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Paper 11
Date: June 5, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTELLIGENT WELLHEAD SYSTEMS, INC.,
Petitioner,

v.

DOWNING WELLHEAD EQUIPMENT, LLC,
Patent Owner.

IPR2024-00256
Patent 11,401,779 B2

Before BENJAMIN D. M. WOOD, CARL M. DEFRANCO, and MATTHEW S. MEYERS, *Administrative Patent Judges*.

WOOD, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Intelligent Wellhead Systems, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 1–3, 6, 8–10, 13, 15–18, 25–28, 31, and 36 of U.S. Patent No. 11,401,779 B2 (Ex. 1001, "the '779 patent"). Downing Wellhead Equipment, LLC ("Patent Owner") filed a Preliminary Response. Paper 9 ("Prelim. Resp.").

We have authority under 35 U.S.C. § 314, 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." 35 U.S.C. § 314(a). Upon considering the Petition, we determine that Petitioner has not satisfied this threshold requirement, and therefore we do not institute *inter partes* review of claims 1–3, 6, 8–10, 13, 15–18, 25–28, 31, and 36 of the '779 patent.

B. Related Proceedings

The Parties identify *Downing Wellhead Equipment, LLC v. Intelligent Wellhead Systems, Inc., et al.*, No. 1:23-cv-01180 (D. CO) as a related matter. Pet. 2; Paper 5, 2. Patent Owner also identifies *Intelligent Wellhead Systems, Inc. v. Downing Wellhead Equipment, LLC*, IPR2024-00300 (PTAB).

C. The '779 Patent

The '779 patent is titled "Hydraulic Fracturing Plan and Execution of Same," and relates to "a hydraulic fracturing plan executable by a hydraulic fracturing system to hydraulically fracture a plurality of oil and gas wells." Ex. 1001, code (54), 2:8–10. Figure 1A of the '779 patent depicts a

hydraulic fracturing system for performing the patent's fracturing methods, and is reproduced below:

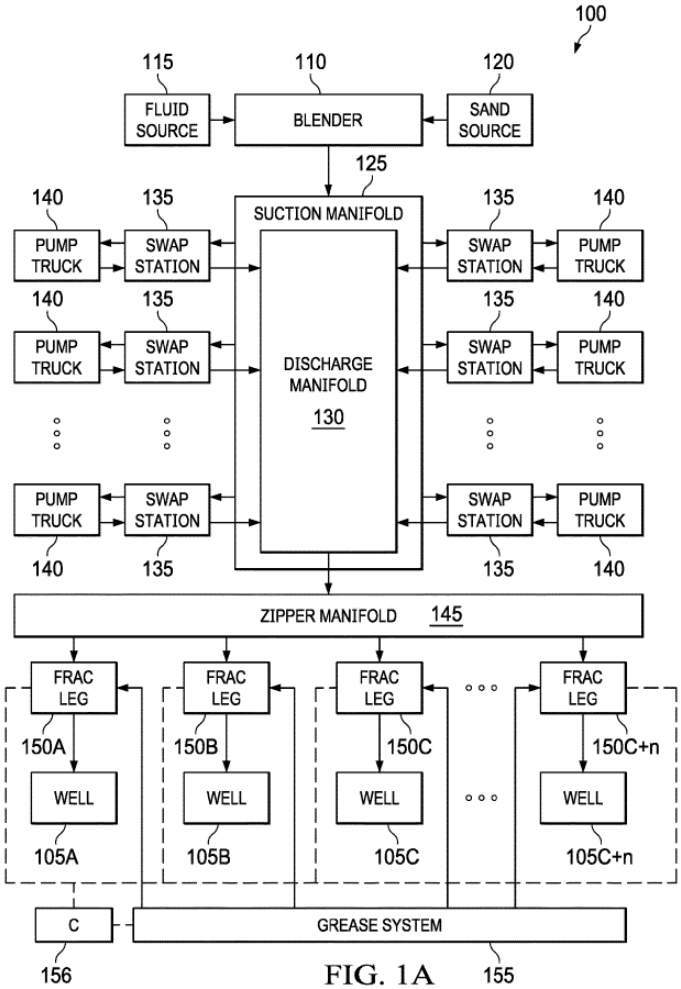

FIG. 1A

Figure 1A depicts hydraulic fracturing system 100, which is used to deliver fracturing fluid to wells 105A through 105C + n. Ex. 1001, 5:41–43. Pump trucks 140 draw the fracturing fluid from suction manifold 125 and discharge it to zipper manifold 145 via discharge manifold 130. *Id.* at 5:47–57. The zipper manifold delivers the fluid to "frac legs" 150A through 150C+n, each leg adapted to deliver the fluid to a corresponding well 105A through 105C+n. *Id.* at 5:57–61. Each frac leg is equipped with one or

more zipper valves 170 capable of allowing or preventing fluid flow to the respective well. *Id.* at 7:47–66, Figs. 2A–2G.

