

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIBERTY ENERGY INC. AND LIBERTY ENERGY SERVICES LLC
Petitioners

v.

U.S. WELL SERVICES, LLC
Patent Owner

Case No. IPR2025-00139
Patent 11,208,878

PETITION FOR *INTER PARTES* REVIEW OF CLAIMS 1-10 OF
U.S. PATENT NO. 11,208,878

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1001	U.S. Patent No. 11,208,878 to Jared Oehring <i>et al.</i> , “Modular switchgear system and power distribution for electric oilfield equipment” (the “’878 Patent”), filed October 9, 2019, issued on December 28, 2021.
1002	File History for U.S. Patent No. 11,208,878.
1003	Declaration of Dr. Robert Durham
1004	U.S. Patent Publication No. 2020/0040705 to Morris <i>et al.</i> , “Switch gear transport that distributes electric power for fracturing operations” (“ <i>Morris</i> ”), filed July 24, 2019, published on June 14, 2022, and claiming priority to a <i>Morris Provisional</i> filed on August 1, 2018.
1005	U.S. Provisional Application No. 62/713,393 to Morris <i>et al.</i> , “Electric Drive Pump for Well Stimulation,” (“ <i>Morris Provisional</i> ”) filed August 1, 2018.
1006	U.S. Patent Publication No. 2017/0222409 to Oehring <i>et al.</i> , “Switch gear load sharing for oil field equipment” (“ <i>Oehring IV</i> ”), filed April 4, 2017, published August 3, 2017.
1007	Schneider Premset Catalog (“ <i>Premset Catalog</i> ”), available May 3, 2017.
1008	Schneider Premset Brochure (“ <i>Premset Brochure</i> ”), available May 4, 2014.
1009	NFPA 70 ®, The National Electric Code®, issued July 16, 2004.
1010	PCT International Patent Publication No. WO 2018/201118 to Orban <i>et al.</i> , “Integrated power and electronics unit for drilling machine” (“ <i>Orban</i> ”), filed April 30, 2018, published November 1, 2018.
1011	U.S. Patent No. 5,042,756 to Robert Pratt, “Flip-flop cable tray walkway” (“ <i>Pratt</i> ”), filed March 20, 1990, issued on August 27, 1991.
1012	U.S. Patent Publication No. 2016/0273328 to Jared Oehring, “Cable Management of Electric Powered Hydraulic Fracturing Pump Unit” (“ <i>Oehring II</i> ”), filed May 3, 2016, and published on September 22, 2016.
1013	U.S. Patent Publication No. 2016/0258267 to Payne <i>et al.</i> , “Well Fracturing Systems with Electrical Motors and Methods of Use,” filed Mar. 3, 2016, published September 8, 2016.
1014	U.S. Patent Publication No. 2016/0105022 to Jared Oehring, “System and Method for Parallel Power and Blackout Protection for Electric Powered Hydraulic Fracturing” (“ <i>Oehring III</i> ”), filed October 13, 2015, and published on April 14, 2016.
1015	U.S. Provisional Patent Application 62/743,360, Jared Oehring <i>et al.</i> , “Automated Fracturing Pump System”, filed October 9, 2018.

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1016	U.S. Provisional Patent Application 62/743,299, Jared Oehring et al., “Modular Switchgear System and Power Distribution for Electric Oilfield Equipment”, filed October 9, 2018.
1017	Complaint, <i>U.S. Well Services, LLC et al. v. Liberty Energy, Inc. et al.</i> , No. 4:24-cv-00839 (S.D. Tex. March 6, 2024)
1018	Plaintiff’s Motion for Leave to File the Second Amended Complaint, <i>U.S. Well Services et al. v. Liberty Energy Inc. et al.</i> , No. 4:24-cv-00839, Dkt. No. 46 (S.D. Tex. Sept. 19, 2024).
1019	<i>Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation</i> (June 21, 2022)
1020	Federal Court Management Statistics (June 30, 2024), available at < https://www.uscourts.gov/sites/default/files/data_tables/fcms_na_appprofile0630.2024.pdf >
1021	NFPA 70 Trademark Specimen filed October 10, 2007, Trademark Reg. No. 78913310.
1022	Michael Eves, <i>SF6 Alternatives: A Literature Review on SF6 Gas Alternatives for use on the Distribution Network</i> , April 11, 2018.
1023	Affidavit of Christopher Butler, Internet Archive regarding EX1007 and EX1008
1024	Affidavit of Christopher Butler, Internet Archive regarding ABB URLs.
1025	Declaration of Michael Eves.
1026	Intentionally Omitted
1027	PREMSET Trademark Registration No. 87032738, Statement of Use and Specimen, dated February 14, 2018.
1028	Claim Listing for Claims of U.S. Patent No. 11,208,878 to Jared Oehring et al., “Modular switchgear system and power distribution for electric oilfield equipment” (the “’878 Patent”), filed October 9, 2019, issued on December 28, 2021.
1029	Lionel B. Roe, PRACTICES AND PROCEDURES OF INDUSTRIAL ELECTRICAL DESIGN (McGraw-Hill: 1972), ISBN: 0-07-053390-3 (“ <i>Roe</i> ”)
1030	John A. Camara, ELECTRICAL ENGINEERING REFERENCE MANUAL FOR THE ELECTRICAL AND COMPUTER PE EXAM, 6 th ed. (Professional Publications, Inc.: 2002), ISBN: 1-888577-56-8 (“ <i>EE-Reference</i> ”)
1031	U.S. Patent No. 1,743,771 to Hall et al., entitled “System of Electric Distribution” (filed March 25, 1926 and issued January 14, 1930) (“ <i>Hall</i> ”)
1032	IEEE100: THE AUTHORITATIVE DICTIONARY OF IEEE STANDARDS TERMS, 7 th ed. (IEEE Press: 2000), ISBN: 0-7381-2601-2 (“ <i>IEEE Standards Dictionary</i> ”)

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1033	Donald G. Fink, STANDARD HANDBOOK FOR ELECTRICAL ENGINEERS, 13 th ed. (McGraw-Hill, New York: 1993), ISBN: 0-07-020984-7 (“Fink”)
1034	U.S. Patent Publication No. 2011/0241590 to Horikoshi <i>et al.</i> , entitled “Motor Driving Apparatus Having Fault Diagnostic Function” (filed Feb. 11, 2011 and published Oct. 6, 2011) (“Horikoshi”).
1035	U.S. Patent Publication No. 2012/0255734 to Coli <i>et al.</i> , entitled “Mobile, Modular, Electrically Powered System for Use in Fracturing Underground Formations” (filed April 6, 2012 and published Oct. 11, 2012).
1036	U.S. Patent No. 9,410,410 to Broussard <i>et al.</i> , entitled “System for Pumping Hydraulic Fracturing Fluid using Electric Pumps” (filed Nov. 16, 2012 and issued Aug. 9, 2016)
1037	“Adjustable Frequency Drives,” <i>Eaton</i> , archived at https://web.archive.org/web/20171114050055/http://www.eaton.com/ecm/idcplg?IdcService=GET_FILE&allowInterrupt=1&RevisionSelectionMethod=LatestReleased&noSaveAs=0&Rendition=Primary&dDocName=PCT_1317113 (November 14, 2017).
1038	“Header” definition. Norman J. Hyne, <i>Dictionary of Petroleum, Exploration, Drilling, and Production</i> (1991).
1039	U.S. Patent No. 2,533,001 to Everett Eberhard, “Flip-Flop Counter Circuit” (“Eberhard”), filed April 30, 1949, issued December 5, 1950.
1040	C. M. Chang, “An N-P-N high power fast germanium core driver transistor,” 1957 <i>International Electron Devices Meeting</i> , Washington, DC, USA, 1957, pp. 114-114, doi: 10.1109/IEDM.1957.187057 (“Chang”).
1041	F. B. Golden, “Liquid Cooling of Power Thyristors,” <i>IEEE Transactions on Industry Applications</i> , vol. IA-8, no. 5, pp. 601-606, Sept. 1972, doi: 10.1109/TIA.1972.349789 (“Golden”).
1042	A. H. Iversen and S. Whitaker, “A uniform temperature, ultra high heat flux liquid cooled, power semiconductor package,” <i>Conference Record of the IEEE Industry Applications Society Annual Meeting</i> , San Diego, CA, USA, 1989, pp. 1340-1347 vol.2, doi: 10.1109/IAS.1989.96817 (“Iverson and Whitaker”).
1043	Hefner, A. R. 1992. “A dynamic electro-thermal model for the IGBT.” In <i>Conference Record of the 1992 IEEE Industry Applications Society Annual Meeting</i> , 1094-104 vol.1 (“Hefner”).

I. MANDATORY NOTICES

Real Party in Interest: Liberty Energy Services LLC, Liberty Energy Inc. (collectively, “Liberty” or “Petitioners”), and Liberty Advanced Equipment Technologies LLC are the real parties in interest.

Related Matters: The ’878 Patent is involved in a pending lawsuit between Petitioners and U.S. Well Services, LLC (“Patent Owner,” or “PO”) entitled *U.S. Well Services, LLC, et al v. Liberty Energy Inc. et al*, 4:24-cv-00839-KPE (S.D. Tex.) (“Liberty Litigation”).

Lead Counsel and Back-Up Counsel: Petitioners designate lead and back-up counsel as noted below. A Power of Attorney is filed concurrently herewith under 37 C.F.R. § 42.10(b).

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Service Information: Correspondence to lead and back-up counsel can be provided at the postal and electronic addresses above. Petitioners also consent to

service by electronic mail at chad.walters@bakerbotts.com, andrew.grado@bakerbotts.com, and jacob.mcdonald@bakerbotts.com.

II. STANDING AND FEES

Standing: Petitioners certify under 37 C.F.R. § 42.104(a) that the '878 Patent is eligible for *inter partes* review and that Petitioners are not barred or estopped from requesting *inter partes* review on the grounds set forth herein.

Fees: The Office is authorized to charge the fee set forth in 37 C.F.R. § 42.15(a) to Deposit Account No. 02-0384 as well as any additional fees that might be due in connection with this Petition.

III. OVERVIEW OF THE '878 PATENT

A. Subject Matter

The '878 Patent relates to a “modular switchgear system” “for electric oilfield equipment.” EX1001, Title. The '878 system may include multiple switchgear powering “various pieces of equipment.” *Id.*, 7:35-37. As shown in Figure 3, first switchgear (“A”) receive power from power sources and distribute that power to second switchgear (“B”) that transfer power to electrical equipment:

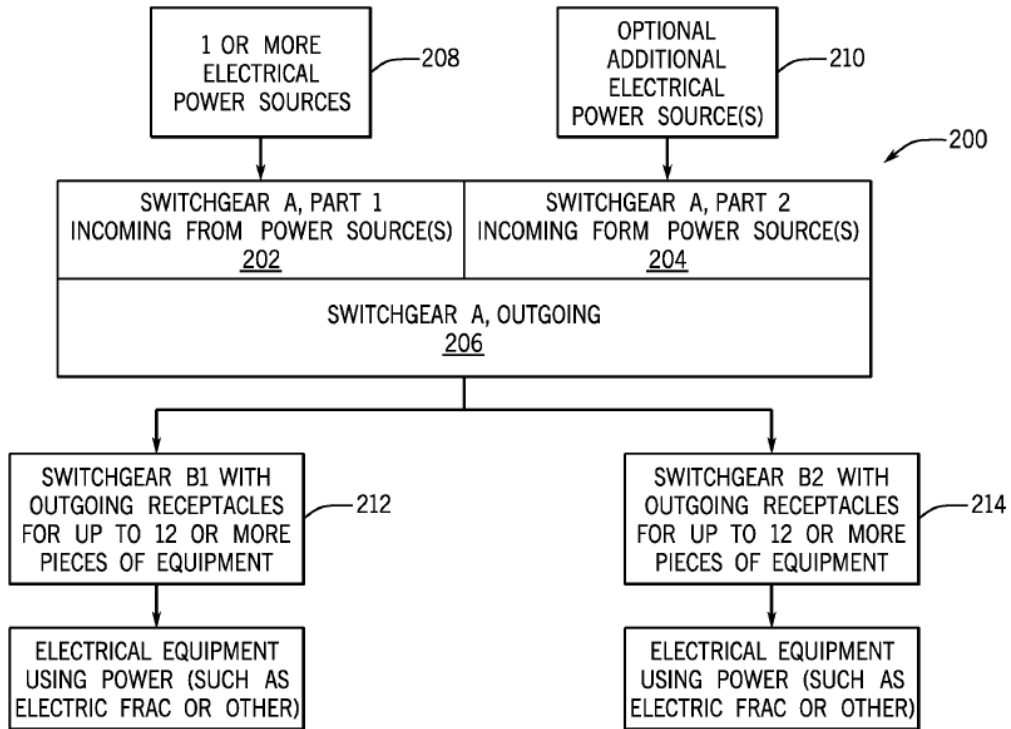


FIG. 3

Id., Fig. 3.

Modular switchgear provides power to electrical equipment, including pumping trailers. EX1001, 9:16-28. Figure 4 illustrates “pumping trailer 400” that receives power from switchgear. EX1001, 9:55-11:5. The pumping trailer contains “pump 404,” “electric motor 412,” “human machine interface (HMI) 416,” “variable frequency drive (VFD) 418,” “platform cover 422,” “transformer 424,” and “cooling system 428”:

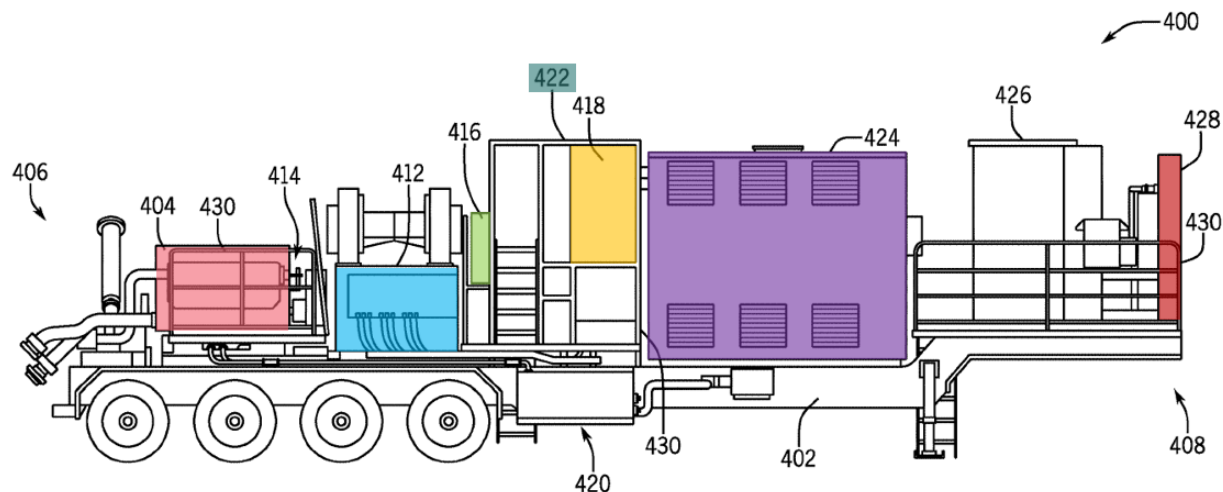


FIG. 4

EX1001, Fig. 4 (annotated).

B. Prosecution History

Application 16/597,014 leading to the '878 Patent was filed October 9, 2019. The Examiner issued a first Non-Final Office Action January 1, 2020, rejecting claims 1-2, 5-6, 9, 12-13, and 16-17 as obvious based on U.S. Patent Publication No. 2019/0203572 ("*Morris II*"); claims 3-4, 10-11, and 18-20 as obvious over *Morris II* in view of U.S. Patent No. 7,835,140 ("*Mori*"); claims 7 and 14 as obvious over *Morris II* in view of U.S. Patent Publication No. 2016/0105022 ("*Oehring III*", EX1013) and claims 8 and 15 as obvious over *Morris II* in view of U.S. Patent No. 9,932,799 ("*Symchuk*"). EX1002, 2128-2136. In response, Applicant argued the prior art did not teach the "variable frequency drive" or "cooling system" of Claim 1. *Id.*, 2115-2116.

The Examiner issued a second Non-Final Office Action July 23, 2020, rejecting claims 1-2, 5-6, 9, 12-13, 16, 18, and 20 over *Morris II* in view of U.S. Patent Publication No. 2016/0032703 (“*Broussard*”); claims 3-4 and 10-11 as obvious over *Morris II* in view of *Broussard* and *Mori*; claims 7 and 14 over *Morris II* in view of *Broussard* and *Oehring III*; claims 8 and 15 over *Morris II* in view of *Broussard* and *Symchuk*; claims 17-18 and 20 over *Morris II* in view of *Broussard* and U.S. Patent Publication No. 2020/0194976 (“*Benussi*”); and claim 19 over *Morris II* in view of *Broussard*, *Benussi*, and *Mori*. EX1002, 634-643. In response, Applicant argued against combining *Morris II* and *Broussard*, canceled claim 15, and added claim 21. *Id.*, 574-586. Applicant also amended claim 17 to recite “a switchgear” having “front aligned, shielded cable connections, the switchgear being positioned within an enclosure.” *Id.*, 577.

