

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PHILLIPS 66,
Petitioner,

v.

MAGĒMĀ TECHNOLOGY, LLC,
Patent Owner.

IPR2021-01174
Patent 10,604,709 B2

Before PATRICK R. SCANLON, CHRISTOPHER M. KAISER,
and BRIAN D. RANGE, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

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

INTRODUCTION

A. Background

Phillips 66 (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1, 2, 4, and 5 of U.S. Patent No. 10,604,709 B2 (Ex. 1001, “the ’709 patent”). Magēmā Technology LLC (“Patent Owner”) filed a Preliminary Response. Paper 13 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(b); 37 C.F.R. § 42.4(a) (2020). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

After considering the Petition, the Preliminary Response, and the evidence of record, we determine that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we do not institute an *inter partes* review of any challenged claim on any asserted ground.

B. Related Matters

The parties identify *Magēmā Tech. LLC v. Phillips 66*, No. 4:20-cv-02444 (S.D. Tex.), as a matter related to the present proceeding. Pet. 1; Paper 5, 2. The parties also note that there are several *inter partes* review proceedings that challenge related patents: IPR2021-01168, IPR2021-01173, and IPR2021-01175. Pet. 1; Paper 5, 2.

C. The Asserted Grounds of Unpatentability

Petitioner contends that claims 1, 2, 4, and 5 of the '709 patent are unpatentable based on the following grounds (Pet. 26–73):¹

Claims Challenged	35 U.S.C. §	References/Basis
1, 2	103	Weiss '974, ² Weiss '515 ³
4, 5	103	Weiss '974, Weiss '515, Weiss '444 ⁴
1, 2	103	ISO 8217:2017, ⁵ Annex VI, ⁶ Weiss '974, Weiss '515, Parkash, ⁷ Buchanan ⁸
1, 2	103	ISO 8217:2017, Annex VI, Weiss '974, Weiss '515, Parkash, Buchanan, AAPA ⁹
4, 5	103	ISO 8217:2017, Annex VI, Weiss '974, Weiss '515, Parkash, Buchanan, Weiss '444

¹ Petitioner also relies on a declaration from Edward L. Sughrue II, Ph.D. Ex. 1082.

² US 2018/0134974 A1, published May 17, 2018 (Ex. 1002).

³ US 2014/0299515 A1, published Oct. 9, 2014 (Ex. 1094).

⁴ US 2014/0332444 A1, published Nov. 13, 2014 (Ex. 1079).

⁵ International Organization for Standardization. (2017). *Petroleum products – Fuels (class F) – Specifications of marine fuels* (ISO Standard No. 8217:2017(E)) (Ex. 1003).

⁶ Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as Modified by the Protocol of 1978 Relating Thereto (Revised MARPOL Annex VI), Oct. 10, 2008, Resolution MEPC.176(58) (Ex. 1004).

⁷ Surinder Parkash, *Petroleum Fuels Manufacturing Handbook* (2010) (Ex. 1102).

⁸ US 2015/0353851 A1, issued Dec. 10, 2015 (Ex. 1049).

⁹ Ex. 1001, 38:60–63, 39:15–67, 40:10–24.

Claims Challenged	35 U.S.C. §	References/Basis
4, 5	103	ISO 8217:2017, Annex VI, Weiss '974, Weiss '515, Parkash, Buchanan, Weiss '444, AAPA

D. The '709 Patent

The '709 patent, titled “Multi-Stage Device and Process for Production of a Low Sulfur Heavy Marine Fuel Oil from Distressed Heavy Fuel Oil Materials,” issued on March 31, 2020. Ex. 1001, codes (45), (54). According to the patent, “[t]here are two basic marine fuel types: distillate based marine fuel, also known as Marine Gas Oil (MGO) or Marine Diesel Oil (MDO); and residual based marine fuel, also known as heavy marine fuel oil (HMFO).” *Id.* at 1:8–11. HMFO has been “used by large ocean-going ships as fuel for large two stroke diesel engines for over 50 years” but “is generally characterized as . . . high in sulfur.” *Id.* at 1:51–2:7.