According to the '779 patent, when a fracturing stage has ended at one well and fracturing another well is contemplated, a determination is made whether to perform a "regular swap" or a "continuous pumping swap" ("CP swap") from the first well to the other well. *Id.* at 7:1–5. This determination may be based on, e.g., determining that the fluid flow rate into the first well is below an upper threshold for a threshold amount of time. *Id.* at 13:28–52.

The steps of executing the CP swap from an "n_1 well" to an "n_1+1 well" are depicted in Figure 15, reproduced below.

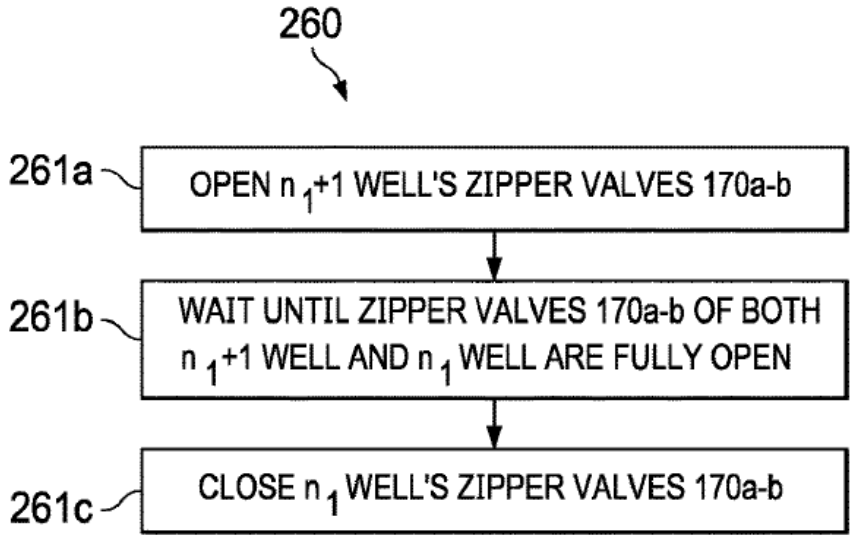

FIG. 15

Figure 15 is a flow diagram illustrating various sub-steps of a CP swap, in which hydraulic fracturing is moved from n1 well to n1+1 well. *Id.* at 4:17–20, 34–28. At sub-step 261a, the n_1+1 well's zipper valves 170a-b are opened and hydraulic fracturing fluid is communicated from the zipper

manifold 145 to the n_1+1 well. *Id.* at 14:20–26. At the sub-step 261b, both the n_1+1 well's and the n_1 well's zipper valves 170a-b are allowed to fully open, so that hydraulic fracturing fluid is communicated from the zipper manifold 145 to the n_1 well and the n_1+1 well. *Id.* at 14:27–35. Finally, at the sub-step 261c, the n_1 well's zipper valves 170a-b are closed. *Id.* at 14:36–40.

The '779 patent explains that "executing the CP swap from hydraulically fracturing . . . the n_1 well . . . to hydraulically fracturing . . . the n_1 +1 well . . . transitions the zipper valves from one well to the other, opening the second well and subsequently shutting-in the first well, all while pumping." Ex. 1001, 14:41–46. "The transition is instantaneous and the total time between stages measured at treatment pressure is less than 20 seconds (as fast as 19 seconds in some instances)." *Id.* at 14:47–49.

D. The Challenged Claims

Petitioner challenges claims 1–3, 6, 8–10, 13, 15–18, 25–28, 31, and 36 of the '779 patent. Pet. 3. Claims 1, 8, 15, and 25 are independent. Claim 1 is representative and reproduced below:[1]

> 1. [1.1] A method, comprising: (a) permitting performance of a first hydraulic fracturing operation on a first well, which first hydraulic fracturing operation comprises pumping fluid into the first well via a first valve associated with the first well, and
>
> [1.2] measuring a flow rate of the fluid being pumped into the first well;
>
> [1.3] (b) determining that the flow rate of the fluid being pumped into the first well is below a flow rate threshold and

[1] We use Petitioner's bracketed identifiers for each limitation. *See* Pet. ix–xvi.