The Examiner issued a Final Office Action February 4, 2021, maintaining the rejection of claims 1-2, 5-6, 9, 12-13, 16, 18, and 20 over *Morris II* in view of *Broussard*; claims 3-4 and 10-11 as obvious over *Morris II* in view of *Broussard* and *Mori*; claims 7 and 14 over *Morris II* in view of *Broussard* and *Oehring III*; claims 8 and 15 over *Morris II* in view of *Broussard* and *Symchuk*; claims 17-18 and 20 over *Morris II* in view of *Broussard*, *Benussi*, and *Johnson*; and claim 19 over *Morris II* in view of *Broussard*, *Benussi*, and *Mori*. EX1002, 454-463. The Examiner indicated claim 21 contained allowable subject matter. *Id.*, 467. In response

Applicant amended independent claim 17 to include limitations of allowable claim 21—“wherein the electric powered pump, the VFD, the switchgear, and the transformer are mounted on a common support structure and a single cable couples the switchgear to the transformer”—and added dependent claims 22-27. *Id.*, 72-77. The Examiner issued a notice of allowance August 20, 2021 for claims 17-20 and 22-27. *Id.*, 34-39.

C. Priority Date

The ‘878 Patent (EX1001) claims priority to provisional application 62/743,360 (EX1015, “‘360 Provisional”) and provisional application 62/743,299 (EX1016, “‘299 Provisional”), both filed on October 9, 2018. The ‘878 Patent is not entitled to the October 9, 2018 priority date because neither provisional application discloses various subject matter of Claim 1, including, without limitation, “switchgear having ... front aligned, shielded cable connections.” *See* EX1015, EX1016; EX1003, §VI.C. Thus, the ‘878 Patent’s earliest priority date is its filing date, October 9, 2019. Nevertheless, Petitioners rely on prior art pre-dating the provisional applications.

IV. SUMMARY OF PRIOR ART AND GROUNDS

A. Morris (EX1004)

Morris is a U.S. Patent Application Publication filed July 24, 2019 and published February 6, 2020. EX1004. *Morris* claims priority to U.S. Provisional Application No. 62/713,393 (EX1005, “*Morris Provisional*”) filed August 1, 2018.

Morris properly claimed benefit to, was filed copending with, and shared a common inventor with *Morris Provisional*. EX1004, items (22), (60), (72); *see* AIA 35 U.S.C. §102(d); MPEP §2154.01(b). The subject matter relied upon in *Morris* is disclosed in *Morris Provisional*. *See* MPEP §2154.01(b).

Dynamic Drinkware does not apply. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1379-80 (Fed. Cir. 2015). The Board has determined that, “under AIA § 102, ‘there is no need to evaluate whether any claim of [a reference] patent document is *actually entitled to priority* or benefit under 35 U.S.C. 119, 120.’” *See, e.g., Penumbra, Inc. v. RapidPulse, Inc.*, IPR2021-01466, Paper 34 (P.T.A.B. March 20, 2023) (precedential), p.32 (emphasis original; citing MPEP §2154.01(b); holding that the requirement in *Dynamic Drinkware*—that under pre-AIA 35 U.S.C. §102(e), a reference patent’s claims must have written description support in its provisional application to be entitled to filing date of provisional application—does not apply to AIA 35 U.S.C. §102(d)); *see also Apple Inc. v. Telefunken Patent AG*, IPR2012-01466, Paper 10 (P.T.A.B. Sept. 14, 2012), p.19.

Thus, for prior art purposes, *Morris* was effectively filed August 1, 2018 and is prior art to the ‘878 Patent at least under 35 U.S.C. §102(a)(2). Like the ‘878 Patent, *Morris* discloses “fracturing pump transports” for “hydraulic fracturing.” EX1004, [0002], [0030], Fig. 1; EX1005, [0002], [0024], Fig. 1. *Morris*’s pump

transports include pumps powered by electric motors and receive electric power from a “single medium voltage ... cable connection” in the same manner as the ’878 Patent. EX1004, [0022], [0027]-[0028], [0031]; EX1005, [0019], [0022]-[0024].

B. Oehring IV (EX1006)

Oehring IV is a U.S. Patent Application Publication published August 3, 2017. EX1006. *Oehring IV* is prior art to the ’878 Patent at least under 35 U.S.C. §102(a)(1). *Oehring IV* describes “switchgear load sharing” for electric-powered fracturing pumps. *Id.*, Title, Abstract.

Oehring IV was filed by PO and shares two common inventors with the ’878 Patent. EX1006, items (71)-(72). The ’878 Patent also copies certain disclosures, including challenged claim limitations, nearly verbatim from *Oehring IV*, as identified in the following table:

’878 Specification	Disclosure in <i>Oehring IV</i>
In certain embodiments, the switchgear configurations described herein may selectively choose between either load sharing, to provide efficiency and flexibility; or having isolated banks of equipment, to provide protection and redundancy. In an embodiment, the switchgear optionally includes a tie breaker. The tie breaker can synchronize three-phase power of a similar voltage and frequency from different sources to act as a common bus, and can evenly distribute the electrical load between a plurality of electric pumps and turbine generators	A feature of the switchgear configurations described herein is the capability selectively choose between either load sharing, to provide efficiency and flexibility; or having isolated banks of equipment, to provide protection and redundancy. In an embodiment, the switchgear optionally includes a tie breaker. The tie breaker can synchronize three-phase power of a similar voltage and frequency from different sources to act as a common bus, and can evenly distribute the electrical load between a plurality of electric pumps and turbine generators

when the tie breaker is in a closed position. The tie breaker will isolate one or more of the plurality of electric powered pumps, the turbine generator, and the switchgear units when the tie breaker is in an open position. The use of a tie breaker can provide an advantage over previous load sharing systems because use of a tie breaker provides more options for the equipment operators and allows the fleet to be more versatile as to which mode of operation—protection and redundancy, or efficiency and flexibility—is more desirable at any given moment. EX1001, 6:7-27.	when the tie breaker is in a closed position. The tie breaker will isolate one or more of the plurality of electric pumps, the turbine generator, and the switchgear units when the tie breaker is in an open position. The use of a tie breaker can provide an advantage over previous load sharing systems because use of a tie breaker provides more options for the equipment operators and allows the fleet to be more versatile as to which mode of operation protection and redundancy, or efficiency and flexibility is more desirable at any given moment. EX1006, [0041].
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C. Premset Catalog (EX1007)

The Premset™ 15 kV SwitchGear Catalog (“*Premset Catalog*”) is a catalog for the Schneider Electric Premset™ switchgear published May 3, 2017. EX1007, 1, 3. *Premset Catalog* is prior art to the ‘878 Patent at least under 35 U.S.C. §102(a)(1).

Premset Catalog was publicly accessible as early as May 3, 2017. EX1023. The catalog was available for download on the Schneider Premset website by May 3, 2017 (as archived on May 21, 2017), over two years before the critical date. EX1023. A member of the public accessed *Premset Catalog* as early as November 30, 2017. EX1022, EX1025. The Premset switchgear that *Premset Catalog* describes was being sold before February 14, 2018, as evidenced by a trademark specimen and

statement of use. EX1027. Moreover, the '878 Patent specification—including portions supporting challenged claim limitations—appears to have been drafted by direct reference to *Premset Catalog*, and in particular to pages 7 and 11. The following table identifies where the '878 Patent specification copied nearly verbatim from *Premset Catalog*, further evidencing its public availability:

'878 Specification	Disclosure in <i>Premset Catalog</i>
“Additional features may also include vacuum circuit breakers, an isolating ground switch within a sealed tank with air at atmospheric pressure, and medium voltage cables directly grounded with the isolation ground switch before opening the cable department panels. Moreover, arranging the devices in series, as noted above, may provide double isolation between the busbars and various cables. In certain embodiments, SF6 is excluded and so the system is RoHS compliant, which reduces environmental concerns.” EX1001, 14:42-51	• “A vacuum circuit breaker;” • “An isolating ground switch within a sealed tank with air at atmospheric pressure” • “MV cables can be directly grounded with the isolating ground switch before opening the cable compartment panels” • “the arrangement of the two devices in series provides double isolation between the busbars and cables • “the system does not contain SF6 and is RoHS compliant, for your peace of mind regarding end-of-life treatment and environmental concerns.” EX1007, p.7.
“Embodiments ... may also include integrated core units. These units enable simple operation, with three positions for each unit: connected, open, and grounded. An intuitive active mimic bus diagram may also be included, with clear indicators for the circuit breaker and grounding switch. Furthermore, interlocks between functions may be positively driven and built-in as standard.” EX1001, 14:52-58	“Integrated core units” with features of • “Simple operation, with just 3 positions for all units: connected—open-grounded,” • “Intuitive active mimic bus diagram, with clear indicators for the circuit breaker and grounding switch,” • “All interlocks between functions are positively driven and built-in as standard” EX1007, p.7.

“The system may also include cubicle architecture for all circuit breakers, as well as multiple circuit breaker load options and two types of operating mechanisms. For example, D01N and D02N: 100 A and 200 A circuit breakers may be utilized for light load and operation. In embodiments, D06N: 600 A circuit breaker may be utilized for simple protection and light operation. Furthermore, in operation, D06H/D12H: 600 A and 1200 A circuit may be used for standard/heavy duty load and operation.” EX1001, 14:59-67	• “Consistent cubicle architecture for all circuit breakers” • “Multiple circuit breaker load options and two types of operating mechanisms” • “D01N and D02N: 100 A and 200 A circuit breakers for light load and operation” • “D06N: 600 A circuit breaker for simple protection and light operation” • “D06H / D12H: 600 A and 1200 A circuit for standard/heavy duty load and operation” EX1007, p.7.
“Use of modular system architecture may simplify installation and upgrades. In embodiments, core units may be optimized for dedicated applications, but may also be arranged to share features such as dimensions and footprint (e.g., 14.75 in. (375 mm) base form factor width), auxiliaries (e.g., electrical operation devices, accessories, options, etc.), intuitive operation, and elbow-style cable connections.” EX1001, 15:1-7	• “Modular system architecture, simplifying installation and upgrades” • The entire range of core units is optimized for dedicated applications, sharing:” • “Same dimensions and footprint, 14.75 in. (375 mm) base form factor width” • “Same auxiliaries such as electrical operation devices, accessories, and options” • “Same intuitive operation” • “Same elbow-style cable connections” EX1007, p.7.

Similarly, Figure 15 of the '878 specification appears to have been copied from *Premset Catalog*'s page 11, shown by comparison below:

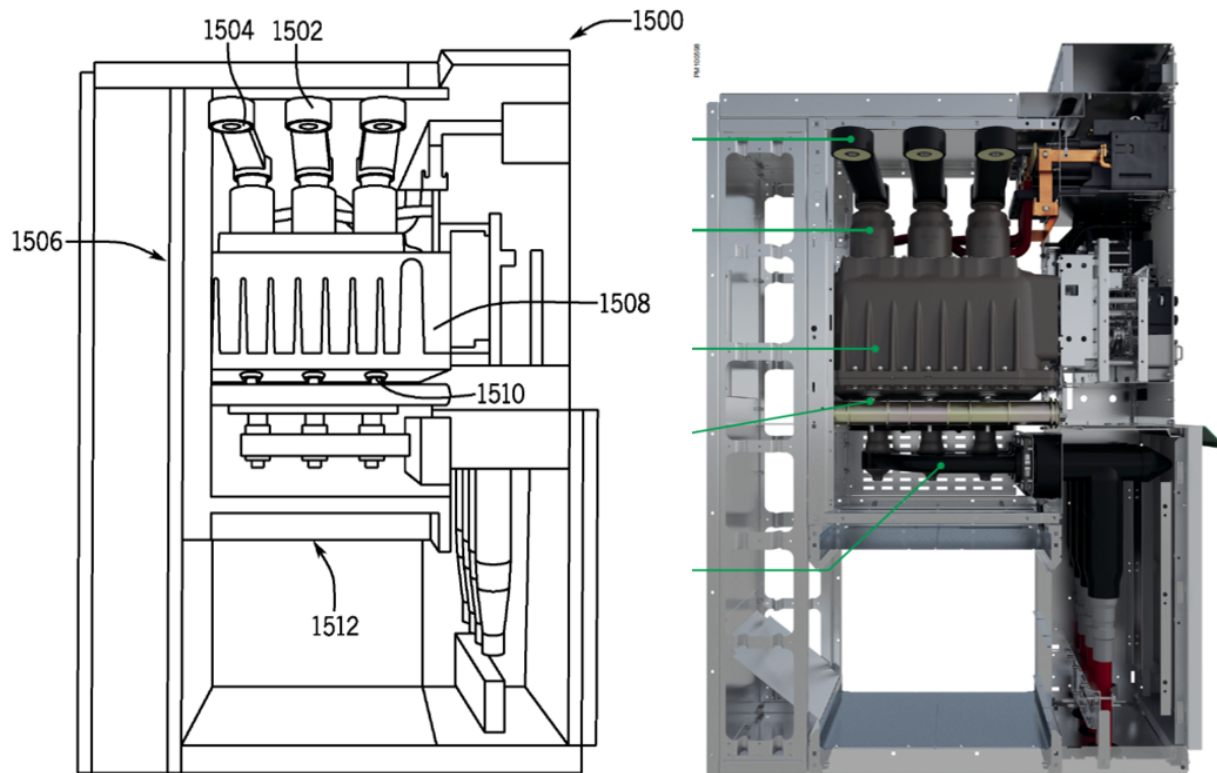


FIG. 15

Compare EX1001, Fig. 15 (left) with EX1007, p.11 (right). *Premset Catalog* itself also evidences public dissemination: it is marked with a “05/2017” date, bears the same identifier (“6045CT1601”) as Schneider’s website (see EX1023, pp.5-6), contains 2017 copyright markings, and bears Schneider Electric trade insignia, including the Schneider Electric trademark. *E.g.*, EX1007, pp.1, 3. *Premset Catalog*

further contains a substantial amount of disclosure that is identical to disclosure in the Premset catalog currently available on Schneider Electric's website.¹

The Board has found significantly less evidence of public accessibility sufficient to meet the threshold showing required for institution. In *Instradent USA, Inc. v. Nobel Biocare Services AG*, the Board found sufficient evidence of a product catalog's public accessibility based on evidence of use in training courses and citation in an IDS, and noted that "product catalogs ... are the type of documents normally intended for public dissemination." IPR2015-01786, Paper No. 14 (P.T.A.B. Feb. 19, 2016), p.16. In this case, public dissemination is evidenced by content in *Premset Catalog* itself (EX1007), its availability online (EX1023), sales of the corresponding PremsetTM product (EX1027), actual download by a relevant practitioner (EX1025), and PO's copying content from the catalog into the '878 specification (EX1001, 14:42-15:7). *See also Int'l Bus. Machines Corp. v. Intellectual Ventures I LLC*, IPR2014-01385, Paper No. 7, (P.T.A.B. Feb. 11, 2015), p.19 (finding "sufficient showing" of printed publication at institution based on date, copyright, part number, and trademark in reference).

¹ The PremsetTM catalog currently on Schneider Electric's website is available at <https://download.schneider-electric.com/doc/6045CT1601/6045CT1601.pdf>, and indicates the catalog was updated in January 2022.

D. Premset Brochure (EX1008)

The brochure titled “Innovation for MV Distribution” (“*Premset Brochure*”) is a switchgear product brochure published online as early as May 14, 2014. EX1008; EX1023, pp.8-23. *Premset Brochure* is prior art to the ‘878 Patent at least under 35 U.S.C. §102(a)(1). *Premset Brochure* describes the same Schneider Electric Premset switchgear as in *Premset Catalog*. See EX1008; EX1003, ¶129.

E. NEC (EX1009)

The 2005 Edition of NFPA 70, National Electric Code (“*NEC*”) is an electrical code issued July 16, 2004. EX1009, 70-1. *NEC* was available to the public at least by October 10, 2007, as indicated in a statement of use and trademark specimen showing *NEC* distributed over the Internet. EX1021. *NEC* is prior art to the ‘878 Patent at least under 35 U.S.C. §102(a)(1). *NEC* educates electrical practitioners on “safeguarding” against “hazards arising from the use of electricity.” *Id.*, §90.1

F. Orban (EX1010)

Orban is an International Patent Application Publication published November 1, 2018. EX1010, item (43). The application leading to *Orban* was effectively filed April 28, 2017. *Id.*, item (60). *Orban* is prior art to the ‘878 Patent at least under 35 U.S.C. §102(a)(1). *Orban* relates to a VFD “for driving an electric motor of a drilling rig machine,” such as a “fracturing pumping system[.]” *Id.*, Abstract, [0042]. The “conventional water-cooled VFD” is cooled by “pump[ing] cooling fluid ... through channels.” *Id.* [0070], Fig. 13.

G. Pratt (EX1011)

Pratt is a U.S. Patent issued August 27, 1991. EX1011. *Pratt* is prior art to the '878 Patent at least under 35 U.S.C. §§102(a)(1)-(2). *Pratt* describes a “cable tray walkway” including “walkway member[s]” “hingedly connected” to a support structure or to cable trays covered by the walkway. *Id.*, Title, 2:21-53; 4:23-33.

