fashion encompassed by claims 7 and 12–14 and would have seen the benefits of doing so.”), 46 (“Because both references are in the oil and gas exploration and drilling fields, a POSITA could have combined Erwin and Mathena ’811 in a fashion that encompasses claims 7 and 12–14 and would have seen the benefits of doing so.”), 48, 52, 55, 56. That statement of similarity, however, does not constitute an articulated reasoning with rational underpinning as to why a POSITA would combine elements of one reference with another, and why a POSITA would modify the teachings of the references to arrive at the claimed invention. Furthermore, to the extent that Petitioner is asserting that a POSITA “could” have combined the references to reach the claimed invention, this is also insufficient for obviousness. *See Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017)

(Saying that references could be combined “does not imply a motivation to pick [the references] and combine them to arrive at the claimed invention.”); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1074 (Fed. Cir. 2015)

(“Obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed inventions.”).

For these reasons, we conclude that Petitioner has not demonstrated a reasonable likelihood of prevailing in showing that claims 4, 6–15, and 28 would have been obvious over any of the proposed combinations of references.

### III. CONCLUSION

Based on the arguments in the briefing, and the evidence of record, we determine that Petitioner has not established a reasonable likelihood that it would prevail on its challenge that claims 1–16 and 28 of the ’545 patent are unpatentable.

### IV. ORDER

In consideration of the foregoing, it is hereby  
ORDERED that the Petition is *denied*.

IPR2019-00133  
Patent 8,784,545 B2

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