> [1.4] has been below the flow rate threshold for a threshold amount of time;
>
> [1.5] (c) during pumping of the fluid into the first well via the first valve, opening a second valve associated with a second well;
>
> [1.6] (d) permitting performance of a second hydraulic fracturing operation on the second well, which second hydraulic fracturing operation comprises pumping fluid into the second well via the second valve; and
>
> [1.7] (e) during pumping of the fluid into the second well via the second valve, closing the first valve associated with the first well;
>
> [1.8] wherein, during each of steps (a), (b), (c), (d), and (e), fluid is continuously pumped to the first valve, the second valve, or both the first valve and the second valve.

Ex. 1001, 22:32–56.

E. Asserted Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable based on the following specific grounds (Pet. 3–4):

Ground	Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1	1–3, 6, 8–10, 13, 15–18, 25–28, 31, 36	102	Krupa[2]
2	1–3, 6, 8–10, 13, 15–18, 25–28, 31, 36	103	Krupa

[2] U.S. Patent Appl. Pub. No. 2022/0268141 A1 (published Aug. 25, 2022) (Ex. 1003).

Ground	Claims Challenged	35 U.S.C. §	Reference(s)/Basis
3	1–3, 6, 8–10, 13, 15–18, 25–28, 31, 36	103	Kajaria,[3] Jackson[4]
4	1–3, 6, 8–10, 13, 15–18, 25–28, 31, 36	103	Krupa, Jackson
5	1–3, 6, 8–10, 13, 15–18, 25–28, 31, 36	103	Kajaria, Jackson, Martino[5]

Petitioner also relies on the Declaration of Robert A. Durham, Ph.D. (Ex. 1002) to support its asserted grounds. Patent Owner relies on the Declaration of John Hughett (Ex. 2006) to support its Preliminary Response.

II. ANALYSIS

A. Legal Standards Used in the Merits Analysis

"In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")); *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d

[3] U.S. Patent Appl. Pub. No. 2017/0275980 A1 (published Sept. 28, 2017) (Ex. 1004).
[4] U.S. Patent Appl. Pub. No. 2007/0023184 A1 (published Feb. 1, 2007) (Ex. 1005).
[5] U.S. Patent Appl. Pub. No. 2017/0315566 A1 (published Nov. 2, 2017) (Ex. 1006).

1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458 (Fed. Cir. 1984).

A claim is unpatentable under 35 U.S.C. § 103 if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious . . . to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective evidence of nonobviousness, i.e., secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner contends that, for the '779 patent, one of ordinary skill in the art "would have had an engineering degree and two or more years' well-related operations experience, or equivalent education/experience." Pet. 11. Patent Owner does not offer an alternative definition, but its Declarant, Mr. Hughett, submits that one of ordinary skill in the art would have had "a degree in petroleum or mining engineering, mechanical engineering, or a comparable discipline, and at least two years of experience in oil and gas

extraction, or an equivalent combination of education and experience." Ex. 2006 ¶ 17.

At this stage of the proceeding, we do not discern a meaningful difference between Petitioner's and Mr. Hughett's proposed definitions, and therefore adopt Petitioner's definition for purposes of this Decision. We also presume that the cited prior art references reflect the level of ordinary skill at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining the level of ordinary skill in the art may be evidenced by the cited references themselves).

C. Claim Construction

We construe claim terms "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. § 42.100(b). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). Any special definitions for claim terms must be set forth in the Specification "with reasonable clarity, deliberateness, and precision." *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

At this stage of the proceeding, we do not perceive the need to expressly construe any claim terms, as the threshold question of institution can be decided without doing so. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (approving

Board decision not to construe claim language where construction is not material to the dispute). *See* Pet. 14; *see also* Prelim. Resp. 40.

D. Grounds 1, 2, and 4: Anticipation and Obviousness of Claims 1–3, 6, 8–10, 13, 15–18, 25–28, 31, and 36 Based on Krupa; Obviousness Based on Krupa and Jackson

Grounds 1, 2, and 4 rely on Krupa as the sole reference (Grounds 1 and 2) or as the primary reference (Ground 4). Pet. 19–54, 83–85. Krupa is the published version of U.S. Application 17/651,716, filed February 18, 2022, and claims priority to Provisional patent application No. 63/153,607, filed February 25, 2021 ("the Krupa Provisional"). Ex. 1003, codes (21), (22), (60).