H. Oehring II (EX1012)

Oehring II is a U.S. Patent Application Publication published September 26, 2016. EX1012. *Oehring II* was filed by PO and shares a common inventor with the '878 Patent. EX1012, items (71)-(72). *Oehring II* is prior art to the '878 Patent at least under 35 U.S.C. §102(a)(1). *Oehring II* describes a trailer-mounted electric fracturing pump unit with an enclosed variable frequency drive (VFD). *Id.*, Title, [0031], Fig. 6.

I. Payne (EX1013)

U.S. Patent Application Publication No. 2016/0258267 by Payne et al. (“*Payne*”) was filed March 3, 2016 and published September 8, 2016. EX1013. *Payne* is prior art to the '878 Patent at least under 35 U.S.C. §§102(a)(1)-(2). *Payne* describes trailer-mounted fracturing systems with electrical motors. *Id.*, Title, [0021]-[002], Figs. 2-3.

J. Grounds

Ground	Claims	Basis (35 U.S.C. §)	Prior Art
1A	1-4, 6-8	103	<i>Morris, Oehring IV, Premset Catalog</i>
1B	1-4, 6-8	103	<i>Morris, Oehring IV, Premset Brochure</i>
2A	4	103	<i>Morris, Oehring IV, Premset Catalog, NEC</i>
2B	4	103	<i>Morris, Oehring IV, Premset Brochure, NEC</i>
3A	5	103	<i>Morris, Oehring IV, Premset Catalog, Orban</i>
3B	5	103	<i>Morris, Oehring IV, Premset Brochure, Orban</i>
4A	9	103	<i>Morris, Oehring IV, Premset Catalog, Pratt</i>
4B	9	103	<i>Morris, Oehring IV, Premset Brochure, Pratt</i>
5A	10	103	<i>Morris, Oehring IV, Premset Catalog, Oehring II</i>
5B	10	103	<i>Morris, Oehring IV, Premset Brochure, Oehring II</i>
6A	1-4, 6-8	103	<i>Morris, Oehring IV, Payne, Premset Catalog</i>
6B	1-4, 6-8	103	<i>Morris, Oehring IV, Payne, Premset Brochure</i>
7A	4	103	<i>Morris, Oehring IV, Payne, Premset Catalog, NEC</i>
7B	4	103	<i>Morris, Oehring IV, Payne, Premset Brochure, NEC</i>
8A	5	103	<i>Morris, Oehring IV, Payne, Premset Catalog, Orban</i>
8B	5	103	<i>Morris, Oehring IV, Payne, Premset Brochure, Orban</i>
9A	9	103	<i>Morris, Oehring IV, Payne, Premset Catalog, Pratt</i>
9B	9	103	<i>Morris, Oehring IV, Payne, Premset Brochure, Pratt</i>
10A	10	103	<i>Morris, Oehring IV, Payne, Premset Catalog, Oehring II</i>

10B	10	103	<i>Morris, Oehring IV, Payne, Premset Brochure, Oehring II</i>
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EX1003, §IV; EX1028 (listing challenged claim elements).

V. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art (“POSITA”) would have either (1) a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Petroleum Engineering or an equivalent field, as well as at least 2 years academic or industry experience in the oil and gas industry, including well drilling, completion, or production, or (2) at least four years industry experience in the oil and gas industry including well drilling, completion, or production. EX1003, §§V.A, VII.

VI. CLAIM CONSTRUCTION

Claim terms in IPR are construed according to their “ordinary and customary meaning” to a POSITA. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*); 37 C.F.R. §42.100(b). Constructions are proposed “only to the extent necessary.” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). For purposes of this proceeding and grounds presented herein, Petitioners do not present any constructions. EX1003, ¶¶22-27, 44.

VII. INSTITUTION IS PROPER

A. *The Fintiv Factors Favor Institution under § 314(a)*

The factors described in *Apple, Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (P.T.A.B. May 13, 2020) (Precedential) (“*Fintiv-I*”) favor institution. Notably, the merits of this Petition are particularly strong, with compelling art and arguments.

The Liberty Litigation is just beginning. Two months ago, plaintiffs sought to amend the complaint and in doing so described the case as “in its infancy” with “ample time” for “Defendants to request a continuance.” EX1018, 6. Thus the *Fintiv* factors favor institution. EX1019, p.3, 8-9; EX1020, p.36 (showing median 30-month time-to-trial); *Samsung Elecs. Co. v. Staton Techiya, LLC*, IPR2022-00324, Paper 13, at 12 (P.T.A.B. July 11, 2022) (applying the median).

A stay motion has not yet been filed in the Liberty Litigation, but Petitioners may file one in the event of IPR institution. The Board has treated related factors as neutral after declining to speculate on the outcome of a stay motion. *See, e.g., HP Inc. v. Slingshot Printing LLC*, IPR2020-01084, Paper 13 at 9 (P.T.A.B. Jan. 14, 2021). “[I]t is often reasonable for a petitioner to wait to file its petition until it learns which claims are being asserted against it in the parallel proceeding.” *Fintiv-I* at 11. Here, Petitioners promptly filed this Petition against all ‘878 Patent claims within four months of receiving infringement contentions. This “diligent” filing favors institution. *See, e.g., Corning v. Dali Wireless*, IPR2021-00762, Paper 8 at 9-10

(P.T.A.B. October 31, 2021) (crediting petitioner’s diligent filing approximately four months after receiving infringement contentions). Due to Petitioners’ diligence, it would be premature at this time to argue regarding timing of milestones in this proceeding versus the Liberty Litigation. If PO raises 314(a) arguments in a Preliminary Response, Petitioners respectfully request opportunity to reply prior to institution to address expected schedules and whether a prior art stipulation would be appropriate.

B. Institution is Proper under § 325(d)

Each Ground herein relies on *Morris* (EX1004) and *Premset Catalog* (EX1007) or *Premset Brochure* (EX1008), none of which was considered during examination. The Board has found the *Becton* factors favor institution where even a single noncumulative secondary reference distinguished the prior-art ground, regardless of other overlapping references. *Oticon Medical AB et al. v. Cochlear Limited*, IPR2019-00975, Paper 15 at 9-20 (P.T.A.B. Oct. 16, 2019) (precedential).

Further, although *Oehring II* and *Oehring IV* are listed on the face of the ‘878 Patent, they were not used to reject the claims. EX1001, item (56); *see also* EX1002, 669, 673. The Board has declined to deny institution where Petitioners relied upon prior art cited on the face of the challenged patent but “not applied by the examiner ... in any rejection of claims.” *Comcast Cable Communs., LLC v. Promptu Sys. Corp.*, Case No. IPR2018-00342, Paper 13 at 17 (P.T.A.B. July 19, 2018).

VIII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. *Ground 1A: Claims 1-4, 6-8 Morris in view of Oehring IV and Premset Catalog*

The combination of *Morris*, *Oehring IV*, and *Premset Catalog*² teaches claims 1-4 and 6-8, and thus renders those claims obvious under 35 U.S.C. §103. EX1003, §XI.

1. Motivation to Combine

A POSITA would have been motivated to combine *Morris* and the teachings of *Oehring IV* and *Premset Catalog*, and would have a reasonable expectation of success. EX1003, §XI.A. *Morris* discloses an electric-powered multi-pump fracturing system, shown in Figure 1, and describes switchgear that “distributes electric power for fracturing operations.” EX1004, Title, Fig. 1; EX1005, Title, Fig. 1. *Oehring IV* similarly describes a fracturing system with multiple “electric pumps” and a “switchgear” that “distribute[s] an electrical load.” EX1006, Abstract.

Morris and *Oehring IV* identify the same operational challenges and similar solutions. *Morris* explains that “minimizing the on-site area or ‘footprint’” is a logistical challenge and goal (EX1004, [0003], [0034]; EX1005, [0002]), while

² The teachings of *Premset Catalog* were within the level of skill in the art prior to the '878 Patent's earliest priority date. For example, Premset switchgear was manufactured and sold well before the '878 Patent's priority date. EX1027.

Oehring IV describes the benefit of using less equipment in “reduc[ing] the need to clear more land and disrupt the surrounding environment” (EX1006, [0044]). *Morris* identifies “increasing the efficiency” of fracturing equipment as a goal (EX1004, [0003]; EX1005, [0002]), and *Oehring IV* states that its load-sharing solution allows equipment to “operate at a higher efficiency” (EX1006, [0042]). *Morris* aims to provide fracturing operations that are “scalable and flexible” with “autonomous” pump transports (EX1004, [0034]; EX1005, [0026]), and *Oehring IV* explains that use of its switchgear “tie breaker” (or “common bus”) “allows the fleet to be more versatile” (EX1006, [0041]).

Morris and *Oehring IV* are thus from the same field of endeavor (electric power distribution for multiple-pump fracturing), identify similar problems and design incentives (operational footprint, efficiency, and operational flexibility), and address problems with similar solutions (switchgear for power distribution and control). See EX1003, ¶152. A POSITA would have considered whether to apply known solutions from one reference in the other. *Id.*

First, a POSITA would have been motivated to combine *Oehring IV*’s express teaching of variable frequency drives (“VFD”) into *Morris*’s fracturing system, and

specifically onto *Morris*'s pump transport.³ EX1003, ¶¶151-53. As taught in *Oehring IV*, “a variable frequency drive (VFD)” can “control the speed of an electric motor.” EX1006, [0043]. Fracturing systems have varying flow rates and the “electrical load constantly changes,” requiring “more or less torque from a variable frequency drive.” EX1006, [0009]. A POSITA would have known to use VFDs, as taught in *Oehring IV*, to control motor speeds in *Morris* for varying loads. EX1003, ¶¶151-53.

A POSITA would have had a reasonable expectation of success in using VFDs in *Morris*'s system. EX1003, ¶161. *Morris* itself teaches locating “drives” on its pump transport, and controlling electric-motor speed with VFDs has been well known for decades. EX1004, [0031], [0034]; EX1005, [0024], [0026]; EX1003, §§IX.K-L (explaining use of VFDs to control electric motors from EX1033-EX1036), XI.A. Moreover, a POSITA would have known that controlling motor speed copes with varying loads and prevents damage. *See* EX1006, [0009], [0028] (explaining that VFDs can “prevent damage”).

³ As noted below for claim element 1[b], *Morris* teaches “drives” that a POSITA would have understood to be VFDs. *Infra* § VIII.A.2(c). But *Morris* does not detail VFD function, and a POSITA would naturally have looked to *Oehring IV*'s teaching on VFD operation for use in *Morris*. EX1003, §XI.A.

Second, a POSITA would have been motivated to combine *Oehring IV*'s "common bus" into *Morris*'s fracturing system for load sharing and synchronization, and specifically into *Morris*'s switchgear. EX1003, ¶¶154-57. Both *Morris* and *Oehring IV* teach and suggest combining *Oehring IV*'s "common bus" into *Morris*'s switchgear. Both references use switchgear for power distribution to transformers (and from there to electric-powered pumps). EX1004, [0030], Fig. 1; EX1005, [0024], Fig. 1; EX1006, [0015], [0022], [0050], [0055]. *Oehring IV* explains that using a "common bus" as a "load sharing system ... allows the fleet to be more versatile" (EX1006, [0041]), and a POSITA would have implemented the common bus in *Morris*'s system to achieve *Morris*'s stated goal of a "scalable and flexible" fleet (EX1004, [0034]; EX1005, [0026]). EX1003, §XI.A. *Oehring IV* also states that "load sharing" allows "turbines to operate at a higher efficiency ... while reducing emissions," (EX1006, [0042]) motivating a POSITA to implement load sharing in *Morris*, which identifies "providing adequate power," "increasing the efficiency," and "reducing the environmental impact" as needed improvements to fracturing operations (EX1004, [0003]; EX1005, [0002]).

A POSITA would also have had a reasonable expectation of success in implementing *Oehring IV*'s common bus—and its functionality in sharing, synchronizing, and isolating loads—in *Morris*'s switchgear. *Morris* illustrates a

switchgear power system that a POSITA would have understood as already containing a common bus, shown in Figure 2 below (annotated in yellow):

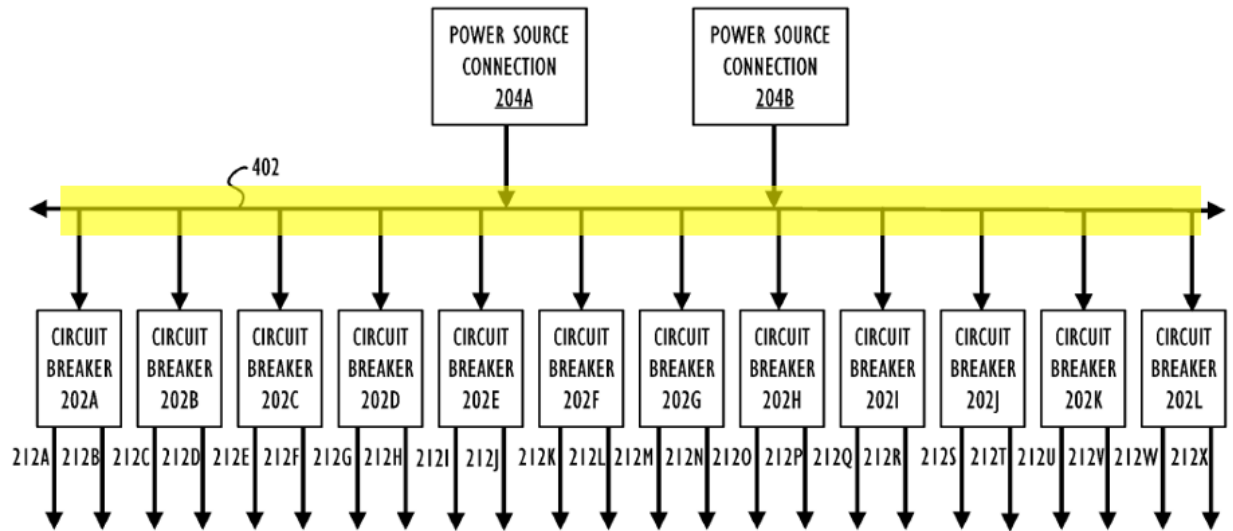


FIG. 4

EX1004, Fig. 4, [0051]; EX1005, Fig. 4, [0034]. Accordingly, *Morris* discloses switchgear having a common bus, and *Oehring IV*'s teachings regarding functionality of the common bus (or tie breaker) would have informed a POSITA to implement those functions (or recognize the teaching of those functions) in *Morris*'s switchgear having a common bus. EX1003, §§IX.I (explaining from EX1029-EX1031 main-tie-main configurations for load sharing and isolation), XI.A, XI.B.f, ¶154. For example, *Oehring IV* teaches (as claimed in the '878 Patent) that the common bus may (1) “synchronize three-phase power of a similar voltage and frequency from different sources,” (2) “evenly distribute the electrical load between a plurality of electric pumps and turbine generators,” and (3) “isolate one or more of

the plurality of electric pumps, the turbine generator, and the switchgear units.” EX1006, [0041]; *see also id.*, [0019]. A POSITA would have known that *Morris*’s common bus could perform these functions as well. EX1003, §§IX.I, XI.A, XI.B.f, ¶154.

Both references also describe switchgear as providing power to transformers at medium voltage (13.8 kV). EX1004, [0027]-[0028]; EX1005, [0021]-[0023]; EX1006, [0050]. A POSITA informed of these similar operating voltages would understand that functions and features of *Oehring IV*’s medium-voltage switchgear (such as those described above) could be implemented in *Morris*’s medium-voltage switchgear in a predictable manner. EX1003, ¶155, §XI.B.f.

While *Oehring IV* discloses “multiple single-conductor cables connecting to a fracturing pump trailer” this disclosure describes cables from a transformer to a pump trailer, not from switchgear to a transformer as recited in Claim 1. EX1006, [0052]. And *Morris* clearly teaches mounting this transformer on the pump transport and coupling switchgear to the transformer (and thus the pump transport) with a single, medium-voltage cable. EX1004, [0027]-[0028]; EX1005, [0021]-[0023]. *Morris* further explains that this configuration, placing the transformer on the pump transport, yields *Morris*’s goals of “autonomous” pump transports in a “scalable and flexible” fleet. EX1004, [0034]; EX1005, [0026].

Moreover, even if this disclosure in *Oehring IV* were teaching multiple cables coupling switchgear to a transformer (which it is not), *Morris* clearly teaches to couple switchgear to the transformer on the pump transport with a single medium-voltage cable to reduce cable count and improve safety. EX1004, [0028]-[0029]; EX1005, [0022]-[0023]. A POSITA would not remove the transformer from the transport and increase the number of cables, contrary to the clear benefits of a single cable in *Morris*, as additional cabling would increase setup time, grow the footprint of the drilling operation, and increase risk of mistakes in connecting cables. EX1003, §XI.B.i.

Finally, a POSITA would also have been motivated to combine *Premset Catalog* with *Morris* (as modified by *Oehring IV*) by mounting medium-voltage switchgear (and as understood by a POSITA, medium-voltage switchgear features and functions taught in *Premset Catalog*) on *Morris*'s fracturing pump transport. EX1003, ¶¶158-60.