Because of this sulfur content, “[e]missions from HMFO burning in ships contribute significantly to both global marine air pollution and local marine air pollution levels.” *Id.* at 2:11–18. International conventions to reduce pollution were enacted, with “all marine fuel oils used in the North American [Emission Control Area]” being required to contain no more than 0.10 percent sulfur by weight after January 1, 2015. *Id.* at 2:19–52. This requirement caused refiners to charge “a premium price . . . to supply a low sulfur HMFO.” *Id.* at 2:52–65.

The '709 patent discusses the shortcomings of some possible solutions to this problem. Replacing HMFO with MGO or MDO is impossible because it would “result[] in an annual shortfall in marine fuel of over 200 million metric tons” due to a lack of excess refining capacity. *Id.* at 3:14–29. Blending HMFO with low-sulfur MGO or MDO would “hurt[] key

properties of the HMFO, specifically lubricity, fuel density, CCAI, viscosity, [and] flash point,” would form “fuel tank sludge,” and would not be economically viable. *Id.* at 3:30–61. Accordingly, “[t]here remains a long standing and unmet need for processes and devices that remove the environmental contaminants (i.e. sulfur, nitrogen, phosphorous, metals especially vanadium and nickel) from HMFO without altering the qualities and properties that make HMFO the most economic and practical means of powering ocean going vessels.” *Id.* at 4:51–57.

The ’709 patent attempts to solve this problem by reduc[ing] the environmental contaminates [sic] from Distressed Fuel Oil Materials (DFOM) in a multi stage device implementing a pre-treatment stage that transforms the DFOM into a Feedstock Heavy Marine Fuel Oil (Feedstock HMFO) and a Core Process that removes the environmental contaminants from the Feedstock HMFO, minimizes the changes in the desirable properties of the Feedstock HMFO and minimizes the production of byproduct hydrocarbons (i.e. light hydrocarbons having C₁-C₄ and wild naphtha (C₄-C₂₀)).”

Id. at 4:61–5:3. The patent describes the Core Process as including mixing a quantity of the Feedstock Heavy Marine Fuel Oil with a quantity of Activating Gas mixture to give a Feedstock Mixture; contacting the Feedstock Mixture with one or more catalysts under reactive conditions in a Reaction System to form a Process Mixture from the Feedstock Mixture; receiving said Process Mixture and separating the liquid components of the Process Mixture from the bulk gaseous components of the Process Mixture; subsequently separating any residual gaseous components and by-product hydrocarbon components from the Product Heavy Marine Fuel Oil; and, discharging the Product Heavy Marine Fuel Oil.

Id. at 6:50–62.

E. Illustrative Claim

Claims 1, 2, 4, and 5 of the '709 patent are challenged. Claim 1 is independent and illustrative. We reproduce claim 1 below while adding bracketed notations to separate claim elements:

1. [a] A process for production of a Product Heavy Marine Fuel Oil from Distressed Fuel Oil Materials,
[b] the process comprising: processing the Distressed Fuel Oil Materials in a pre-treatment unit under operative conditions to give a pre-treated Feedstock Heavy Marine Fuel Oil,
[c] and wherein the pre-treatment unit is selected from the group comprising: steam stripper column; a distillation column; a divided wall distillation column; a reactive distillation column; a counter-current extraction unit, a fixed bed absorption unit, a solids separation unit, a blending unit; and combinations thereof,
[d] wherein the pre-treated Feedstock Heavy Marine Fuel Oil complies with ISO 8217 except for the environmental contaminants including a sulfur content (ISO 14596 or ISO 8754) between the range of 5.0 wt % to 0.50 wt %;
[e] mixing a quantity of the pre-treated Feedstock Heavy Marine Fuel Oil with a quantity of Activating Gas mixture to give a Feedstock Mixture;
[f] contacting the Feedstock Mixture with one or more transition metal catalysts under reactive conditions to form a Process Mixture from said Feedstock Mixture;
[g] receiving said Process Mixture and separating Product Heavy Marine Fuel Oil liquid components of the Process Mixture from gaseous components and by-product hydrocarbon components of the Process Mixture and,
[g] discharging the Product Heavy Marine Fuel Oil.

Ex. 1001, 41:2–26; *see also* Pet. xii (reproducing claim with same bracketed notations).