Petitioner contends that "[b]ecause *Krupa*'s effective filing date is February 25, 2021—before the '779's priority date (May 17, 2021)[6]—*Krupa* is prior art under 35 U.S.C. § 102(a)(2)." Pet. 6. Patent Owner asserts, however, that Krupa is not prior art. Prelim. Resp. 2–21. According to Patent Owner, "Petitioner fails to establish that the subject matter relied upon in Krupa is supported by the Krupa Provisional," and "[w]ithout this threshold showing ***in the Petition***, Petitioner has not carried its burden to show that Krupa qualifies as prior art." *Id.* at 3. We agree with Patent Owner.

Petitioner's burden to show with particularity why the patent it challenges is anticipated by or would have been obvious over a patent or published patent application necessarily requires the reference patent document first to be qualified as prior art. *See Tech. Licensing Corp. v.*

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[6] The '779 patent claims priority to a provisional patent application filed May 17, 2021. Ex. 1001, code (63).

Videotek, Inc., 545 F.3d 1316, 1327 (Fed. Cir. 2008) (party's burden to prove anticipation of a patent includes initial burden of showing that the cited art was prior to the filing date of the challenged patent). Under 35 U.S.C. § 102(a)(2)—the subsection under which Petitioner contends Krupa qualifies as prior art—when the reference patent document's actual filing date is *before* the challenged patent's actual filing date, a petitioner need only refer to the filing dates appearing on the challenged patent and reference patent document to make a *prima facie* showing that the reference is prior art. 35 U.S.C. § 102(d)(1) ("For purposes of determining whether a patent or application for patent is prior art to a claimed invention under subsection (a)(2), such patent or application shall be considered to have been effectively filed, with respect to any subject matter described in the patent or application—(1) if paragraph (2) does not apply, as of the actual filing date of the patent or the application for patent.").

Here, however, Krupa's actual filing date is *after* the '779 patent's filing date. *Compare* Ex. 1003, code (22) (Krupa filed Feb. 18, 2022) *with* Ex. 1001, code (22) ('779 patent filed Jul. 29, 2021). Petitioner therefore must seek the benefit of the earlier February 25, 2021 filing date of the Krupa Provisional. 35 U.S.C. § 102(d)(2). Pet. 6. Under subsection 102(d)(2), to qualify as prior art, a reference patent or published patent application is considered effectively filed as of the filing date of its provisional application only to the extent that the provisional "describes the subject matter" relied on in the reference patent document. We cannot presume that the Krupa Provisional describes the subject matter in Krupa that the Petition relies on, however. *See Dynamic Drinkware*, 800 F.3d at 1380 ("[B]ecause the PTO does not examine priority claims unless

necessary, the Board has no basis to presume that a reference patent is necessarily entitled to the filing date of its provisional application."). The burden to make this showing thus falls squarely on Petitioner. But Petitioner does not explain how the Krupa Provisional supports the relevant subject matter relied on in Krupa. In fact, Petitioner did not introduce the Krupa Provisional into the record, so it would not be possible to do so.[7] Accordingly, Petitioner has not adequately shown that Krupa is prior art, and therefore Petitioner does not have a reasonable likelihood of prevailing with respect to any of the claims challenged in Grounds 1, 2, and 4, which grounds rely on Krupa in whole or substantial part.

E. Ground 3: Obviousness Based on Kajaria and Jackson and Ground 5: Obviousness Based on Kajaria, Jackson, and Martino

Petitioner contends that the challenged claims would have been obvious over Kajaria and Jackson, and, alternatively, that the challenged

[7] We previously denied Petitioner's request to submit a preliminary reply brief to cure this deficiency. Paper 10. Petitioner had argued that it had good cause to submit a reply under 37 C.F.R. § 42.108(c) because it could not have reasonably foreseen that Patent Owner would challenge Krupa's status as prior art in the Preliminary Response. *Id.* at 3. We disagreed, because it was clear from the face of the '779 patent and Krupa that Petitioner could not rely on the actual filing dates of these documents to establish Krupa's prior-art status and would therefore have to show that Krupa was entitled to the earlier filing date of the Krupa provisional. *See id.* at 4 ("Because Krupa issued from an application filed after the '779 patent's filing date, and because Krupa's entitlement to the filing date of the [Krupa] provisional cannot be presumed, Krupa cannot be shown to be prior art without record evidence that shows the [Krupa] provisional discloses the relevant information relied upon in Krupa.") (footnote omitted). We therefore concluded that "Krupa's status as prior art was a foreseeable issue from the outset." *Id.*

claims would have been obvious over Kajaria, Jackson, and Martino. Pet. 3–4, 55–83, 85–86. Patent Owner opposes. Prelim. Resp. 48–64.