A POSITA would have used teachings of *Premset Catalog* in *Morris*'s system according to known methods to yield predictable results. Both *Morris* and *Oehring IV* teach use of medium-voltage switchgear (e.g., at 13.8 kV). EX1004, [0021]; EX1005, [0019]; EX1006, [0050]-[0051]. *Oehring IV* specifically states that switchgear may be “rated for 15 kV.” EX1006, [0051]. A POSITA would have naturally looked to use switchgear having features and benefits of *Premset*

Catalog—which teaches a medium-voltage switchgear—for the medium-voltage switchgear disclosed in *Morris* and *Oehring IV*. EX1007, p.1; EX1003, §XI.A, ¶161.

A POSITA would also have been motivated to mount medium-voltage switchgear (as taught in *Premset Catalog*) on *Morris*’s fracturing pump transport to further *Morris*’s objective of providing “autonomous” pump transports in a “scalable and flexible” fleet. EX1004, [0034]; EX1005, [0026]; EX1003, ¶160. Placing switchgear on the pumping transport would increase autonomy of the pump transport, a central goal in *Morris*. EX1004, [0034]; EX1005, [0026]; EX1003, §XI.A. Integrating switchgear into the pumping transport would also reduce the need for “additional support-based transports” and “reduce[] physical footprint,” additional goals in *Morris*. Moreover, a POSITA considering *Morris*’s teaching to “mount[] the drives and transformers ... onto the fracturing pump transport” would also mount switchgear, which is commonly co-located with transformers and drives, onto the pump transport. EX1004, [0034]; EX1005, [0026]; EX1003, ¶160, §§XI.B.e,h; *see also* EX1024, pp.5-6, 7-8, 12-34 (describing switchgear co-located with transformers and drives in various modular power-distribution applications).

Oehring IV also motivates placing medium-voltage switchgear onto the pumping transport in its teaching that power distribution components are “modular and movable to different locations on mobile platforms.” EX1006, [0026], Claim 12. *Premset Catalog* also explains that the Premset switchgear has a “modular

system architecture” that enables “scalable solutions.” EX1007, p.7-8. A POSITA presented with this modularity would place switchgear on the mobile platform—the pump transport—that furthers *Morris*’s goals of achieving an autonomous, scalable, and flexible pump transport fleet.

And a POSITA would have known from *Premset Catalog* that medium-voltage switchgear could be used in a modular manner on *Morris*’s pump transport with a reasonable expectation of success. EX1003, ¶¶158-161. A POSITA would have been motivated to use shielded solid insulation (2SIS) switchgear, as taught in *Premset Catalog*, to obtain the benefits of advances in switchgear technology. EX1007, p.7; EX1003, ¶¶158-61. 2SIS switchgear offered several benefits, including modularity, compact size, shorter lead times, reduced maintenance, and extended lifetime, in contrast to other types of switchgear commonly used in fracturing operations that had a larger footprint and increased maintenance. EX1003, ¶¶158-61. *Premset Catalog* further teaches a “modular system architecture” for medium-voltage 2SIS switchgear, further motivating a POSITA to use 2SIS switchgear to simplify installation, maintenance, and upgrades to switchgear in the fracturing system. EX1007, p.7; EX1003, ¶¶158-61.

All these reasons would have motivated a POSITA to combine a VFD, common load sharing bus, and medium-voltage switchgear, as taught in *Oehring IV* and *Premset Catalog*, into *Morris*’s pump transport.

2. Claim 1

For the reasons discussed below, the combination of *Morris*, *Oehring IV*, and *Premset Catalog* renders obvious claim 1. EX1003, §XI.B.

a) 1[p]: A hydraulic fracturing system for fracturing a subterranean formation, comprising:

Morris teaches a hydraulic fracturing system for fracturing a subterranean formation. EX1004, Fig. 1, [0010]; EX1005, Fig. 1, [0009]. *Morris* explains that “fracturing ... inject[s] fracturing fluid ... to fracture the subsurface geological formations.” EX1004, [0002]; EX1005, [0001].

b) 1[a]: an electric powered pump coupled to a well associated with the subterranean formation and powered by at least one electric motor, the electric powered pump configured to pump fluid into a wellbore associated with the well;

Morris explains that fracturing pumps inject fluid into a well associated with a subterranean formation. *See* 1[p]; *supra* §VIII.A.2(a). *Morris* also teaches an electric-powered pump, powered by an electric motor, for pumping fluid into a wellbore.

Morris describes “electric prime movers” “mounted on the transports 104” pumping fluid into a well. EX1002, [0022]. “[E]lectric prime movers ... drive one or more pumps.” *Id.*, [0031]. A POSITA would have understood that “electric prime mover” describes an electric motor driving the electric-powered pump. EX1002, [0022], [0031]; EX1003, ¶166. *Morris*’s fracturing fleet also uses “electric power for operations,” and a POSITA would have understood using electric power requires

electric motors and electric-powered pumps described in *Morris*. See EX1004, [0038]; EX1005, [0029]; EX1003, §XI.B.b.

c) 1[b]: a variable frequency drive (VFD) connected to the at least one electric motor to control the speed of the at least one electric motor;

Morris and *Oehring IV* both teach a VFD connected to and controlling an electric motor's speed, and a POSITA would have known electric motors were commonly controlled with VFDs. EX1003, §§IX.K-L, XI.B.c. *Oehring IV* teaches "a variable frequency drive connected to the at least one electric motor to control the speed of the at least one electric motor." EX1006, [0028]; see also *id.*, [0043]. *Morris* similarly teaches "drives and/or other control instrumentation mounted on the fracturing pump transport" with "electric prime movers." EX1004, [0031], EX1005, [0024]. *Morris* reiterates that "mounting the drives ... onto the fracturing pump transport" removes "the need for ... drive power transports that provide power conversion and/or drive control." EX1004, [0034], EX1005, [0026]. A POSITA would have known VFDs are "drives" and "control instrumentation" provides "drive control," as disclosed in *Morris*, and providing drive control requires connecting the VFD to the motor to control motor speed. EX1003, ¶¶168-170. Moreover, it would have been well within a POSITA's knowledge to connect a VFD to an electric motor to control its speed, particularly in fracturing operations where pumping load varies. EX1003, ¶171, §§IX.K-L.

Accordingly, *Morris* and *Oehring* IV each discloses connecting a VFD to the electric motor to control electric motor speed.

d) 1[c]: a transformer for conditioning power to the electric powered pump, the power being received from at least one generator at a voltage higher than an operating voltage of the electric pump; and

Morris teaches a transformer receiving power from a generator at a voltage higher than the operating voltage of the electric pump and stepping the received voltage down to the lower operating voltage. “[T]he fracturing pump transport comprises a transformer that steps down the electric power received at the first voltage level to at least one lower voltage level.” EX1004, [0006]; EX1005, [0005]. *Morris* explains that transformers on pumping transports receive power at medium-voltage (13.8 kV) that is higher than the electric pumps’ operating voltage. EX1004, [0027], Fig. 1; EX1005, [0019], [0024], Fig. 1. The transformer steps that voltage down to lower voltage (e.g., 4.2 kV, 2.1 kV) for pump operation. EX1004, Fig. 1, [0031] (“[E]ach fracturing pump transport 104 could include a single transformer ... to step down the voltage to two different voltage levels. The 4.2 kV or 2.1 kV voltage level supplies electric power to one or more electric prime movers (not shown) that drive one or more pumps”); EX1005, [0024], Fig. 1.

Morris’s transformers (and pump transports generally) also receive power from a generator. For example, “power source of electricity 102 includes one or more turbine electric generator transports that ... generate mechanical energy and

then converts the mechanical energy to electricity.” EX1004, [0023], Fig. 1; EX1005, [0020], Fig. 1; *see also* EX1004, [0053]; EX1005, [0039].

e) 1[d]: a switchgear, receiving power from at least one generator, configured to distribute power to a plurality of pieces of wellsite equipment,

Morris and *Oehring IV* both teach switchgear receiving power from generators and distributing power to wellsite equipment. EX1003, §XI.B.e. Switchgear in *Morris* and *Oehring IV* receive power from generators. *Morris*’s switchgear receives power from “mobile source of electricity 102” that “includes one or more turbine-electric generator transports.” EX1004, [0023]; EX1005, [0020]; *supra* §VIII.A.2(d). *Oehring IV*’s switchgear is “electrically coupled” to “at least one generator” and may “combine the output of multiple electrical generators.” EX1006, Abstract, [0014], Fig. 9.

Morris further discloses switchgear that includes “circuit breakers,” with each circuit breaker “configured to output electric power to a corresponding transport.” EX1004, [0005]; EX1005, [0004]-[0005]. Each transport in *Morris* contains pieces of wellsite equipment. For example, *Morris* explains that its pump transport contains one or more transformers, a VFD, electric motor, and electric-powered pump. EX1004, [0022], [0031]; EX1005, [0019], [0024]; *supra* §§VIII.A.2(b)-(d),(h). *Oehring IV* similarly discloses that switchgear distribute power to wellsite equipment. *Oehring IV*’s switchgear is “configured to distribute an electrical load

between the plurality of electric pumps.” EX1006, Abstract. Various switchgear in *Oehring IV* can also “distribute power to other switchgear units” and “to transformers and auxiliaries.” *Id.*, [0055]. A POSITA would also have known that switchgear commonly receive and distribute power to multiple pieces of equipment. EX1003, §§IX.F (explaining switchgear and circuit breaker operation from EX1029-EX1032), I.

f) 1[e]: the switchgear having a common load sharing bus and front aligned, shielded cable connections,

Morris discloses switchgear having a common load sharing bus. For example, *Morris* Figure 4 illustrates a switchgear common bus 402 sharing load between two power sources and a number of circuit breakers powering electrical equipment:

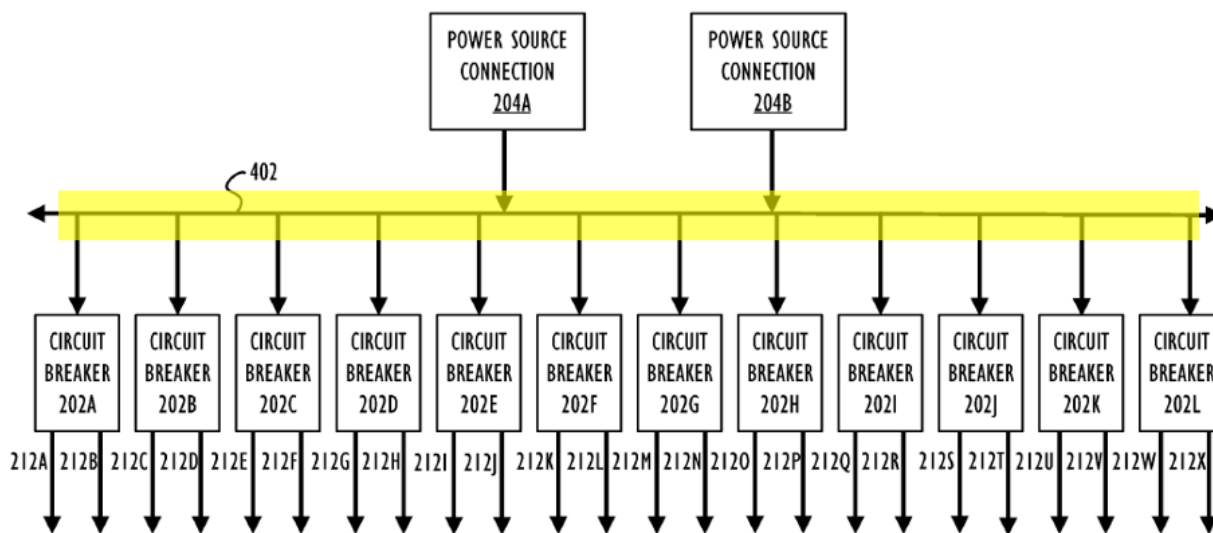


FIG. 4

EX1004, [0051], Fig. 4; EX1005, [0037], Fig. 4. A POSITA would have understood that *Morris*'s common bus distributing load between power sources and powered equipment performed load sharing. EX1003, ¶¶182-83, §§IX.D,I.

Oehring IV—which was filed by PO and shares two common inventors with the '878 Patent—also teaches a “common load sharing bus.” *See supra* §IV.B. *Oehring IV* discloses that the “switchgear optionally includes a tie breaker,” also described “as a common bus.” EX1006, [0041]. The “common bus” can “evenly distribute the electrical load,” and a POSITA would have known that load sharing distributes the electrical load. EX1003, ¶¶184-85, §§IX.D,I. *Oehring IV* further explains that the “common bus” can be configured to perform “load sharing” when in a closed position or “isolate” equipment when in an open position. EX1006, [0041]. A POSITA would accordingly understand that the “common bus” is a “common load sharing bus” because it provides “load sharing” capabilities. *See, e.g.*, EX1006, [0085] (explaining switchgear “load sharing through their internal electrical bus”); EX1003, ¶184.

Oehring IV further teaches that switchgear may provide load sharing, and a POSITA would understand from this teaching to use switchgear, such as the Premset, to provide a common load sharing bus. *See* EX1006, [0062] (describing “load sharing through one switchgear”), [0071] (“A tie breaker can be installed in

each switchgear”), [0085] (“The switchgear units in this configuration can provide load sharing through their internal electrical bus”); EX1003, ¶¶184-85.

Premset Catalog also teaches switchgear having a common load sharing bus and front-aligned, shielded cable connections. *Premset Catalog* illustrates “busbar connections” implementing a common bus. EX1007, p.9-11,37.

Premset Catalog further describes a “bus-tie circuit breaker section” that a POSITA would have understood as implementing a common load sharing bus. EX1007, p.22; EX1003, ¶¶86-89, 187. For example, the bus-tie circuit breaker section of the Premset provides “bus segment isolation and power redundancy.” *Id.* A POSITA would have understood that “power redundancy” means the bus is load sharing. EX1003, ¶¶186-87. Moreover, a POSITA would have been motivated to implement the common load sharing bus in the combined system of *Morris* and *Oehring IV* using switchgear having the features described in *Premset Catalog*. EX1003, ¶¶158-60.

Premset Catalog also discloses “[f]ront aligned cable connections” with “shielded solid insulation” and illustrates these connections and their alignment at the front of the switchgear. EX1007, p.11, 60-61. A POSITA would have understood that cable connections with “shielded solid insulation” are “shielded.” EX1003, ¶188.

Accordingly, the combination of *Morris*, *Oehring IV*, and *Premset Catalog* teach switchgear having a common load sharing bus and front-aligned, shielded cable connections.

g) 1[f]: the switchgear being positioned within an enclosure;

Morris, *Oehring IV*, and *Premset Catalog* teach enclosing the switchgear. EX1003, §XI.B.g. *Morris* illustrates circuit breakers within its switchgear as enclosed, as does *Oehring IV*, and a POSITA would have known that switchgear are commonly enclosed. See e.g., EX1004, Figs. 2-3 (illustrating circuit breakers enclosed within a trailer); EX1005, Figs. 2-3; EX1006, Fig. 3A; EX1003, ¶¶190-93. *Premset Catalog* also teaches switchgear contained within an enclosure: the switchgear is illustrated as enclosed and rated to the “IEEE Standard for Metal-Enclosed Interrupter Switchgear.” EX1007, p.26; EX1003, ¶194. *Premset Catalog* further discloses switchgear with an “enclosure rating” to “NEMA 1 Indoor, Type B,” motivating a POSITA to enclose the switchgear. EX1007, p.27; EX1003, ¶194.

h) 1[g] wherein the electric powered pump, the VFD, the switchgear, and the transformer are mounted on a common support structure

PO amended Claim 1 to include limitation 1[g] to obtain allowance. *Supra* §III.B. But *Morris* teaches an electric-powered pump, VFD, and transformer mounted on a common support structure, and it would have been obvious to a POSITA to mount switchgear on the common support structure in light of the

teachings of *Morris*, *Oehring IV*, and *Premset Catalog*. Moreover, the '878 Patent copies disclosures describing switchgear from *Oehring IV* and *Premset Catalog*, which further indicates a POSITA would have considered the references together and been motivated to combine them. *See supra* §§IV.B-C, VIII.A.1.

First, *Morris* expressly discloses an electric-powered pump, a VFD, and a transformer mounted on a common support structure, a pump transport. *Morris*'s "fracturing pump transport 104 may include one or more transformers." EX1004, [0030], Fig. 1; EX1005, [0024], Fig. 1. *Morris* also explains the one or more transformers supply power to "drives"—that a POSITA would have understood to be a VFD—and describes this VFD as "mounted on the fracturing pump transport." EX1004, [0031], EX1005, [0024]. It would also have been obvious to a POSITA, based on *Morris*'s and *Oehring IV*'s disclosure of a VFD for motor control and common knowledge, to provide a VFD mounted on the same transport as the electric motor. EX1006, [0028], [0043]; EX1003, ¶¶101-08, 199-200. The transformer also supplies power to "electric prime movers" and "pumps." EX1004, [0031], EX1005, [0024]. A POSITA would have understood that a "pump transport" would contain pumps and the motors that drive them, and that the transformer would be mounted on the same "pump transport" as the equipment it supplies. EX1003, ¶¶196-97. Accordingly, a POSITA reading *Morris* would have known to mount the

transformer, VFD, electric motor, and electric-powered pump on a common support structure.