ANALYSIS

A. Claim Construction

Petitioner does not argue that any term appearing in the challenged claims requires express construction. Pet. 22–26. Instead, Petitioner argues that, with the exception of “merchantable,” a term that does not appear in any challenged claim, “all claim terms should receive their ordinary and customary meanings consistent with the specification and prosecution history.” *Id.*

For its part, Patent Owner “contends that no claim construction is necessary apart from that agreed to by the parties in the Litigation and that contained in the district court’s claim construction order.” Prelim. Resp. 36 (citing Ex. 1107). Patent Owner further contends the parties have “agreed that ‘compliant with ISO 8217:2017’ means the material ‘meets the bulk physical properties of any of a RMA, RMB, RMD, RME, RMG, or RMK residual marine fuel as set forth in Table 2 of the ISO 8217:2017 standard.’” *Id.* (citing Ex. 1016, 1–2).

We determine we need not expressly construe any terms of the challenged claims in order to determine whether or not to institute trial. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“we 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))).

B. Asserted Obviousness Based on Weiss ’974 and Weiss ’515

Petitioner argues that claims 1 and 2 of the ’709 patent would have been obvious over the combination of Weiss ’974 and Weiss ’515. Pet. 26–

51. Petitioner also argues that claims 4 and 5 would have been obvious over the combination of Weiss '974, Weiss '515, and Weiss '444. *Id.* at 51–56.

1. Weiss '974

Weiss '974 is titled “Method for Converting Feedstocks Comprising a Hydrocracking Step, a Precipitation Step and a Sediment Separation Step, in Order to Produce Fuel Oils.” Ex. 1002, code (54). The patent “relates to a process for the conversion of heavy oil feeds of the atmospheric residue and/or vacuum residue type for the production of heavy fractions for use as fuel oil bases, in particular bunker fuel bases, with a low sediment content.” *Id.* ¶ 1.

The patent states that “quality requirements for marine fuels are described in ISO standard 8217,” which places restrictions on sulphur content by weight, but “a vessel could use a sulphur-containing fuel oil as long as the vessel is equipped with a system for treating fumes allowing the oxides of sulphur emissions to be reduced.” *Id.* ¶ 2. However, according to the patent, “[a]nother very restrictive recommendation is the sediment content after aging in accordance with ISO 10307-2 (also known as IP390).” *Id.* ¶ 3.

Weiss '974 describes a known, prior-art process “employing an ebullated bed hydrocracking step and a step with a reactor termed an upflow reactor associated with a reactor termed a stripper. The sediment content of the final effluent is reduced compared with the effluent from the ebullated bed step.” *Id.* ¶ 8. However, “[a]lthough ebullated bed technology is known to be suitable for heavy feeds charged with impurities, the nature of the ebullated bed means that it produces catalyst fines and sediments which have to be removed in order to provide a product quality such as bunker fuel.” *Id.*

¶ 10. To improve on this, Weiss '974 introduces a “process integrating a precipitation step and physical separation of the sediments downstream of a hydrocracking step.” *Id.* ¶ 12. Weiss '974 further states that

a process of this type can be used to obtain heavy fractions having a low sediment content after aging, said heavy fractions advantageously being able to be used completely or in part as a fuel oil or as a fuel oil base, in particular as bunker fuel or bunker fuel base complying with specifications, namely a sediment content after aging (measured in accordance with the method ISO 10307-2) of 0.1% by weight or less.

Id. The patent describes a process with the following sequence of steps:

- a) a step of hydrocracking the feed in the presence of hydrogen;
- b) a step of separating the effluent obtained from step a);
- c) a step of precipitating sediments, in which the heavy fraction obtained from the separation step b) is brought into contact with a distillate cut at least 20% by weight of which has a boiling point of 100° C. or more for a period of less than 500 minutes, at a temperature in the range 25° C. to 350° C., and at a pressure of less than 20 MPa;
- d) a step of physical separation of the sediments from the heavy fraction obtained from step c);
- e) a step of recovering a heavy fraction having a sediment content, measured using the ISO 10307-2 method, of 0.1 % by weight or less.

Id. at code (57) (formatting added for readability). Weiss '974 also discloses an optional hydrotreatment (step f) to reduce the sulphur content of the heavy fraction obtained from step d) or e). *Id.* ¶¶ 90–93.