1. Kajaria (Ex. 1004)

Kajaria describes systems and methods for providing pressurized fluid to multiple wells at a hydraulic fracturing well site. Ex. 1004 ¶ 10. Fracturing fluid is delivered from hydraulic fracturing pumps to a frac pump outlet header ("missile"), and from there to an inlet head, fluid conduit, and the wellheads. *Id.* Figure 4 depicts a portion of this system, and is reproduced below:

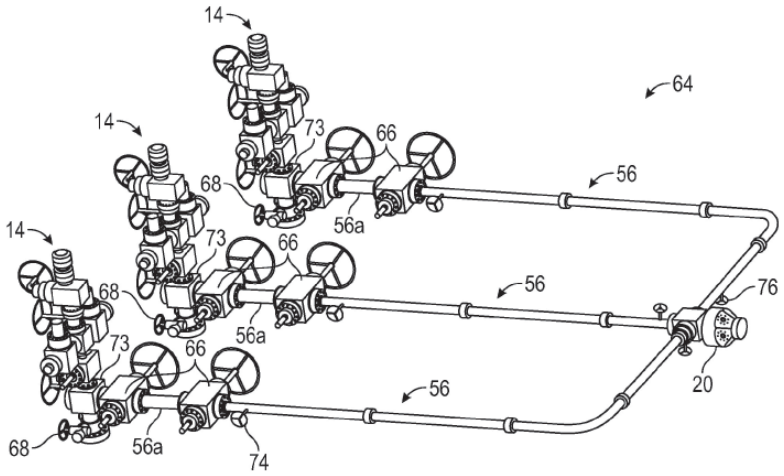

FIG. 4

Figure 4 depicts flow system 64 comprising inlet head 20, fluid conduit 56 connecting inlet head 20 to multiple "trees" 14 (structures comprising valves and other controls) each associated with one of the wells. Ex. 1004 ¶¶ 6, 33. One or more valves 66, located on the portion of conduit 56 connecting inlet head 20 to each tree 14, regulate flow to each well as desired by the operator. *Id.* ¶ 33. When the valve 66 for a particular well is in the open position, fluid flow through the fluid conduit 56 into the well is unrestricted,

"and will enter the well, as desired by the operator." *Id.* When in the closed position, "fluid flow through the fluid conduit 56 is prevented by the valve 66." *Id.* According to Kajaria:

> One reason the ability to allow or prevent flow before the flow reaches a particular tree 14 is advantageous is because it allows an operator to easily direct flow between wells at a multi-well site as needed in the course of operations. For example, different wells might operate on different cycles in a hydraulic fracturing operation. Thus, it may be desirable to provide pressurized fluid to a particular well at a particular time or place in the frac cycle, while simultaneously stopping the flow of fluid into another well that is in a different place in the frac cycle. With the flow system 64 of the present technology it is possible [to] direct flow between wells continuously simply by opening or closing the valves 66 associated with individual wells.

Id. ¶ 35. Kajaria further explains that when fluid flow to tree 14 is stopped by closing the corresponding valve 66, "valves on the tree can be operated to allow the operator to insert a line, frac isolation ball, etc. as needed." *Id.*

2. Jackson (Ex. 1005)

Jackson teaches a method of fracturing a geological formation to recover hydrocarbons, such as natural gas, from the formation, the method including: "introducing a supply of fracturing fluid [e.g., nitrogen] to the formation until a first threshold is reached, adjusting the flow of the fracturing fluid to reach a second threshold, adjusting the flow to reach a third threshold and ceasing flow of the fracturing fluid to the formation." Ex. 1005 ¶¶ 3, 12. Figure 3 depicts one embodiment of Jackson's fracturing method, and is reproduced below:

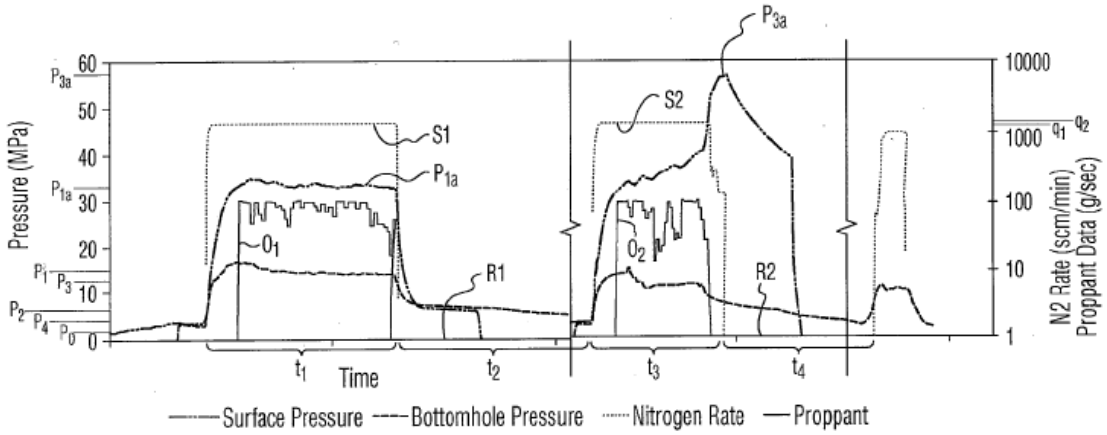

FIG. 3

Figure 3 is a chart showing fracturing-fluid flowrate and observed pressure over time during a fracturing operation. Ex. 1005 ¶ 36. The passage of time is shown on the horizontal axis, flow rate on the left vertical axis, and pressure on the right vertical axis. *Id.* at Fig. 3. According to Jackson's method, starting at initial pressure P_0, fracturing gas is introduced into the well in a "first surge S1 at a flow rate q_1 of at least 300 scm or possibly at least 1000 scm over a time period t_1," e.g., 1 to 20 minutes, to raise the pressure in the well bore to an elevated level P_1. *Id.* ¶ 61. Following the pressure rise, a "period of relaxation R1 may occur in which the inflow of frac gas may be greatly diminished or stopped to a rate of less than 300 scm, and during which the pressure is permitted to decline over a time period t_2 [e.g., one to 24 hours] to some lesser value P_2." *Id.* At the end of time period t_2, gas is again introduced "as surge S2 at a flow rate q_2 of at least 300 scm or possibly at least 1000 scm over a time period t_3 [e.g., 1 to 20 minutes] to raise the pressure in the well bore to a high pressure P_3." *Id.* ¶ 62. Proppant may be added during S1 and S2, and additional time periods may follow. *Id.* ¶ 61–63.

3. Martino

Martino teaches, *inter alia*, a processor-controlled variable control device for controlling the speed at which a choke valve (flow control valve) is adjusted, thereby controlling the speed at which the flow rate of a production fluid (e.g., oil, gas, or drilling fluids) is adjusted. Ex. 1006 ¶¶ 3, 18, 20–22, Figs. 6, 7. Petitioner relies on Martino to teach limitations 8.1, 8.2, 25.2, and 25.3, which Petitioner characterizes as reciting "boilerplate computer language." Pet. 85.

4. Independent Claims 1 and 8

Limitation [1.5] of independent claim 1 recites "during pumping of the fluid into the first well via the first valve, opening a second valve associated with a second well" (limitation [1.5]). Ex. 1001, claim 1. Limitation [8.7] of independent claim 8 is identical. *Id.*, claim 8. Petitioner relies on Kajaria to teach this limitation. Pet. 62–63, 67. Petitioner specifically directs our attention to Kajaria's statement that "[w]ith the flow system 64 of the present technology it is possible [to] direct flow between wells continuously simply be opening or closing the valves 66 associated with the individual wells." *Id.* at 62–63. Petitioner contends that

> A POSITA would have understood that *Kajaria*'s disclosure of 'continuously' directing flow between multiple wells 'simply by opening or closing the valves' associated with each of the wells includes opening a second valve to a second well while fluid is being pumped into the first well via the first valve to continuously pump fluid between the first and second wells.

Id. at 63 (citing Ex. 1002 ¶ 307).