Second, it would have been obvious to a POSITA to mount switchgear on the common support structure. *See supra* §VIII.A.1. A POSITA would have found it obvious from *Morris* that the pump transport contained multiple switchgear. EX1003, ¶¶179, 198; *see also id.* §IX.A-F (explaining power generation and distribution using switchgear with generators and transformers). *Morris* also motivates switchgear on the pump transport by teaching a POSITA to mount electrical equipment on the pump transport so that it is “individually autonomous.” EX1004, [0034]; EX1005, [0026]. “Having autonomous trailers allows the fracturing fleet [] to become scalable and flexible.” EX1004, [0034]; EX1005, [0026]. *Morris* further teaches avoiding “additional support-based transports,” such as the switchgear transport trailer, when scaling the fracturing fleet. EX1004, [0034]; EX1005, [0026]. A POSITA would thus have placed switchgear on the pump transport to increase autonomy, provide flexibility, and avoid additional support-based transports. EX1003, ¶198. And a POSITA would have known that co-locating switchgear with transformers and motor control was commonly performed in power distribution systems, including mobile systems for fracturing. EX1024, pp.5-6 (describing use of “medium voltage” switchgear in “modular,” “skid or wheel mounted” enclosure for power distribution in oil and gas applications), 7-8 (co-

locating switchgear, transformer, and “other equipment[]” on “mobile electric center”), 12-34 (co-locating switchgear with transformers and drives, including for oil and gas applications); EX1003, ¶160.

Premset Catalog further teaches medium-voltage switchgear that is modular and compact. EX1007, p. 9-11. A POSITA considering *Morris*’s goals of fracturing fleet autonomy, scalability, and flexibility—and informed by *Premset Catalog*’s disclosure of modular components—would naturally place switchgear on the pump transport to enhance autonomy, scalability, and flexibility. EX1003, ¶¶158-160.

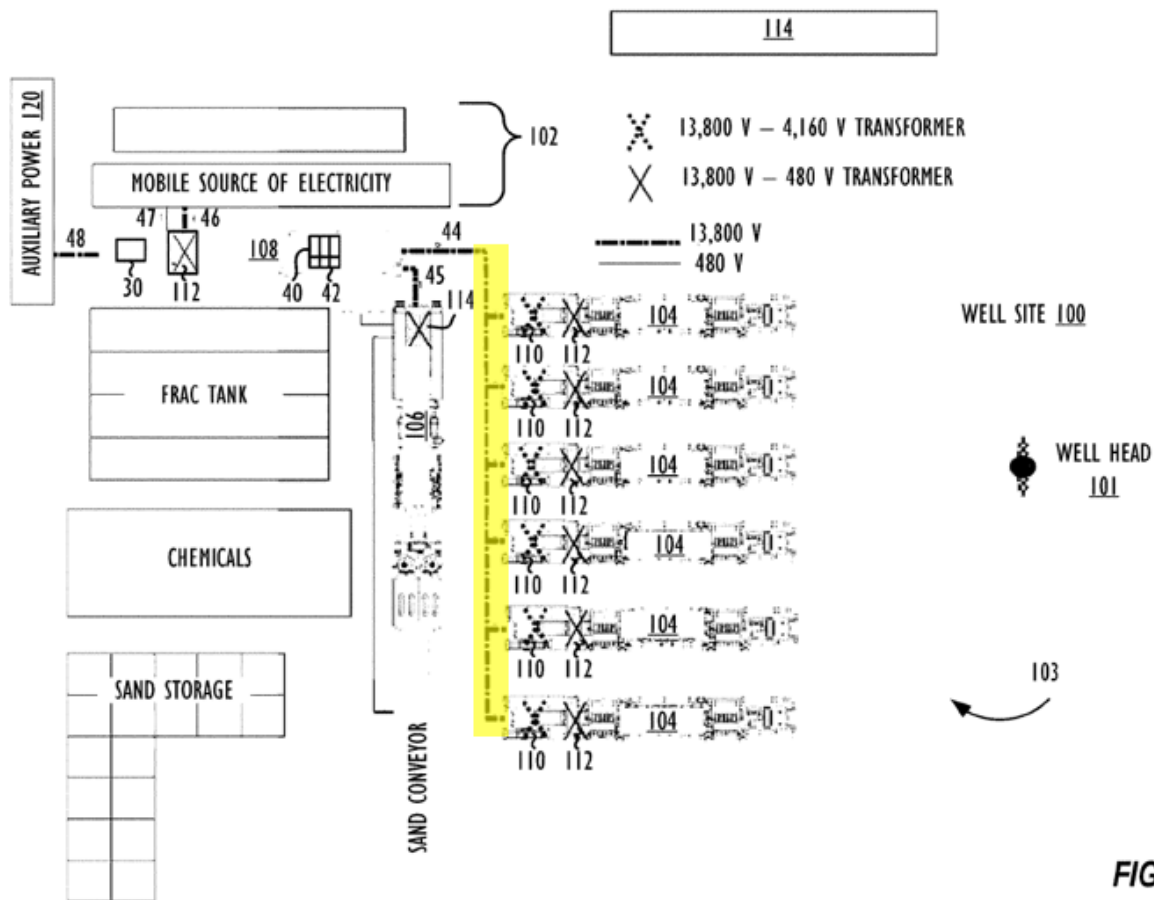
While *Morris* discloses a switchgear transport that is separate from *Morris*’s fracturing pump transport, these teachings would have motivated a POSITA to mount switchgear on the pump transport. Moreover, *Oehring IV* teaches that “switchgear [] can distribute power to other switchgear units.” EX1006, [0055]. A POSITA would thus have understood to mount switchgear on pump transports, in addition to *Morris*’s switchgear transport, which could distribute power to switchgear located on pump transports. *See* EX1003, ¶198 (explaining multiple sets of switchgear on pump transport). A POSITA would have understood that a “hierarchy of switchgear units” supports load sharing and isolation, as taught by *Oehring IV*. EX1006, [0055]-[0056], [0085], [0090]; *see also* EX1003, §IX.F.

For all these reasons, it would have been obvious to a POSITA to mount switchgear on the common support structure along with an electric-powered pump, a VFD, and a transformer.

i) 1[h] and a single cable couples the switchgear to the transformer.

PO amended Claim 1 to include limitation 1[h] to obtain allowance. *Supra* §III.B. *Morris*, however, discloses that a single cable couples the switchgear to the transformer. *Morris* states “each fracturing pump transport 104 is directly connected to the switch gear transport 108 with a single medium voltage (e.g., 13.8 kV) cable connection 44.” EX1004, [0027]; EX1005, [0022]. Similarly, “[t]o output and provide electric power, each circuit breaker ... connects to a transport (e.g., fracturing pump transport) **using a single electrical cable 44.**” EX1004, [0022] (emphasis added); EX1005, [0019]. *Morris* further explains the benefit of a single, medium-voltage cable connecting switchgear to the transformer in reducing cabling and promoting safety. EX1004, [0028]-[0029]; EX1005, [0022]-[0023].

Morris Figure 1 also illustrates a single cable (annotated in yellow) connecting switchgear to each transformer on *Morris*’s pumping transports:



EX1004, Fig. 1; EX1005, Fig. 1.

Accordingly, a POSITA would have understood to couple switchgear to the transformer with a single medium-voltage cable.

3. Claim 2

- a) The system of claim 1, wherein the common load sharing bus is configured to synchronize three-phase power of a similar voltage and frequency from different sources, the switchgear evenly distributing an electrical load between the electric powered pump and the at least one generator.

Oehring IV—which was filed by PO and shares two common inventors with the '878 Patent—teaches both (1) switchgear evenly distributing an electrical load between the electric-powered pump and the at least one generator and (2) a common load sharing bus that synchronizes three-phase power of a similar voltage and frequency from different sources. *See supra* §IV.B. First, *Oehring IV* teaches a “tie breaker,” also described as a “common bus,” that “evenly distribute[s] the electrical load between a plurality of electric pumps and turbine generators” when in a “closed position.” EX1006, [0041]. *Oehring IV* also explains that “switchgear units can provide load sharing through their internal electrical bus,” and a POSITA would have understood “load sharing” to include “evenly distribut[ing] the electric load.” EX1006, [0085]; EX1003, ¶205.

Second, *Oehring IV* teaches a switchgear “tie breaker” “can synchronize three-phase power of a similar voltage and frequency from different sources to act as a common bus.” EX1006, [0041]; *see also* EX1003, §IX.J (explaining three-phase power). *Premset Catalog* also discloses a common load sharing bus in a “modular bus bar system” within the switchgear unit that a POSITA would understand required synchronization. EX1007, p.9, 11, 57; EX1003, §XI.C. Accordingly, the combination of *Morris*, *Oehring IV*, and *Premset Catalog* teaches a switchgear unit having a common load sharing bus that synchronizes three-phase power of a similar voltage and frequency from different sources. EX1003, §XI.C.

4. Claim 3

- a) wherein the common load sharing bus is configured to isolate the electric powered pump, the at least one generator, and the switchgear.

See supra §VIII.A.3. *Oehring IV* further teaches that its switchgear can be “configured to ... isolate one or more of the plurality of electric pumps, the at least one generator, and the at least two switchgear units.” EX1006, [0019]; *see id.* [0041]. A POSITA would have understood that a common load sharing bus would isolate an electric pump, a generator, and a single switchgear unit. EX1003, §§IX.I, XI.D; *see also* EX1007 (explaining that the “bus-tie circuit breaker” in the Premset switchgear provides “bus segment isolation”). *Oehring IV* further explains the function of the common load sharing bus to provide load sharing in a closed position (see *supra* §VIII.A.3) and to isolate “electric pumps, the turbine generator, and the switchgear units” when in an open position. EX1006, [0041].

Accordingly, it would have been obvious to a POSITA that the switchgear contains a common load sharing bus configured to isolate the electric-powered pump, the generator, and the switchgear. EX1003, §XI.D.

5. Claim 4

- a) The system of claim 1, wherein the electric powered pump, the VFD, and the transformer are mounted on the common support structure and a second single cable couples the switchgear to the common support structure.

The combination of *Morris*, *Oehring IV*, and *Premset Catalog* renders obvious the additional limitations of Claim 4. EX1003, §XI.E.

Premset Catalog discloses, or at least it would have been obvious to a POSITA, the need for a “ground” connection to properly operate switchgear. EX1003, ¶¶212-13. For example, the Premset’s “solid insulation is ground shielded.” EX1007, p.7. *Premset Catalog* also discloses “[a]n isolating **ground** switch,” and that “MV cables ***can be directly grounded*** with the isolating ground switch.” EX1007, p.7, 8, 9, 11.

Oehring IV further discloses a “system ground cable 406” acting “as a ground between the fracturing pump trailer 425 and a 13.8 kV to 600 V transformer (not shown) providing power to the fracturing pump trailer 425.” EX1006, [0053]. Accordingly, *Oehring IV* teaches a “second cable” (system ground cable 406) coupling the transformer to the common support structure (pump trailer). A POSITA would have found it obvious to combine *Premset Catalog*’s teaching that switchgear need grounding and *Oehring IV*’s teaching that a second cable (a system ground cable) provides grounding by coupling the switchgear to the trailer. EX1003, ¶¶212-14. A POSITA would also have known that electrical Codes and Standards such as the National Electrical Code (NEC) require grounding electrical equipment, including switchgear, at a fracturing operation. EX1003, ¶214.

6. Claim 6

- a) The system of claim 1, wherein the switchgear comprises: integrated core units configured to operate in a connected position, an open position, or a grounded position.

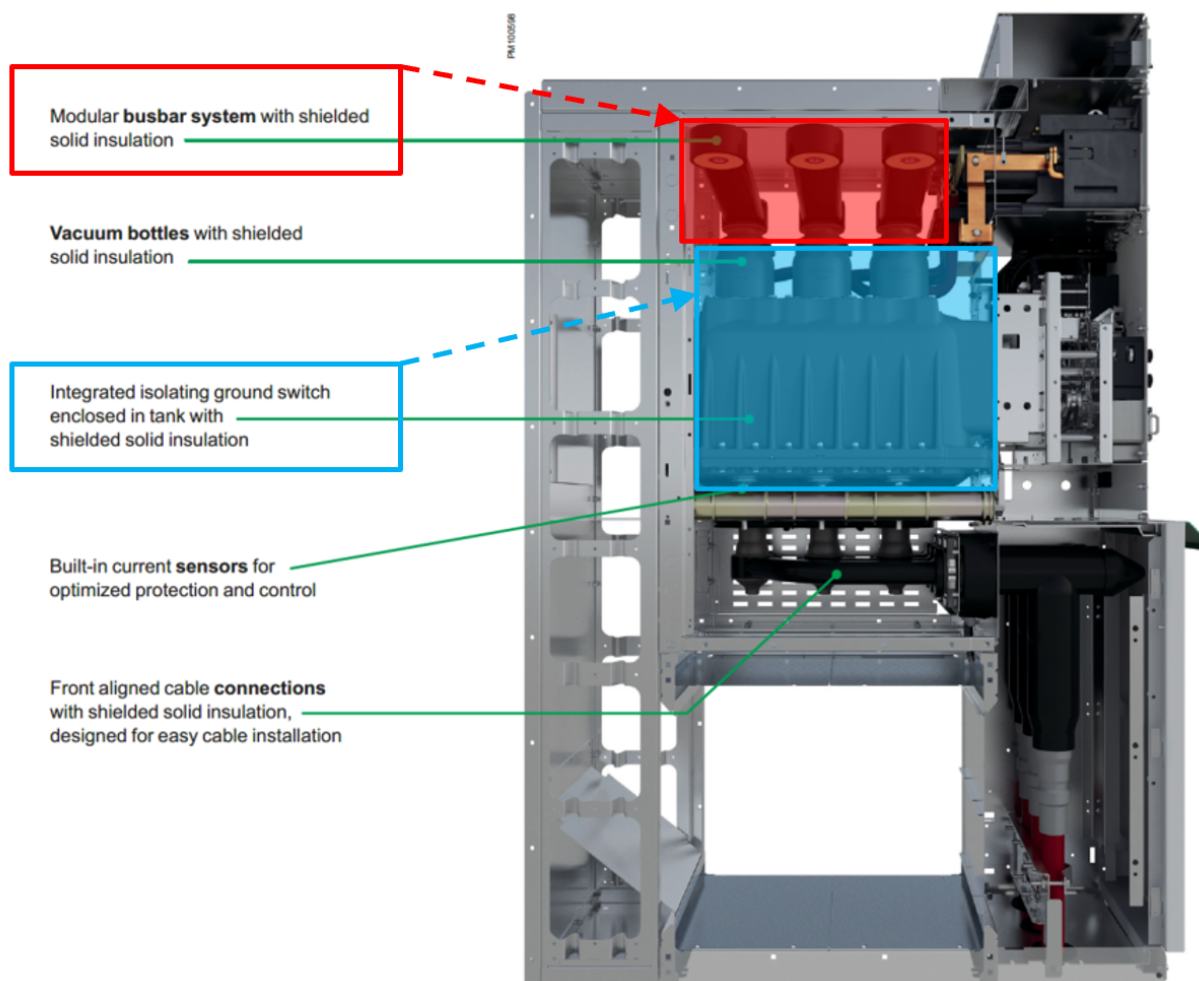
See supra §§IV.C, VIII.A.1. *Premset Catalog* teaches switchgear having “integrated core units” with a “connected,” “open,” and “grounded” position. EX1007, p.7. *Premset Catalog* describes its “integrated core units” as having “3 positions for all units: connected – open – grounded.” *Id.* And as discussed above, the ’878 Patent appears to have incorporated the limitations of claim 6 into its specification and claims by direct reference to *Premset Catalog*. *See supra* §IV.C.

Accordingly, *Morris*, *Oehring IV*, and *Premset Catalog* render obvious the limitations of claim 6. EX1003, §XI.F.

7. Claim 7

- a) 7[a] The system of claim 6, wherein the switchgear further comprises: an isolating ground switch, enclosed within a tank arranged proximate the common load sharing bus; and

See supra §§IV.C, VIII.A.6. *Premset Catalog* teaches “an isolating ground switch within a sealed tank.” EX1007, p.7. As shown below, *Premset Catalog* also illustrates the “isolating ground switch enclosed in tank” (annotated in blue) next to a “busbar system” (i.e., a common load sharing bus, annotated in red):



EX1007, p.11; *see also id.*, pp.9-10, 57.

The '878 Patent also copied the limitations of claim 7 into its specification and claims nearly verbatim from *Premset Catalog*. *See supra* §IV.C. Accordingly, *Premset Catalog* discloses switchgear having an isolating grounding switch enclosed within a tank and arranged proximate the common load sharing bus. EX1003, §XI.G.

- b) 7[b] cable connections for coupling to the switchgear.

Premset Catalog contains a section describing “cable connections” for coupling to the switchgear. EX1007, p.57-59. This section also tabulates various cables and connectors that a POSITA would have understood were for coupling to the switchgear of sources and loads. *Id.*; EX1003, §XI.G.