2. Weiss '515

Weiss '515 is titled “Process for Conversion of Petroleum Feed Comprising an Ebullated Bed Hydroconversion Step in a Fixed Bed Hydrotreatment Step for the Production of Low Sulphur Content Fuel.”

Ex. 1094, code (54). The patent describes “a conversion method for heavy petroleum feeds for the production of fuel bases of the type vacuum distillate, atmospheric residue and vacuum residue, in particular bunker fuel bases with low sulphur content.” *Id.* ¶ 1.

Weiss ’515 describes the following sequence of steps in its method:

- a step of ebullated bed hydroconversion of the feed in the presence of a supported catalyst,
- a separation step allowing a residual fraction to be obtained,
- a step of fixed bed hydrotreatment of the residual fraction using an upstream system of permutable reactors.

Id. at code (57).

3. *Weiss ’444*

Weiss ’444 is titled “Process for Hydroconverting Oil Feeds in Fixed Beds for the Production of Low Sulphur Fuels.” Ex. 1079, code (54).

Weiss ’444 “relates to a process for the conversion of heavy oil feeds for the production of fuel bases of the vacuum distillate, atmospheric residue and vacuum residue type, in particular bunker fuel bases with a low sulphur content.” *Id.* ¶ 1. The patent states that its process “can be used to produce fuel bases, in particular bunker fuel bases, complying with the recommendations of the MARPOL convention,” specifically “version 2010 of ISO standard 8217 (Annex VI to the MARPOL convention),” which sets levels for sulphur, sediments, and viscosity. *Id.* ¶¶ 3–4.

Weiss ’444 describes the following sequence of steps in its method:

- a step for fixed bed hydrodemetallization of the feed using an upstream system of fixed bed swing reactors;
- a step for fixed bed hydrocracking of the hydrodemetallized effluent in the presence of a hydrocracking catalyst;
- a step for separation in order to obtain a heavy fraction;

a step for hydrodesulphurization of the heavy fraction in which hydrogen is reinjected.

Id. at code (57).

4. *Analysis*

Each challenged claim of the '709 patent recites several limitations requiring the presence of a "Heavy Marine Fuel Oil." Ex. 1001, 41:5–6 (forming "a pre-treated Feedstock Heavy Marine Fuel Oil"), 41:12–13 (requiring "the pre-treated Feedstock Heavy Marine Fuel Oil [to] compl[y] with ISO 8217"), 41:15–16 ("mixing a quantity of the pre-treated Feedstock Heavy Marine Fuel Oil with a quantity of Activating Gas mixture"), 41:25–26 ("discharging the Product Heavy Marine Fuel Oil"), 41:27 (claim 2 depending from claim 1), 41:40 (claim 4 depending from claim 1), 41:53 (claim 5 depending from claim 1).

Petitioner relies on Weiss '974 to teach or suggest the use of HMFO in these limitations. Pet. 30 (citing Ex. 1002 ¶¶ 2, 12, 20, 87–89, 113–114, 116, 118, 120–124, 127–128), 32 (citing Ex. 1002 ¶¶ 2–3, 6, 10–13, 20, 65, 87, 89, 127–128), 45–46 (citing Ex. 1002 ¶¶ 2, 3, 6, 10–13, 20, 65, 80–85, 87, 89, 92), 47 (citing Pet. 45–46), 48 (citing Ex. 1002 ¶ 100), 49–50 (citing Ex. 1002 ¶¶ 16, 105–108). Specifically, Petitioner argues that Weiss '974's "exemplary process . . . yielded an ISO 8217 RMG 380 fuel oil." *Id.* at 30 (citing Ex. 1002 ¶¶ 127–128). Petitioner also argues that Weiss '974 teaches "a bunker fuel of a 'desired . . . fuel oil grade' that meets marine fuels' 'quality requirements,' rendering the HSFO . . . compatible with[] HMFO." *Id.* at 32. In addition, Petitioner argues that the "pre-hydrotreatment HSFO" of Weiss '974 is "an HMFO feedstock" because it is formed by removing "the sediments and 'at least a portion of the distillate cut introduced during

precipitation step c)” from “the post-precipitation heavy fraction.” *Id.* at 45. Petitioner also argues that the pre-hydrotreatment HSFO of Weiss ’974 “satisf[ies] the ’709 Patent’s definition of ‘Feedstock HMFO’” because that HSFO “would have been ISO-8217-compliant and merchantable.” *Id.* at 46. Finally, Petitioner alleges that the post-hydrotreatment LSFO of Weiss ’974 is the “Product Heavy Marine Fuel Oil” of the challenged claims, but Petitioner does not explain why this is so. *Id.* at 49–50 (citing Weiss ’974 ¶ 108).