Patent Owner responds that although Kajaria "discloses a system for fracturing a multi-well site that includes valves for controlling the flow into

each well, Kajaria lacks any disclosure of manipulating the valves in any particular sequence, much less in the specific sequence claimed: '*during pumping of the fluid into the first well via the first valve, opening a second valve associated with a second well*.'" Prelim. Resp. 50. According to Patent Owner, "Petitioner appears to suggest that Kajaria inherently discloses this step," because Kajaria's disclosure of "continuously" directing flow between wells "would include opening a valve to a second well while fluid is being pumped into the first well." *Id.* at 51–52 (citing Pet. 63). But, Patent Owner asserts, there is "no evidence that 'continuously directing flow between multiple wells' using valves ***necessarily*** includes opening a valve to one well while pumping into another." *Id.* at 52. Patent Owner contends that the only support is Petitioner's declarant, Dr. Durham, who states, "[i]n order for fluid to be 'continuously' pumped between the wells, it would be necessary to open the second valve while the previous valve is still open." *Id.* (citing Ex. 1002 ¶ 207). Patent Owner submits that this testimony "is entitled to no weight" because it "assumes without support that Kajaria's disclosure of 'continuously' directing flow is equivalent to 'continuously' pumping within the meaning of the '779 Patent." *Id.* at 52–53. According to Patent Owner, however, "Kajaria does not define or further describe 'direct[ing] flow between wells continuously,'" or provide "any specifics at all about the process of transitioning between wells to be fractured." *Id.* at 53.

We are not persuaded that Kajaria teaches limitation [1.5] or limitation [8.7]. First, Kajaria does not expressly teach these limitations, and, indeed, Petitioner does not appear to contend as much. Instead, Petitioner contends that one of ordinary skill in the art would have

understood paragraph 35 of Kajaria as "includ[ing]" this step. But paragraph 35 teaches that "it may be desirable to provide pressurized fluid to a particular well at a particular time or place in the frac cycle, while *simultaneously stopping* the flow of fluid into another well that is in a different place in the frac cycle." Ex. 1004 ¶ 35 (emphasis added). Providing pressurized fluid to one well which *simultaneously stopping* flow to another well suggests that fluid flow is not being provided to both wells at the same time. Second, "direct[ing] flow *between* wells continuously" is not the same as *pumping* flow *to* wells continuously, as Petitioner's argument suggests. Paragraph 35 of Kajaria states that it is possible to direct flow between wells continuously "simply by opening or closing the valves 66 associated with individual wells," and is silent regarding whether the frac pumps are on. This suggests that "*direct*[*ing*] flow between wells continuously" only refers to the valve lineup—i.e., at least one valve 66 is open "continuously''—and does not mean *providing* fluid flow continuously. Interpreting the "continuously" statement in paragraph 35 in this manner is consistent with our interpretation of the "simultaneously stopping" sentence in the same paragraph, discussed above.

Third, the declarant testimony on which Petitioner relies—paragraph 307 of Mr. Durham's declaration—appears to be based on a misreading of Kajaria. Mr. Durham repeats the sentence in the Petition for which it is offered for support (Pet. 63), and adds: "[i]n order for fluid to be 'continuously' pumped between the wells, it would be necessary to open the second valve while the previous valve is still open." Ex. 1002 ¶ 307. But Kajaria does not teach "continuously" *pumping* between the wells, it teaches "continuously" *directing flow* between the wells by opening or closing

valves associate with wells, without specifying the operational status of the frac pumps. Neither Petitioner nor Mr. Durham points to any teaching in Kajaria supporting the notion that fluid is continuously *pumped* to multiple wells at the same time. Accordingly, Mr. Durham's opinion that it would be "necessary to open the second valve while the previous valve is still open" is accorded little weight.

Claims 1 and 8 also recite "during pumping of the fluid into the second well via the second valve, closing the first valve associated with the first well" (limitations [1.7] and [8.9]). Ex. 1001, claims 1, 8. Relying again on paragraph 35 of Kajaria, Petitioner contends that:

> A POSITA would have understood that Kajaria's disclosure of 'continuously' directing flow between multiple wells and providing fluid into a well while stopping flow to another would include closing the first valve associated with the first well while fluid is being pumped into the second well via the second associated valve in a process of continuously pumping fluid between the first and second wells.

Pet. 64 (citing Ex. 1002 ¶ 312). Petitioner's contention is based on Kajaria teaching "continuously pumping fluid between the first and second wells," which, as discussed above, does not follow from Kajaria's teaching of continuously directing flow between wells by opening and closed valves associated with each well. Therefore, we are also not persuaded that Kajaria teaches limitations [1.7] and [8.9].