Accordingly, *Premset Catalog* discloses the limitations of claim 7.

8. Claim 8

- a) The system of claim 1, wherein the common support structure is at least one of a trailer, a skid, a pad, a truck bed, or a combination thereof.

See supra §VIII.A.2(h); EX1003, §XI.H. *Morris* teaches a common support structure that is a trailer, a skid, a pad, or a truck bed in its “fracturing pump transport.” EX1004, [0030]; EX1005, [0024]. *Morris* further defines “the term ‘transport’” as “any transportation assembly, including ... a trailer, truck, skid, rail car, and/or barge.” EX1004, [0016]-[0017]; EX1005, [0015]-[0016].

B. Ground 1B: Claims 1-4, 6-8 Morris in view of Oehring IV, and Premset Brochure

The combination of *Morris*, *Oehring IV*, and *Premset Brochure* teaches each element of claims 1-4 and 6-8, and thus renders those claims obvious under 35 U.S.C. §103. EX1003, §XII. As discussed in Ground 1A, and relied on in Ground 1B, the combination of *Morris* and *Oehring IV* teaches elements of claims

1-4 and 6-8. *Premset Brochure* also teaches claim elements 1[e]-1[g] and claims 4 and 6-7. EX1003, §XII.B-E.

1. Motivation to Combine

As discussed in Ground 1A, a POSITA would have been motivated to combine *Morris* and *Oehring IV* with the teachings of *Premset Catalog*. A POSITA would have been motivated to combine *Morris* and *Oehring IV* with the teachings of *Premset Brochure* for the same reasons. *See supra* §VIII.A.1; EX1003, §XII.A.

Both *Morris* and *Oehring IV*, for example, describe switchgear providing power to transformers at medium voltage (13.8 kV). EX1004, [0027]-[0028]; EX1005, [0021]-[0023]; EX1006, [0050]. And *Premset Brochure* teaches medium-voltage switchgear rated to 15 kV. EX1008, p.10. Like *Premset Catalog*, *Premset Brochure* also teaches a shielded solid insulation (2SIS) switchgear that is modular and low maintenance with an extended lifetime. EX1008, p.3,5. A POSITA would have been motivated to use switchgear having features taught in *Premset Brochure* to obtain a number of benefits, including safety and reliability, modularity, reduced footprint, and distributed intelligence. EX1003, §XII.A

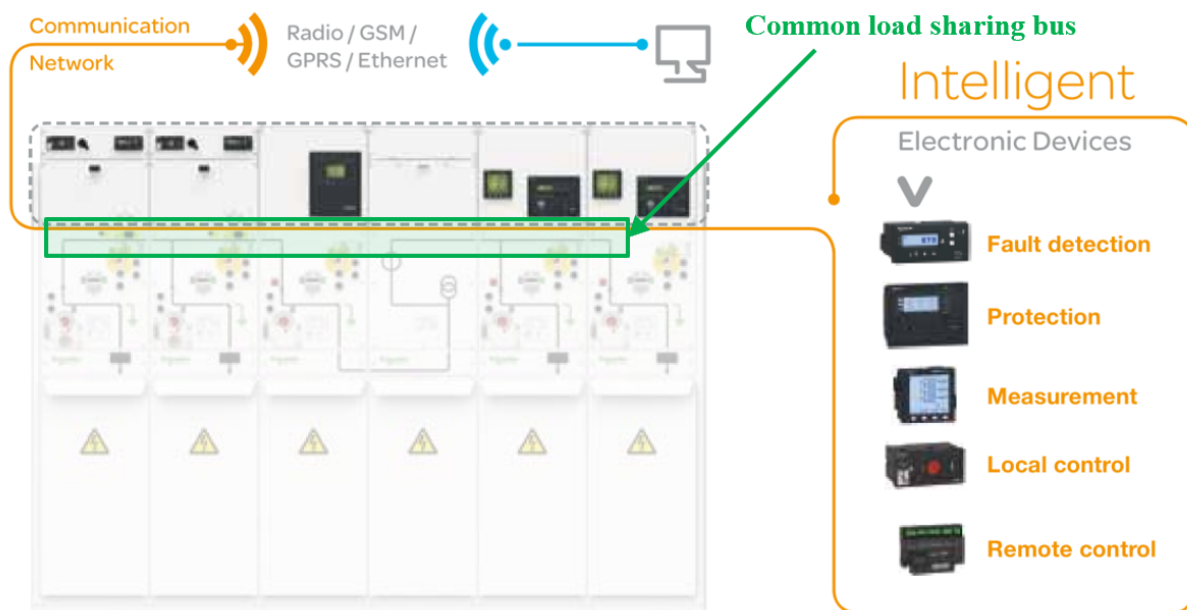
2. Claim 1

a) 1[p]-1[d] and 1[h]

See supra §§VIII.A.2(a)-(e),(i).

b) 1[e]:

See supra §VIII.A.2(f). As explained in Ground 1A, and relied on here, *Morris* and *Oehring IV* both teach switchgear having a common load sharing bus. *Premset Brochure* also discloses switchgear having a common load sharing bus, which would further motivate a POSITA to use 2SIS switchgear, such as that disclosed in *Premset Brochure*, in the combined system of *Morris* and *Oehring IV*. EX1003, §XII.B.a. *Premset Brochure* illustrates a common load sharing bus (annotated in green below):



EX1008, p.4. *Premset Brochure* also explains the Automatic Transfer System feature, which provides “source transfer ... to reduce power supply interruption,” and provides for “load management” and “asset management.” *Id.* A POSITA would

understand from this disclosure that the common bus provides load sharing. EX1003, ¶229.

Premset Brochure also discloses front-aligned cable connections. *Premset Brochure* describes its switchgear as having “simple front power connections,” and further states that “cable connections are aligned in front.” EX1008, p.7.

And it would have been obvious to a POSITA that the cable connections described in *Premset Brochure* were “shielded.” *Premset Brochure* describes switchgear employing solid shielded insulation (2SIS). EX1008, p.5. And *Premset Brochure* explains that “no part of the main circuit [is] exposed to free air,” such that a POSITA would have understood that cable connections were shielded to prevent exposure and promote safety. *Id.*; EX1003, ¶¶230-31.

c) 1[f]:

See supra §VIII.A.2(g). The *Premset Brochure* illustrates switchgear positioned within an enclosure multiple times. EX1008, p.1, 5, 10. *Premset Brochure* also describes the Premset switchgear as meeting specifications for “metal-enclosed switchgear.” *Id.*, 10. A POSITA would have understood accordingly to position switchgear within an enclosure. EX1003, §XII.B.b.

d) 1[g]

See supra §VIII.A.2(h). *Premset Brochure* also describes “compact and modular” switchgear. EX1008, p. 7. A POSITA informed by *Premset Brochure*’s

disclosure of modular components would naturally place the switchgear on the pump transport enhance *Morris*'s goals of autonomy, scalability, and flexibility. EX1003, §XII.B.c.

Accordingly, the combination of *Morris* with the teachings of *Oehring IV* and *Premset Brochure* renders obvious claim 1.

3. Claim 2

See supra §VIII.A.3.

4. Claim 3

See supra §VIII.A.4.

5. Claim 4

See supra §VIII.A.5. The combination of *Morris*, *Oehring IV*, and *Premset Brochure* renders obvious the additional limitations of Claim 4. EX1003, §XII.C.

Premset Brochure discloses, or at least it would have been obvious to a POSITA, that a “ground” connection would be needed to properly operate switchgear. EX1003, ¶¶235-36. *Premset Brochure* teaches a ground connection for switchgear. For example, *Premset Brochure* teaches an “earth shielded system.” EX1008, p.5. *Premset Catalog* also discloses an “earthing switch,” providing “cable earthing,” and “core units” providing an “earthed” position. EX1008, pp.5-6, 8-9. As described in Ground 1A, POSITA would have also coupled the switchgear to the trailer in view of *Premset Brochure*'s teaching that switchgear need earthing and *Oehring IV*'s teaching that a second cable (a system ground cable) provides

grounding, as well as electrical Codes and Standards such as the National Electrical Code (NEC) requiring grounding. *See supra* §VIII.A.5; EX1003, ¶¶237-38.

Accordingly, a POSITA would have found it obvious, based on the teachings of *Premset Brochure* and *Oehring IV* to use a second cable (grounding cable) to couple the switchgear to the common support structure (pump trailer) as claimed in Claim 4.

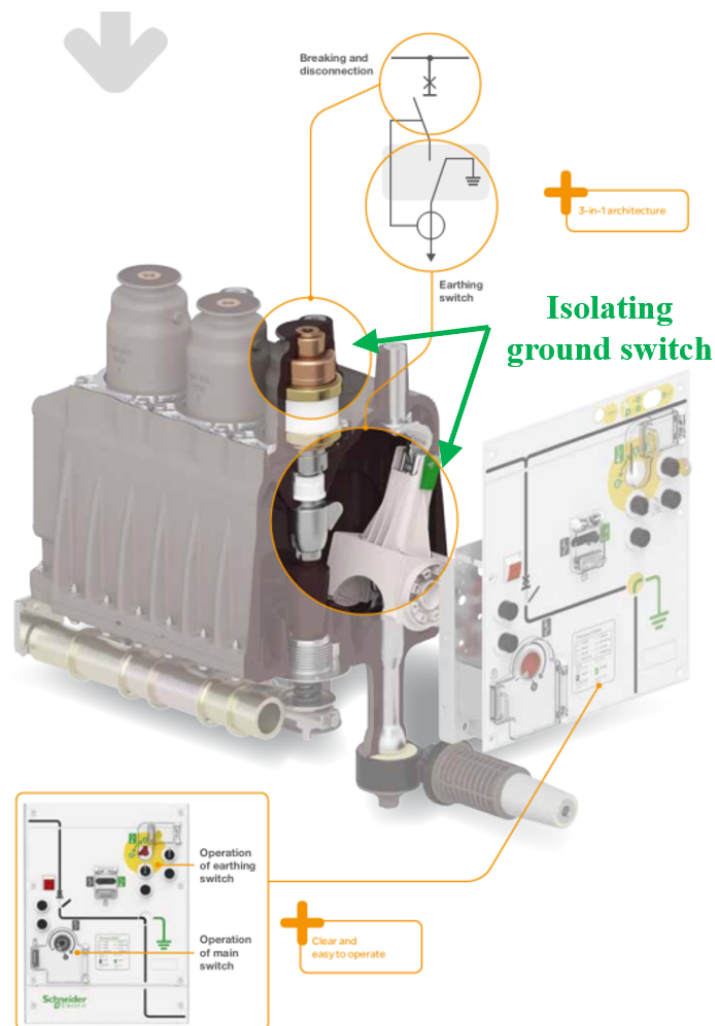
6. Claim 6

Premset Brochure also discloses integrated core units operating in connected, open, and grounded positions. EX1003, §XII.D. *Premset Brochure* describes and illustrates an integrated “core unit.” EX1008, p.6, 8-9. The core unit is insulated, contains a circuit breaker and “earthing switch,” and provides for built-in interlocking. *Id.* These *Premset Brochure* features match the integrated core unit features in the ’878 specification. *See* EX1001, 14:52-58 (describing “interlocks”), 15:38-44 (describing “core unit” as “an insulated functional unit”), 15:50-53, Fig. 15. The core unit also provides “breaking, disconnection, and earthing functions,” and specifically “three possible operating positions: closed, open and disconnected, and earthed.” EX1008, p.9. A POSITA would have understood these three positions described in *Premset Brochure* correspond to the claimed “connected,” “open,” and “grounded” positions. EX1003, §XII.D. Accordingly, the combination of *Morris*, *Oehring IV*, and *Premset Brochure* teaches the limitations of claim 6. *Id.*

7. Claim 7

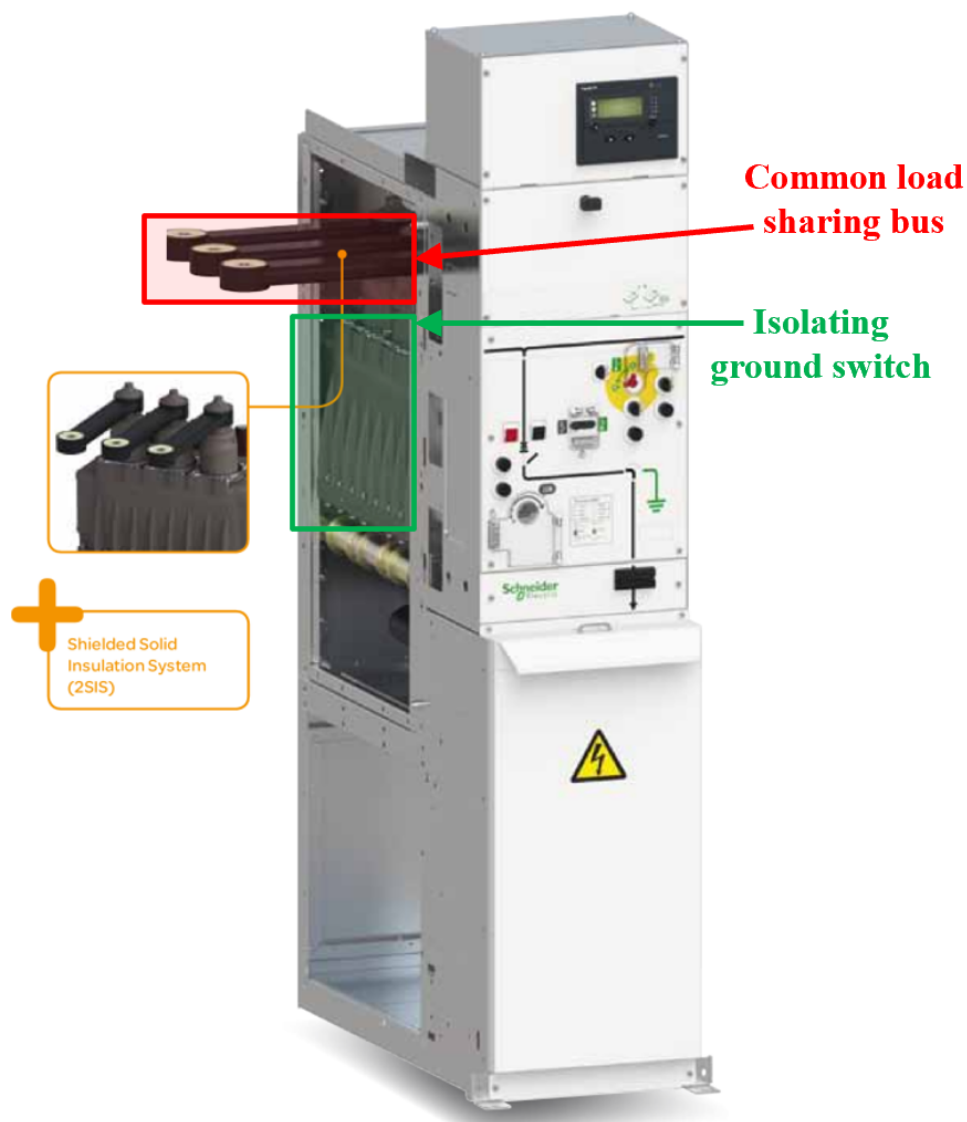
a) 7[a]

Premset Brochure discloses an isolating ground switch enclosed within a tank arranged proximate the common load sharing bus. EX1003, §XII.E. *Premset Brochure* illustrates and describes a breaker and an “earthing switch” (annotated in green below) that a POSITA would have understood as an “isolating ground switch”:



EX1008, p.8; EX1003, §XII.E.a. The switch is in a sealed tank. EX1008, p.5 (illustrating sealed tank and explaining “no part of the main circuit [is] exposed to

free air”), 10 (describing Premset as “vacuum switchgear”); EX1003, §XII.E.a. The switch is also located next to the common load sharing bus (as shown annotated in red and green below):



EX1008, p.5.

b) 7[b]

See supra §VIII.B.7(a). *Premset Brochure* also discloses cable connections for coupling to the switchgear. EX1003, §XII.E.b. *Premset Brochure* describes

“cable connections” along with various “cable entry arrangements (bottom-front, bottom-rear, top-rear, etc.)” that a POSITA would have understood were for coupling to the switchgear of sources and loads. EX1008, p.7. *Premset Brochure* also explains a “cable test feature” for access to “cable test injection points.” EX1008, p.9.

Accordingly, the combination of *Morris*, *Oehring IV*, and *Premset Brochure* teaches the limitations of claim 7.

8. Claim 8

See supra §VIII.A.8.

C. Ground 2A: *Morris* in view of *Oehring IV*, *Premset Catalog* and *NEC*

See supra §VIII.A.1-2. The references of Ground 1A, further combined with *NEC*, also render obvious claim 4.

1. Motivation to Combine

See supra §VIII.A.1. A POSITA would also have been motivated to combine the references of Ground 1A with *NEC* to bond or ground the switchgear, and would have a reasonable expectation of success. EX1003, §XIII.A.

NEC governs protections for industrial electrical installations in the US, including oil and gas operations. EX1003, §X.E. To safeguard personnel from electrical hazards, a POSITA would have applied *NEC*’s known techniques for grounding and bonding electrical equipment to switchgear installed on a pump

transport in a predictable manner. EX1003, §XIII.A POSITA would have understood that coupling switchgear to the pump transport with a second cable would effectively bond or ground the switchgear as required in *NEC*. *Id.*; EX1003, ¶¶251-60.