The ’709 patent defines a Heavy Marine Fuel Oil (“HMFO”) in part as “a residual petroleum product compliant with the ISO 8217 standards for the physical properties or characteristics of a merchantable HMFO.” Ex. 1001, 8:4–7 (defining “Feedstock Heavy Marine Fuel Oil”), 8:13–15 (defining “Product HMFO”). Petitioner argues that “[a]ll these definitions dictate is ISO-8217-compliance.” Pet. 23. Not so. Instead, these definitions require both that an HMFO comply with “the ISO 8217 standards for the physical properties or characteristics of a merchantable HMFO” and that the HMFO be a “residual petroleum product.” Ex. 1001, 8:4–7, 8:13–15. This is important because marine fuel oil can be either residual-based or distillate-based. Ex. 1082 ¶ 29; Ex. 2007 ¶ 25; *see also* Ex. 1102, 12 (“There are two basic types of fuel oils; distillate and residual. A third type of fuel oil is a mixture of the two basic types, commonly known as ‘intermediate.’”).

Thus, to demonstrate the that Weiss ’974 teaches or suggests both the feedstock HMFO and the product HMFO of the challenged claims, as Petitioner argues it does, Petitioner must show that Weiss ’974 teaches or suggests four facts: (1) the pre-hydrotreatment HSFO is a residual petroleum product, (2) the pre-hydrotreatment HSFO is ISO-8217-compliant, (3) the

post-hydrotreatment LSFO is a residual petroleum product, and (4) the post-hydrotreatment LSFO is ISO-8217-compliant. Petitioner does not show all four of these facts sufficiently to demonstrate a reasonable likelihood of prevailing in showing that the challenged claims are obvious over the combination of Weiss '974 and Weiss '515.

With respect to the pre-hydrotreatment HSFO of Weiss '974, many of Petitioner's arguments show only that the fuel oil is a bunker fuel that complies with ISO 8217. *See, e.g.*, Pet. 32, 46. These arguments alone are insufficient because ISO-8217-compliant bunker fuels can be either distillate-based or residual-based. Ex. 1003, 14–17; Ex. 1082 ¶ 29; Ex. 2007 ¶ 25. Thus, showing that a fuel is a bunker fuel or that a fuel complies with ISO 8217 does not show that the fuel is residual-based. In addition, Petitioner argues that the pre-hydrotreatment HSFO of Weiss '974 is formed by removing “the sediments and ‘at least a portion of the distillate cut introduced during precipitation step c)’” from “the post-precipitation heavy fraction.” Pet. 45. This argument does not show that the HSFO is a residual petroleum product, as opposed to a distillate product or an intermediate product, because Petitioner does not explain either (1) how much distillate must be removed from the oil to make it into a residual-based product or (2) how much distillate Weiss '974 actually removes.

One argument, in our view, may show sufficiently (for institution purposes) that Weiss '974 teaches or suggests that its pre-hydrotreatment HSFO is residual-based: Petitioner argues that Weiss '974's “exemplary process . . . yielded an ISO 8217 RMG 380 fuel oil.” *Id.* at 30 (citing Ex. 1002 ¶¶ 127–128). On the present record, we agree. Weiss '974 includes a working example of its invention in which a non-hydrotreated bunker fuel is

produced that “constitute[s] a high quality bunker fuel which could be sold with grade RMG or IFO 380.” Ex. 1002 ¶ 128; *see* Ex. 1002 ¶¶ 113–127 (explaining production of the bunker fuel in question without using Weiss ’974’s hydrotreating steps). Dr. Sughrue testifies that “grade RMG or IFO 380” in Weiss ’974 is “a reference to ISO 8217’s RMG 380 residual marine fuel grade.” Ex. 1082 ¶ 60. And ISO 8217 defines RMG 380 as a grade of residual marine fuel. Ex. 1003, 16–17. Thus, Petitioner has shown sufficiently that Weiss ’974 teaches or suggests that its pre-hydrotreatment HSFO is a residual petroleum product.