Jackson is not relied on to cure the deficiencies noted in Kajaria above. *See* Pet. 55–67 (citing Jackson only for limitations [1.2]–[1.4] and [8.4]–[8.6]). Martino is not cited for any aspect of claims 1 and 8. *See id.* Therefore, for the above reasons, we are not persuaded that Petitioner has a reasonable likelihood of prevailing in showing that independent claims 1

and 8, and the challenged claims depending therefrom, would have been obvious over Kajaria and Jackson; or over Kajaria, Jackson, and Martino.

5. Claims 15 and 25

Independent claim 15 recites "in response to determining that the flow rate measured at step (a) has satisfied one or more flow rate conditions, the first valve associated with the first well is opened at step (b) before the second valve associated with the second well is closed at step (b)" (limitation [15.6]). Ex. 1001, claim 15. Limitation [25.8] of independent claim 25 is identical. *Id.*, claim 25. Petitioner relies on the combination of Kajaria and Jackson to teach these limitations.

Petitioner contends that "Kajaria discloses directing fluid between wells continuously by operating valves associated with wells to provide fluid to one well at a particular time/place, while simultaneously stopping the flow of fluid into another well that is in a different place in the frac cycle." Pet. 74 (citing Ex. 1004 ¶¶ 24, 28, 35, Abstr., Figs. 1, 4). Petitioner further asserts that Kajaria discloses that "sensor data may be used to make decisions about a continuous hydraulic fracturing operation for multiple wells." *Id.* Further, according to Petitioner, Jackson "discloses determining if flowrate conditions were met for different stages of a fracturing process," e.g., Jackson discloses that "fracturing methods include 'introducing a supply of fracturing fluid to the formation until a first threshold is reached, adjusting the flow of the fracturing fluid to reach a second threshold, adjusting the flow to reach a third threshold and ceasing flow the fracturing fluid to the formation.'" *Id.* at 75 (quoting Ex. 1005 ¶ 3). Petitioner submits that "[i]t would have been obvious to use Jackson's measured fluid flowrate into a well as the type of sensor data used in Kajaria to make decisions about

a continuous hydraulic fracturing operation for multiple wells, including when to switch from fracturing one well to another." *Id.* (citing Ex. 1002 ¶¶ 358–362).

We are not persuaded that Petitioner has a reasonable likelihood of prevailing in showing that the combination of Kajaria and Jackson teaches these limitations. First, as discussed above, we are not persuaded that Kajaria[8] teaches opening a valve to one well before closing the valve to another well, much less doing so based on flow rate conditions. Second, as Patent Owner notes (Prelim. Resp. 57–58), neither Kajaria nor Jackson teaches using flow-rate conditions to determine when to switch fracturing fluid flow from one well to another, regardless of the order in which the wells' valves are opened. Jackson teaches adjusting fluid flow into a single well to meet certain pressure thresholds, but neither Petitioner nor Mr. Durham explains how this teaching is relevant to determining when to switch fracturing one well to another.

For the above reasons, we are not persuaded that Petitioner has a reasonable likelihood of prevailing in showing that independent claims 15, and 25, and the challenged claims depending therefrom, would have been obvious over Kajaria and Jackson. Martino is not relied on to cure the deficiencies noted above. *See* Pet. 85–86 (relying on Martino to teach limitations 8.1, 8.2, 25.2, and 25.3, which Petitioner characterizes as "boilerplate computer language"). Therefore, we are also not persuaded that Petitioner has a reasonable likelihood of prevailing in showing that claims

[8] Petitioner does not allege that Jackson teaches this aspect of limitations [15.6] and [25.8].

15 and 25, and the challenged claims depending therefore, would have been obvious over Kajaria, Jackson, and Martino.

6. Summary as to Grounds 3 and 5

For the above reasons, we are not persuaded that Petitioner has a reasonable likelihood of prevailing with respect to Grounds 3 and 5.

F. Patent Owner's 35 U.S.C. § 325(d) Challenge

Patent Owner argues that we should deny institution under 35 U.S.C. § 325(d) because Grounds 3 and 5 are based on the same or substantially the same art previously presented to the Office. Prelim. Resp. 22–34. Because we determine not to institute *inter partes* review for other reasons, this argument is moot.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has not shown that there is a reasonable likelihood that it would prevail with regard to at least one of the claims challenged in the Petition. Accordingly, we do not institute *inter partes* review of any of the challenged claims of the '779 patent on any asserted ground.

IV. ORDER

For the reasons given, it is

ORDERED that the Petition for *Inter Partes* Review is *denied*.

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