Moreover, teachings in *Morris* and *NEC* would have led a POSITA to bond or ground switchgear to the pump transport. *Morris* teaches mounting electrical equipment to a “lay-down trailer” such that “beams of the lay-down trailer may be resting on the ground,” facilitating trailer grounding. EX1004, [0017]; EX1005, [0016]. A POSITA would also have known from *NEC* to use a cable as a common bonding or grounding conductor to the trailer. EX1009, Art. 250.118, 70-110 (listing conductors that are “solid or stranded,” “in the form of a wire,” “flexible metal conduit,” “type AC cable,” and “type MC cable”); EX1003, ¶¶256-60.

All these reasons would have motivated a POSITA to comply with *NEC* by bonding or grounding switchgear to the pump transport with a second cable.

2. Claim 4

As discussed in Ground 1A, *Morris* discloses an electric-powered pump, VFD, and transformer on a pump transport. *Supra* §VIII.A.2(h). The references of Ground 1A combined with *NEC* further teaches bonding or grounding switchgear to the pump transport via a cable, which is a “second single cable.” *Supra* §§VIII.A.5, VIII.C.1; EX1003, §XIII.B (explaining *NEC* teaching of bonding and grounding).

D. Ground 2B: Morris in view of Oehring IV, Premset Brochure and NEC

As discussed in Ground 1B, the combination of *Morris*, *Oehring IV*, and *Premset Brochure* renders claim 1 obvious under 35 U.S.C. §103. The references of Ground 1B, further combined with *NEC*, also render obvious claim 4. EX1003, §XIV.

1. Motivation to Combine

A POSITA would have been motivated to combine *Morris*, *Oehring IV*, and *Premset Brochure* with *NEC* to ground the switchgear for the same reasons as described in Grounds 1B and 2A. EX1003, §XIV.A.

2. Claim 4

As discussed in Ground 1B, *Morris* discloses an electric-powered pump, VFD, and transformer mounted on a pump transport. *Supra* §VIII.B.2(h). The references of Ground 1B combined with *NEC* further teaches grounding switchgear (located on the pump transport) to the pump transport via a grounding cable, a “second single cable.” *Supra* §§VIII.B.5, VIII.D.1; EX1003, §XIV.B (explaining *NEC* teaching of bonding and grounding).

E. Ground 3A: Morris in view of Oehring IV, Premset Catalog, and Orban

See supra §VIII.A.1-2. The references of Ground 1A, further combined with *Orban*, also render obvious claim 5. EX1003, §XV.

1. Motivation to Combine

See supra §VIII.A.1. A POSITA would also have been motivated to combine the references of Ground 1A with *Orban*, and would have a reasonable expectation of success. EX1003, §XV.A.

As described in Ground 1A, *Morris*'s pump transport contains one or more VFDs for controlling operation of the electric pump. *See supra* §VIII.A.2(c),(h). A POSITA would have applied known, conventional techniques for liquid cooling a VFD to cool VFD(s) on *Morris*'s pump transport in a predictable manner. EX1003, §§IX.M, XV.A. *Orban*, for example, describes a “conventional water-cooled VFD.” EX1010, [0070].

Orban also expressly teaches using its VFD-cooling system in pumping operations like those in *Morris*. *Orban* states that its IPEU (which contains a VFD) can be used in a “fracturing pumping system.” EX1010, [0042]. Indeed, the primary VFD application *Orban* envisions is “driving an electric motor of a drilling rig machine.” *Id.*, Abstract, Claim 1. A POSITA would have thus looked to *Orban* to provide liquid cooling of VFDs on *Morris*'s pump transport.

2. Claim 5: “The system of claim 1, further comprising: a cooling system providing a cooling fluid to the VFD via one or more headers.”

See supra §§VIII.A.2(c),(h), VIII.E.1. *Orban* further teaches a “conventional water-cooled VFD” and a liquid cooling system that a POSITA would have used on

Morris's pumping trailer. See EX1010, [0070], Fig. 13. *Orban* teaches that a pump “pumps cooling fluid (e.g., water) ... through channels ... via various tubing and other conduits” to cool the VFD. *Id.* And *Orban* Fig. 13 illustrates cooling fluid delivered to the VFD via one or more headers supplying the “channels” and “conduits” that deliver cooling fluid to the VFD:

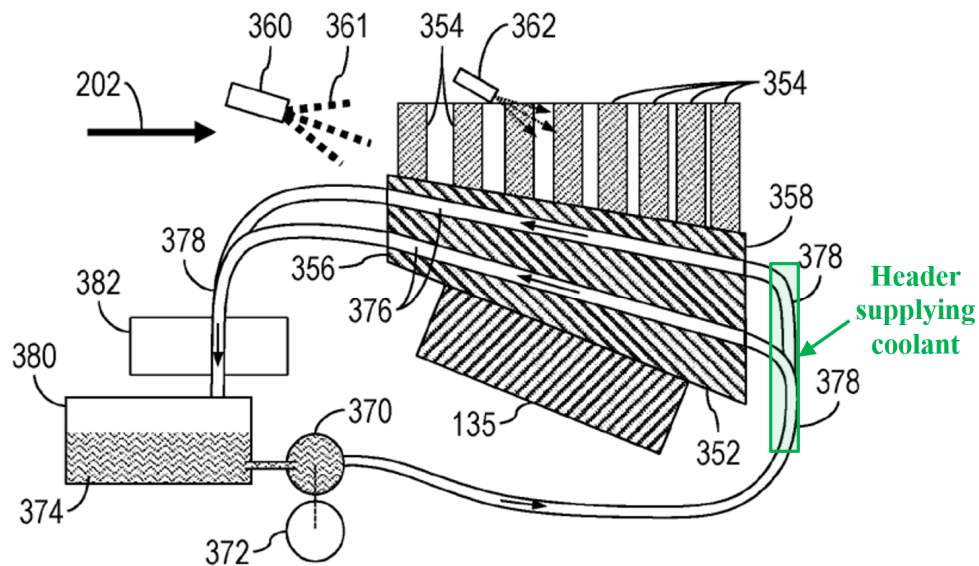


FIG. 13

Id.; EX1038 (defining “header” as “a pipe or tube with one inlet and several outlets, or several inlets and one outlet”). Moreover, a POSITA would have found it obvious to supply coolant to the VFD via a header, a solution commonly implemented in liquid-cooled VFDs commercially available prior to the ’878 Patent’s priority date. See, e.g., EX1037, p.271 (V6-T2-271) (describing commercially available “liquid cooled drives” cooled via a header); EX1003, §§IX.M (explaining from EX1039-EX1043 liquid cooling of power electronics), XV.B.

F. Ground 3B: Morris in view of Oehring IV, Premset Brochure, and Orban

As discussed in Ground 1B, the combination of *Morris*, *Oehring IV*, and *Premset Brochure* renders claim 1 obvious under 35 U.S.C. §103. The references of Ground 1B, further combined with *Orban*, also render obvious claim 5. EX1003, §XVI.

1. Motivation to Combine

A POSITA would have been motivated to combine *Morris*, *Oehring IV*, and *Premset Brochure* with *Orban* for the same reasons described in Grounds 1B and 3A. *See also* EX1003, §XVI.A.

2. Claim 5

See supra §VIII.E.2; EX1003, §XVI.B.

G. Ground 4A: Morris in view of Oehring IV, Premset Catalog and Pratt

See supra §VIII.A.1-2. The references of Ground 1A, further combined with *Pratt*, also render obvious claim 9. EX1003, §XVII.

1. Motivation to Combine

See supra §VIII.A.1. A POSITA would also have been motivated to combine the references of Ground 1A with *Pratt*, and would have a reasonable expectation of success. EX1003, §XVII.A.

Express teachings in *Morris* and *Pratt* would have led a POSITA to apply *Pratt*'s cable tray walkway in *Morris*'s pump transport. *Morris* describes numerous

cable connections at various voltages—for AC power, DC power, and communications—at an electric-powered drilling site. EX1004, [0019], [0031]; EX1005, [0018], [0024]. So much so that *Morris* “reduce[s] the number of electrical cables” by supplying power at medium voltage. EX1004, [0027]-[0029]; EX1005, [0022]-[0023]. A POSITA seeking to manage cables in fracturing operations, a problem in *Morris*, would look naturally to cable management solutions—such as *Pratt*’s cable tray walkway—to manage numerous cables safely and efficiently. EX1003, ¶¶281-82.

A POSITA would also have known to minimize cable wear, tear, and corrosion. EX1003, ¶¶283-84. *Pratt*’s cable tray walkway minimizes cable wear and tear by accessing cables without removing or walking on them and “adequately vent[s]” cables with perforated walkway gratings. EX1011, 1:45-48, 2:14-18, 2:44-48, 2:59-63. A POSITA would have implemented *Pratt*’s cable trays on *Morris*’s pump transport for these benefits.

Morris further teaches that mobile and autonomous pump transports enable a scalable and flexible fracturing operation (EX1004, [0016]-[0017], [0034]; EX1005, [0015]-[0016], [0026]), motivating mobile, repeatable cable management: operators cannot continually adjust cables manually. EX1003, ¶283; *see also* EX1012, Title, [0003], [0006] (providing “cable management” to “minimize space and time requirements for rig up and rig down” because “electrical connection ... is time

consuming”). A POSITA would have looked to *Pratt*’s cable trays to facilitate rapid pump transport setup and teardown, as motivated by *Morris*. See EX1011, 2:11-14, 3:6-11.

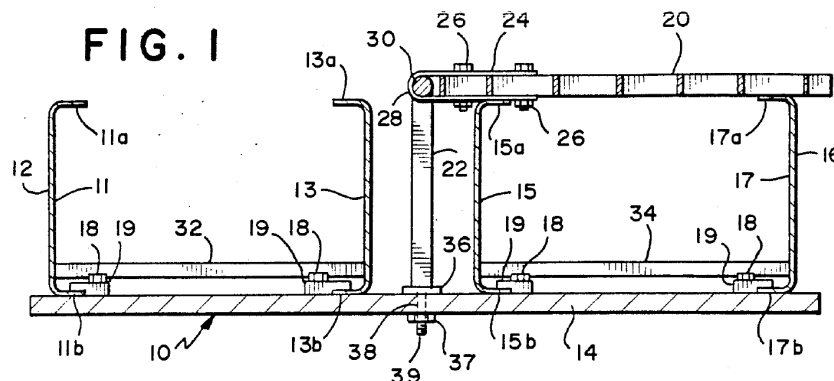
And finally, *Morris* identifies “reduc[ing] physical footprint” as a logistical challenge in fracturing operations. EX1004, [0003], [0034]; EX1005, [0002], [0026]. *Pratt*’s cable trays permit cable management with a minimal footprint, beneath walkways. EX1011, 1:49-54, 2:59-63. A POSITA minimizing footprint would have naturally applied *Pratt*’s cable trays to minimize trailer area devoted to cables, particularly in light of disclosures from the ’878 Patent’s inventors motivating and using “cable trays” for cable management. See EX1012, [0006] (explaining that “numerous cables ... occupy valuable space”); EX1014, [0041] (describing “specially designed cable trays for running cables on the [pump] trailer”); EX1003, ¶¶283-85.

All these reasons would have motivated a POSITA to use *Pratt*’s cable trays on *Morris*’s pump transports.

2. Claim 9: “The system of claim 1, further comprising: cable trays positioned below a walking surface of the common support structure, the cable trays being covered by a hinged cover that pivots to provide access to one or more cable trays.”

See *supra* §§VIII.A.2(h), VIII.G.1. Combining *Pratt*’s cable tray walkway with *Morris*’s pump transport renders obvious the elements of Claim 9. EX1003, §XVII.B.

Pratt teaches cable trays positioned below a walking surface. Figure 1 illustrates cable trays 12 and 16 and a “walkway member” 20 over the cable trays:



EX1011, 4:8-37, Fig. 1; *see also* Figs. 3-4.

Pratt's cable trays are also covered by a hinged cover that pivots to provide access to the cable trays. The "walkway member" can be "hingedly connected" to a support or to cable trays themselves. *Id.*, 4:23-37, Fig. 1. An operator can lift the walkway member, which pivots about the hinge, to access cable trays. *Id.*, 2:32-39, 2:59-63, 5:15-22, Figs. 1, 3-4. A POSITA would have combined *Pratt*'s cable trays and walkway members into *Morris*'s pump transports to achieve several benefits—easy cable installation, protection, access, and inspection—with minimal and predictable adjustments. EX1003, §XVII.B.

H. Ground 4B: Morris in view of Oehring IV, Premset Brochure and Pratt.

As discussed in Ground 1B, the combination of *Morris*, *Oehring IV*, and *Premset Brochure* renders claim 1 obvious under 35 U.S.C. §103. The references of

Ground 1B, further combined with *Pratt*, also render obvious claim 9. EX1003, §XVIII.

1. Motivation to Combine

A POSITA would have been motivated to combine *Morris*, *Oehring IV*, and *Premset Brochure* with *Pratt* for the same reasons described in Grounds 1B and 4A. *See also* EX1003, §XVIII.A.

2. Claim 9

See supra §VIII.G.2; EX1003, §XVIII.B.

I. Ground 5A: Morris in view of Oehring IV, Premset Catalog and Oehring II.

See supra §VIII.A.1-2. The references of Ground 1A, further combined with *Oehring II*, also render obvious claim 10. EX1003, §XIX.

1. Motivation to Combine

See supra §VIII.A.1. A POSITA would also have been motivated to combine the references of Ground 1A with *Oehring II*, and would have a reasonable expectation of success. EX1003, §XIX.A.

A POSITA would have applied known techniques of *Oehring II*—an enclosed VFD with a control interface—to the known device in *Morris*—a pump transport—with predictable results. As *Morris* and *Oehring II* both describe electric fracturing pump transports, a POSITA would naturally have considered whether elements from *Oehring II* could be integrated onto *Morris*'s pump transport. *See* EX1004, [0031];

EX1005, [0026]; EX1012, [0003]; EX1003, ¶301. And a POSITA would have understood that the modifications of enclosing the VFD and adding a control interface require no more than basic engineering skill well within the knowledge of a POSITA. EX1003, ¶302.

Moreover, *Oehring II* expressly teaches that the VFD is enclosed. EX1012, [0031]. A POSITA would also have understood the benefits of enclosure: to provide air conditioning as taught in *Oehring II* and to prevent exposure, both of operators and enclosed equipment. *Id.*; EX1003, ¶302.

Express teachings and suggestions in *Morris* and *Oehring II* would also have motivated a POSITA to provide a VFD control interface. *Morris* teaches that transports should be “individually autonomous.” EX1004, [0031], [0034]; EX1005, [0024], [0026]. A POSITA would know that local control instrumentation on the pump transport supports autonomy by enabling operators to control operations locally at the pump transport. EX1003, ¶302. Further informed by *Oehring II*’s teaching of “controls provided within [the] enclosure” and *Morris*’s teaching that each trailer contains “drives *and other control instrumentation*” (emphasis added), a POSITA would have understood that an enclosed, operator-controlled interface allows local control and supports *Morris*’s goal of individually autonomous transports. *See* EX1003, ¶¶170, 302; EX1004, [0031], EX1005, [0024]; EX1012, [0031].

2. Claim 10: “The system of claim 1, further comprising: a human machine interface, positioned proximate the VFD; and a platform cover at least partially covering the humane machine interface and VFD.”

See supra §VIII.I.1. As discussed in Ground 1, *Morris* teaches a VFD mounted on a common support structure (a pump transport). *Supra* §§VIII.A.2(c),(h). Further, combining *Oehring II*’s human-machine interface and VFD enclosure with *Morris*’s pump transport renders obvious remaining elements of Claim 10. EX1003, §XIX.B.

Oehring II—which was filed by PO and shares a common inventor with the ’878 Patent—teaches a human-machine interface in “various controls provided within enclosure 160.” *See supra* §IV.H; EX1012, [0031]; EX1003, §XIX.B.a. “[O]perations personnel ... access and monitor” the controls. *Id.* And *Oehring II*’s controls are positioned proximate the VFD because they are “within enclosure 160,” “inside of which is ... a variable frequency drive.” EX1012, [0031]. *Oehring II* also teaches a platform cover covering the human-machine interface and VFD because *Oehring II*’s “enclosure” (the claimed “platform cover”) contains both the VFD and “controls within [the] enclosure.” *Id.*; EX1003, §XIX.B.b.

J. Ground 5B: Morris in view of Oehring IV, Premset Brochure and Oehring II.

As discussed in Ground 1B, the combination of *Morris*, *Oehring IV*, and *Premset Brochure* renders claim 1 obvious under 35 U.S.C. §103. The references of

Ground 1B, further combined with *Oehring II*, also render obvious claim 10. EX1003, §XX.

1. Motivation to Combine

A POSITA would have been motivated to combine *Morris*, *Oehring IV*, and *Premset Brochure* with *Oehring II* for the same reasons described in Grounds 1B and 5A. See also EX1003, §XX.A.

2. Claim 10

See supra §VIII.I.2; EX1003, §XX.B.