The same cannot be said for Petitioner’s allegations with respect to the post-hydrotreatment LSFO of Weiss ’974. Petitioner relies on the post-hydrotreatment LSFO of Weiss ’974 to teach or suggest the product HMFO of the challenged claims, but Petitioner does not explain why the LSFO is an HMFO. Pet. 49–50 (citing Ex. 1002 ¶¶ 16, 105–108). In the cited paragraphs, Weiss ’974 describes separating the hydrotreatment effluent “by atmospheric distillation into a gaseous fraction, at least one atmospheric distillate fraction . . . and an atmospheric residue fraction,” with the atmospheric residue being separated “by vacuum distillation into a vacuum distillate fraction containing vacuum diesel and a vacuum residue.” Ex. 1002 ¶ 107. “The vacuum residue fraction and/or the vacuum distillate fraction and/or the atmospheric residue fraction may in part constitute at least fuel oil bases,” which “may be mixed with one or more cutter stocks” to “obtain a fuel oil.” *Id.* ¶¶ 108, 110. Neither Weiss ’974 nor Petitioner explains why this mixing step to obtain a fuel oil (rather than merely a fuel oil base) retains the residual nature of the petroleum product without converting it into a distillate or intermediate petroleum product. Moreover,

to the extent that Petitioner relies on the fuel oil base of paragraph 108—rather than the fuel oil of paragraph 110—to teach or suggest the product HMFO of claim limitations 1(g) and 1(h), Petitioner does not explain why that fuel oil base would have complied with ISO 8217.

Thus, Petitioner has not shown sufficiently that the combination of Weiss '974 and Weiss '515 (with the addition of Weiss '444 for claims 4 and 5) teaches or suggests the HMFOs recited in the challenged claims. Accordingly, Petitioner has not demonstrated a reasonable likelihood of prevailing on the obviousness of the challenged claims over these combinations of references.

C. Asserted Obviousness Based on ISO 8217:2017, Annex VI, Weiss '974, Weiss '515, Parkash, and Buchanan

Petitioner argues that claims 1 and 2 of the '709 patent would have been obvious over the combination of ISO 8217:2017, Annex VI, Weiss '974, Weiss '515, Parkash, and Buchanan. Pet. 56–71. Petitioner also argues that claims 4 and 5 would have been obvious over the combination of ISO 8217:2017, Annex VI, Weiss '974, Weiss '515, Parkash, Buchanan, and Weiss '444. *Id.* at 71–73. In addition, Petitioner argues that claims 1, 2, 4, and 5 would have been obvious over these same combinations of references, with the addition of AAPA. *Id.* at 56–73.

1. ISO 8217:2017

ISO 8217 is a standard for “Petroleum products — Fuels (class F) — Specifications of marine fuels” from the International Organization for Standardization (“ISO”). Ex. 1003, Title. This version was published in 2017. *Id.* at ii. The document describes “the requirements for fuels for use in marine diesel engines and boilers, prior to conventional onboard treatment

(settling, centrifuging, filtration) before use.” *Id.* at 1. The “document specifies seven categories of distillate fuels” and “six categories of residual fuels.” *Id.*

ISO 8217 provides Table 2, which lists the characteristics of several grades of residual marine fuels. *Id.* at 10–11.

2. *Annex VI*

Annex VI, or more precisely “Revised MARPOL Annex VI,” is titled “Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as Modified by the Protocol of 1978 Relating Thereto.” Ex. 1004, 1. Annex VI sets forth “Regulations for the Prevention of Air Pollution from Ships.” *Id.* at 3.

3. *Parkash*

Parkash is an excerpt from the “Petroleum Fuels Manufacturing Handbook.” Ex. 1102, 1. Specifically, Parkash consists of two portions of chapter 6 of that handbook, titled “Residual Fuel Oils.” *Id.* at 5, 10–15. The first portion of Parkash discusses the specifications applicable to residual fuel oils and marine fuel oils. *Id.* at 10–12. The second portion of Parkash discusses the blending of residual fuel oil from various refinery streams. *Id.* at 13–15.

4. *Buchanan*

Buchanan relates to “marine fuel compositions having a sulfur content of less than or equal to 1000 ppm and methods of producing the same.” Ex. 1049, code (57). According to Buchanan, the adoption of Annex VI “require[d] that by Jan. 1, 2015 marine fuel used by maritime vessels inside Sulfur Emission Control Areas (SECA) or Emission Control Areas (ECAs)

have a sulfur content of less than 0.01% or 1000 ppm.” *Id.* ¶ 7. “Therefore, there [was] a need for a commercially available, low cost marine fuel or blend that offers satisfactory emission profiles for use inside and outside ECAs.” *Id.* Buchanan teaches that “[h]ydrodesulfurization (‘HDS’) is the industry’s standard method of removing unwanted sulfur compounds in petroleum refining operations and is sometimes referred to as ‘hydrotreating.’” *Id.* ¶ 8. “Unfortunately, the HDS process typically requires expensive, high-pressure (up to 1,000 psig), high-temperature (400-550° C.) equipment to help produce environmentally compatible fuels.” *Id.*

Buchanan discusses the distillation of crude oil “into two broad categories” of “hydrocarbon products”: “distillate fuel oil products” and “residual fuel oil products.” *Id.* ¶ 9. “Typically, distillate fuel oil products have a low viscosity and low sulfur content, whereas residual fuel oil products are highly viscous and generally high in sulfur content.” *Id.* Switching between these two types of fuel oils in the same engine can cause problems, so Buchanan teaches that “the industry has been skeptical of the functional capabilities of blends of distillate fuel oil products . . . with residual fuel oil products.” *Id.* ¶¶ 10–11. Buchanan teaches blending various refinery streams to achieve a blended product with low sulfur content. *Id.* ¶¶ 14–39. To do this, “[a]ny blending process as known by a [person] skilled in the art may be used. For example in-line static mixers, paddle mixers in the tank, etc., or any known process may be used.” *Id.* ¶ 40.

5. *AAPA*

The ’709 patent contains three working examples. Ex. 1001, 35:28–40:67. Example 2 describes the use of “a commercially available and

merchantable ISO 8217 compliant HMFO, except for a high sulfur content (2.9 wt %)” as a “Feedstock HMFO.” *Id.* at 38:60–63. The ’709 patent describes the “observed bulk properties” of this feedstock HMFO as “consistent with ISO 8217 for a merchantable residual marine fuel oil.” *Id.* at 39:15–67. Similarly, Example 3 of the ’709 patent describes the use as a feedstock HMFO of “a commercially available and merchantable ISO 8217 RMK-500 compliant HMFO, except that it ha[d] high environmental contaminates (i.e. sulfur (3.3 wt %)).” *Id.* at 40:10–24. Petitioner argues that the descriptions of the commercially available products used in Examples 2 and 3 constitute admissions that those products were prior art to the ’709 patent. Pet. 58–60.

6. *Analysis*

Each challenged claim of the ’709 patent recites “processing . . . Distressed Fuel Oil Materials in a pre-treatment unit under operative conditions to give a pre-treated Feedstock Heavy Marine Fuel Oil, . . . wherein the pre-treatment unit is selected from the group comprising . . . a blending unit.” Ex. 1001, 41:4–11. Petitioner argues that the asserted prior art teaches the production of three high-sulfur fuel oils, which Petitioner refers to as HSFO1, HSFO2, and HSFO3. Pet. 58–59 (citing Ex. 1001, 38:61–63, 40:10–14; Ex. 1003, 5, 16–17; Ex. 1004, 19–20). Petitioner argues that each of HSFO1, HSFO2, and HSFO3 is an HMFO and that a person of ordinary skill in the art would have produced each of these fuel oils in a blending unit. *Id.* at 65–68 (citing Ex. 1002 ¶¶ 20, 110; Ex. 1003, 16–17; Ex. 1049 ¶ 40; Ex. 1102, 10–15).