K. Ground 6A: Claims 1-3, 6-8 Morris in view of Oehring IV, Payne, and Premset Catalog

In this Ground, Petitioners rely on the combination of *Payne* and the references of Ground 1A for obviousness of claim elements 1[g], and this Ground relies on Ground 1A for the remaining claim elements of claims 1-4 and 6-8. *See supra* §VIII.A; EX1003, §XXI.

1. Motivation to Combine

As discussed in Ground 1A, a POSITA would have been motivated to combine *Morris*, *Oehring IV*, and *Premset Catalog*. A POSITA would also have been motivated to combine the references of Ground 1A with the teachings of *Payne* for reasons similar to those discussed in Ground 1A, rendering obvious claim element 1[g]. EX1003, §XXI.A.

Morris, Payne, and Oehring IV all describe electric power distribution for an electric-powered fracturing system. EX1004, [0020], Fig. 1; EX1005, [0019], Fig. 1; EX1006, Abstract; EX1013, [0003], [0009], Fig. 1. *Payne* also identifies the same operational challenges as *Morris* and *Oehring IV* and proposes similar solutions. Similar to *Morris* and *Oehring IV* (see Section VIII.A.1 above), *Payne* identifies goals in fracturing operations that include reducing “footprint of the site,” minimizing “environmental impact,” and “efficient distribution of power.” EX1013, [0009]. *Payne* also proposes a similar solution to address these challenges: power distribution to electric motors and associated control. EX1013, [0003].

Payne, Morris and *Oehring IV* are thus from the same field of endeavor (electric power distribution for multiple-pump fracturing operations), identify similar problems in the field (operational footprint, efficiency, and operational flexibility), and address the problems with similar solutions (electric power distribution and control using switchgear). A POSITA would have considered whether known solutions from one reference could be applied in the other. EX1003, ¶317. And as discussed above, all three references identify identical design incentives (reducing footprint, minimizing environmental impact, improving efficiency, and enabling flexibility) that would have motivated a POSITA to evaluate whether teachings in one reference could improve the others to achieve those incentives. A POSITA would have been motivated to mount equipment (pumps,

motors, VFDs and switchgear) on the pump transport, as taught in *Payne*, to achieve *Morris*'s goal of achieving an autonomous, scalable, and flexible fracturing fleet. EX1003, ¶317.

Payne further teaches "automatic control operations" for controlling power distribution throughout the power system. *See, e.g.*, EX1013, [0009]. *Morris* describes "control instrumentation" on pump transports and states that switchgear may "act as a hub for receiving control," but does not explain how control would be configured or automated. EX1004, [0031], [0037]; EX1005, [0024], [0028]. Accordingly, a POSITA would have looked to *Payne* to achieve the benefits of automated control in the combined system of *Morris* and *Oehring IV*.

Similarly, *Morris* teaches medium-voltage power distribution that a POSITA would have been motivated to implement alongside the teachings of *Payne*. *Payne* is silent regarding voltage levels used for power distribution (other than explaining that its transformers step down voltage). EX1013, [0043]. *Morris*, however, teaches power distribution to pump transports using medium-voltage and describes several associated benefits, such as less cabling, easier cable management, and improved safety. EX1004, [0027]-[0029]; EX1005, [0022]-[0023]. A POSITA would have been motivated apply the teachings of *Payne* to *Morris*'s fracturing system to obtain the benefits of *Morris*'s medium-voltage power distribution.

Payne (like *Oehring IV*) also teaches modular system components that may be reconfigured on mobile platforms. EX1013, [0045]; EX1006, [0026]. A POSITA comparing *Payne*'s teaching of modularity (and *Oehring IV*'s) to *Morris*'s direction to implement "autonomous trailers" that are "scalable and flexible" would naturally have looked to reconfigure system components to achieve *Morris*'s goals. EX1003, ¶318.

A POSITA would have been motivated by all these reasons to combine the teachings of *Payne* with *Morris* and *Oehring IV*. EX1003, §XXI.A.

2. Claim 1

a) 1[g]

As explained in Ground 1, *Morris* teaches an electric-powered pump, VFD, and transformer mounted on a common support structure, and it would have been further obvious to a POSITA that switchgear was mounted on the common support structure in light of a combination with *Payne*. EX1003, §XXI.B.b.

First, as described in Ground 1, *Morris* expressly discloses an electric-powered pump, a VFD, and a transformer mounted on a common support structure, a pump transport, and *Oehring IV* similarly teaches a VFD for motor control that a POSITA would have understood was mounted on the pump transport. *See supra* §§VIII.A.2(c),(h). Accordingly, a POSITA reading *Morris* and *Oehring IV* would have known to mount the transformer, VFD, electric motor, and electric-powered

pump on the same pump transport, a common support structure. For example, *Morris*

Figure 1 illustrates transformers (annotated in green) mounted on pump transports:

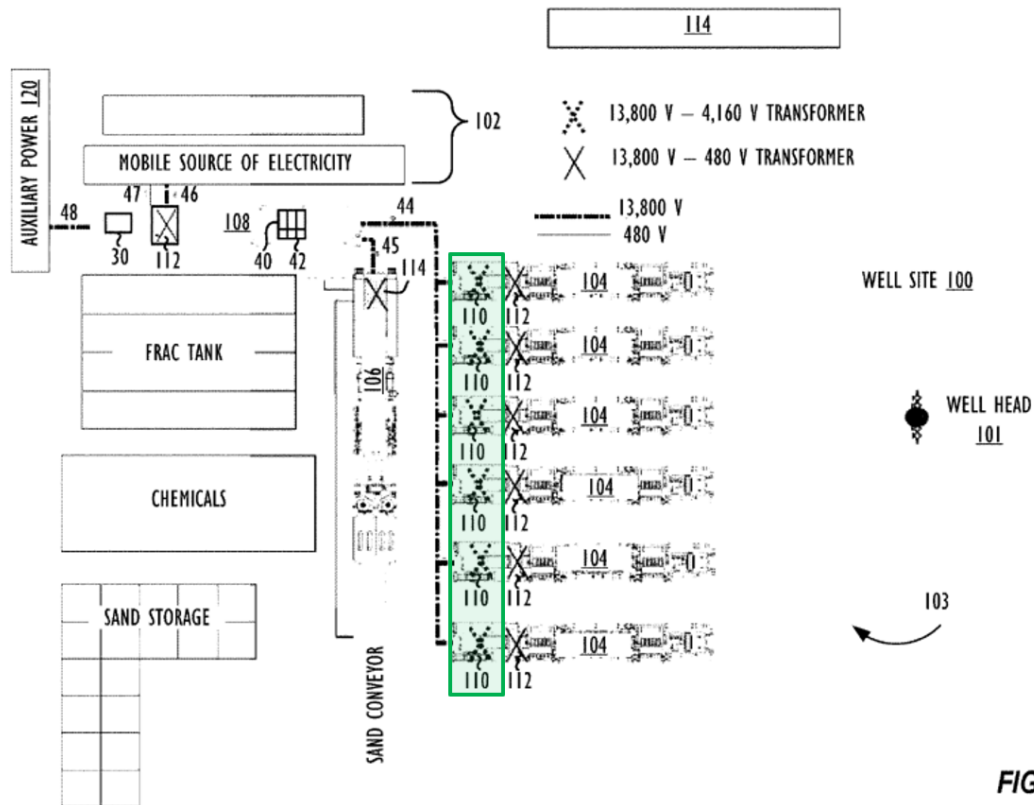
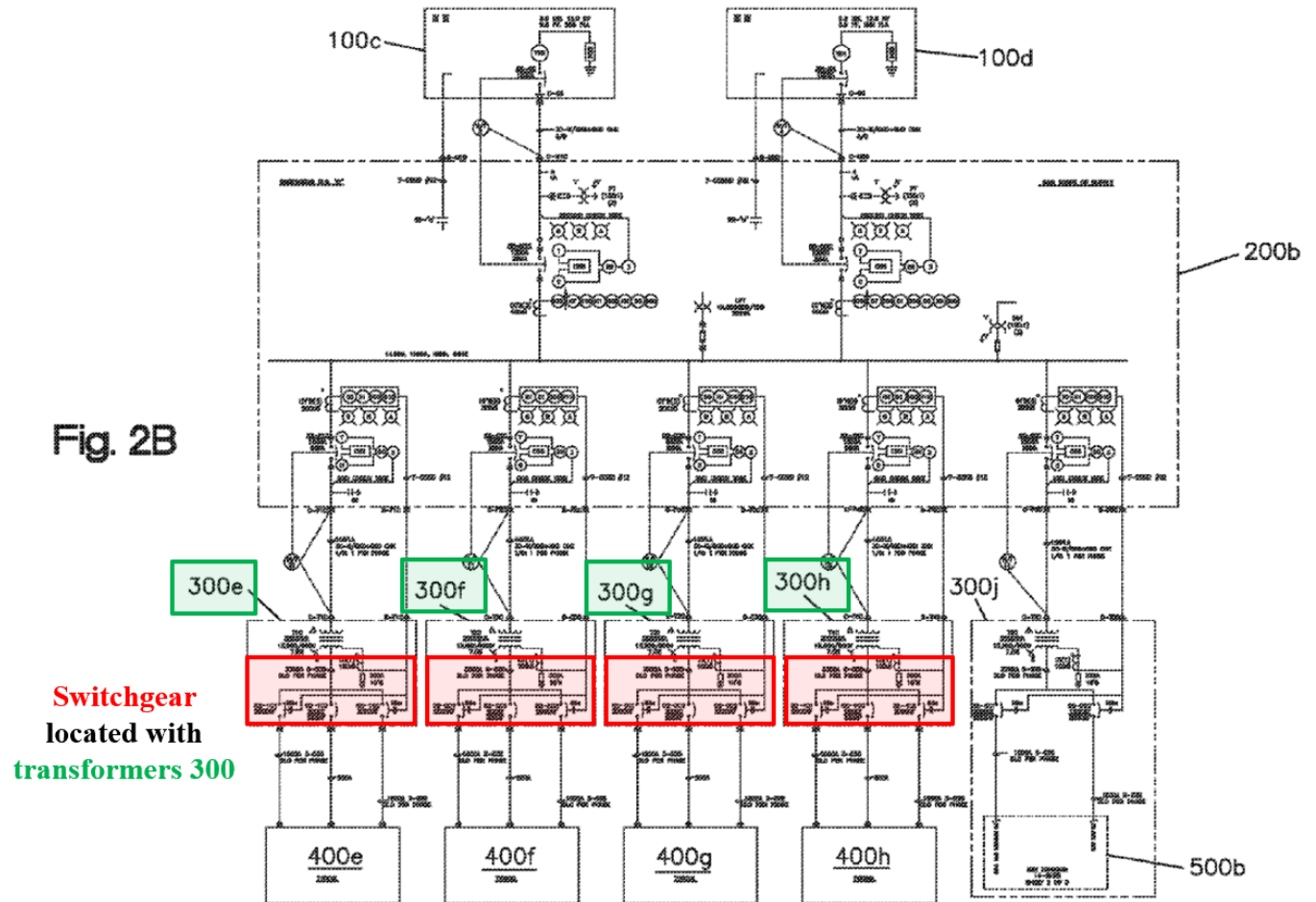


FIG.1

EX1004, Fig. 1; EX1005, Fig. 1.

Second, the combination of *Payne* and *Morris* teaches mounting switchgear with a transformer on a pump transport. EX1003, ¶¶324-28. *Payne* teaches “switchgear trailers” containing “switchgear modules” 200a-200b, similar to *Morris*’s “switchgear transport,” but *Payne* also illustrates switchgear (annotated in red) co-located with each transformer 300a-300h (annotated in green), as shown in Figure 2:



EX1013, Fig. 2. Accordingly, a POSITA informed by *Morris* to locate the transformer on the pump transport (e.g., EX1004, [0022], [0031], Fig. 1; EX1005, [0019], [0024], Fig. 1) would have known from *Payne* to also locate medium-voltage switchgear with the transformer on the pump transport (EX1013, Fig. 2; *see also* EX1003, §IX.F-I (explaining use of transformers and switchgear in power distribution)). And *Morris* further teaches medium-voltage switchgear, operating at 2.1 kV or 4.2 kV, located with the transformer. EX1004, [0018] (explaining that medium-voltage covers 1 kV to 35 kV), [0031]; EX1005, [0017], [0024]; EX1003,

¶¶179, 198. A POSITA would have accordingly found it obvious to implement medium-voltage switchgear, with features as taught in *Premset Catalog*, in the combined system of *Morris*, *Oehring IV*, and *Payne*, for the same reasons as described in Ground 1. EX1003, ¶330, §XI; *see supra* §§VIII.A.1, VIII.A.2(e)-(g),(i), VIII.B.

Payne also discloses additional switchgear on the pump transport that distributes power to wellsite equipment on the trailer. EX1003, ¶¶324-27 (explaining switchgear in “power panel,” “control switches 413,” and “lighting panel 413” located on pump transport). Accordingly, it would have been obvious to a POSITA to mount switchgear on the common support structure along with an electric-powered pump, a VFD, and a transformer. The combination of *Morris*, *Oehring IV*, *Payne*, and *Premset Catalog* teaches each element of claims 1-4 and 6-8, and thus render those claims obvious under 35 U.S.C. §103. EX1003, §XXI.

L. Ground 6B: Claims 1-3, 6-8 Morris in view of Oehring IV, Payne, and Premset Brochure

In this Ground, Petitioners rely on the combination of *Payne* and the references of Ground 1B for obviousness of claim elements 1[g], and this Ground relies on Ground 1B for the remaining claim elements of claims 1-4 and 6-8. *See supra* §VIII.B; EX1003, §XXII.

1. Motivation to Combine

A POSITA would have been motivated to combine *Morris*, *Oehring IV*, and *Premset Brochure* with the teachings of *Payne* for the same reasons as in Grounds 1B and 6A, rendering obvious claim element 1[g]. *See also* EX1003, §XXII.A.

2. Claim 1

a) 1[g]

See supra §VIII.K.2(a); EX1003, §XXII.B.b.

M. Ground 7A: *Morris in view of Oehring IV, Payne, Premset Catalog, and NEC*

Morris, *Oehring IV*, *Payne*, and *Premset Catalog*, combined with *NEC*, render obvious claim 4 for the same reasons in Ground 1A, 2A, and 6A. *See also* EX1003, §XXIII.

N. Ground 7B: *Morris in view of Oehring IV, Payne, Premset Brochure, and NEC*

Morris, *Oehring IV*, *Payne*, and *Premset Brochure*, combined with *NEC*, render obvious claim 4 for the same reasons in Ground 1B, 2B, and 6B. *See also* EX1003, §XXIV.

O. Ground 8A: *Morris in view of Oehring IV, Payne, Premset Catalog, and Orban*

Morris, *Oehring IV*, *Payne*, and *Premset Catalog*, combined with *Orban*, render obvious claim 5 for the same reasons in Ground 1A, 3A, and 6A. *See also* EX1003, §XXV.

P. Ground 8B: Morris in view of Oehring IV, Payne, Premset Brochure, and Orban

Morris, Oehring IV, Payne, and Premset Brochure, combined with *Orban*, render obvious claim 5 for the same reasons in Ground 1B, 3B, and 6B. *See also* EX1003, §XXVI.

Q. Ground 9A: Morris in view of Oehring IV, Payne, Premset Catalog, and Pratt.

Morris, Oehring IV, Payne, and Premset Catalog, combined with *Pratt*, render obvious claim 9 for the same reasons in Ground 1A, 4A, and 6A. *See also* EX1003, §XXVII.

R. Ground 9B: Morris in view of Oehring IV, Payne, Premset Brochure, and Pratt.

Morris, Oehring IV, Payne, and Premset Brochure, combined with *Pratt*, render obvious claim 9 for the same reasons in Ground 1B, 4B, and 6B. *See also* EX1003, §XXVIII.

S. Ground 10A: Morris in view of Oehring IV, Payne, Premset Catalog, and Oehring II.

Morris, Oehring IV, Payne, and Premset Catalog, combined with *Oehring II*, render obvious claim 10 for the same reasons in Ground 1A, 5A, and 6A. *See also* EX1003, §XXIX.

T. Ground 10B: Morris in view of Oehring IV, Payne, Premset Brochure, and Oehring II.

Morris, Oehring IV, Payne, and Premset Brochure, combined with *Oehring II*, render obvious claim 10 for the same reasons in Grounds 1B, 5B, and 6B. *See also* EX1003, §XXX.

IX. CONCLUSION

Petitioners respectfully request *inter partes* review of the '878 Patent be instituted and that the challenged claims be cancelled as unpatentable under 35 U.S.C. § 318(b).

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies on this 20th day of November 2024, that true and correct copies of the foregoing PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 11,208,878, Exhibits 1001-1043, and Petitioner's power of attorney were served in their entirety to Patent Owner via FedEx Express® or Express Mail:

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**CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME
LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE
REQUIREMENTS**

1. This Petition complies with the type-volume limitation of 14,000 words, comprising 13,976 words, excluding the parts exempted by 37 C.F.R. § 42.24(a).
2. This Petition complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word in 14-point Times New Roman.

Respectfully submitted,

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