Specifically, Petitioner argues that “HSFO1-HSFO3 would have obviously been produced in a blending unit like [Buchanan’s] ‘in line static

mixer[or] paddle mixer[] in [a] tank’ by blending DFOM like Parkash’s atmospheric and/or vacuum residues . . . , rendering each of HSFO1-HSFO3 a pre-treated HMFO.” *Id.* at 68 (citing *id.* at 65–68; Ex. 1082 ¶¶ 121–122). In more detail, Petitioner argues that Parkash teaches blending atmospheric and vacuum residual streams with other refinery process streams in order to produce ISO-8217-compliant residual fuel oil, rendering obvious the creation of HSFO1, HSFO2, and HSFO3 via this blending process. *Id.* at 65–67 (citing Ex. 1102, 10–15). Finally, Petitioner argues that Buchanan teaches the use of particular types of blending units to blend a residual fuel product with a distillate fuel oil product, rendering obvious the use of such a blending unit to carry out Parkash’s blending process. *Id.* at 67 (citing Ex. 1049 ¶ 40).

We are not persuaded that Petitioner has shown sufficiently that a person of ordinary skill in the art would have found it obvious to use Buchanan’s blending units to carry out Parkash’s blending process to produce any of HSFO1, HSFO2, or HSFO3. First, paragraph 40 of Buchanan teaches blending a generic “residual fuel product” with a generic “distillate fuel oil product” in order “to form a homogeneous final blended fuel oil product.” Ex. 1049 ¶ 40. Petitioner does not explain why a person of ordinary skill in the art would have considered Buchanan’s generic blending teachings to apply to the production of the specific fuel oils Petitioner identifies as HSFO1, HSFO2, and HSFO3.

Second, to the extent that Petitioner contends that Buchanan’s teaching applies to any mixture of two fuel oils, one residual and one distillate, we note that Parkash teaches blending multiple process streams, including several distillate streams and at least two residual streams.

Ex. 1102, 14. Petitioner does not explain why a person of ordinary skill in the art would have considered Buchanan's two-stream blending unit to apply to Parkash's multi-stream blending process.

Third, Petitioner's statement that "it would have been obvious to employ '[a]ny blending process as known by a [POSITA]'" in carrying out Parkash's blending method is conclusory. Pet. 67. "[A] finding of obviousness at the time of invention requires a 'plausible rational[e] as to why the prior art references would have worked together.'" *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1335 (Fed. Cir. 2013) (quoting *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010)). In other words, Petitioner must provide "some articulated reasoning with some rational underpinning" to combine the known elements in the manner required in the claim at issue. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). A conclusory statement without supporting evidence or rationale does not provide the requisite reasoning. *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) ("Attorney's argument in a brief cannot take the place of evidence.").

Finally, with respect to HSFO2 and HSFO3, Petitioner does not explain why a person of ordinary skill in the art would have produced these fuel oils by blending Parkash's process streams using Buchanan's blending unit, rather than simply purchasing them. Each of these fuel oils was "commercially available." Pet. 58 (quoting Ex. 1001, 38:61–63, 40:10–14). Petitioner argues that "commercially available" equals "on sale," rendering each of HSFO2 and HSFO3 prior art. *Id.* (citing 35 U.S.C. § 102(a)(1)). Thus, a person of ordinary skill in the art simply could have purchased HSFO2 and HSFO3 rather than producing them using the Parkash/Buchanan

blending process. Petitioner does not explain why a person of ordinary skill in the art would have ignored this fact in favor of producing their own versions of HSFO2 and HSFO3.

For all these reasons, Petitioner has not demonstrated a reasonable likelihood of prevailing on the obviousness of the challenged claims over the combinations of references based on ISO 8217:2017, Annex VI, Weiss '974, Weiss '515, Parkash, and Buchanan.

D. Discretionary Denial

Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution under *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 (PTAB May 13, 2020) (precedential). Prelim. Resp. 10–30. Petitioner disagrees. Pet. 7–13. Because we deny institution based on the merits of Petitioner's unpatentability arguments, we need not decide whether to exercise discretion to deny institution.

CONCLUSION

Upon consideration of the Petition, the Preliminary Response, and the evidence presented, we determine that Petitioner has not shown a reasonable likelihood that it will prevail in showing that at least one of the challenged claims is unpatentable. Accordingly, we do not institute an *inter partes* review of any challenged claim based on any ground asserted in the Petition.

ORDER

It is hereby

ORDERED that, pursuant to 35 U.S.C. § 314, the Petition is denied, and no *inter partes* review is instituted.

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