

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SIEMENS INDUSTRY, INC.,
Petitioner,

v.

EMA ELECTROMECHANICS, INC.,
Patent Owner.

IPR2021-01517
Patent 7,724,489 B2

Before CHRISTOPHER L. CRUMBLEY, KRISTINA M. KALAN, and
RUSSELL E. CASS, *Administrative Patent Judges*.

CASS, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Siemens Industry, Inc. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–20 (the “challenged claims”) of U.S. Patent No. 7,724,489 B2 (Ex. 1001, “the ’489 patent”). Paper 1 (“Pet.”). EMA Electromechanics, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

An *inter partes* review may not be instituted unless it is determined that “the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314 (2018); *see also* 37 C.F.R. § 42.4(a) (2020) (“The Board institutes the trial on behalf of the Director.”). The reasonable likelihood standard is “a higher standard than mere notice pleading,” but “lower than the ‘preponderance’ standard to prevail in a final written decision.” *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential).

For the reasons provided below and based on the record before us, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of at least one of the challenged claims. Patent Owner has not persuaded us that we should exercise our discretion to deny institution of trial. Accordingly, we institute an *inter partes* review on all grounds set forth in the Petition.

B. Real Parties in Interest

Petitioner states that the real parties in interest are Siemens Industry, Inc. and Siemens Corporation. Pet. 1. Patent Owner states that EMA Electromechanics, Inc. is the real party in interest. Paper 4.

C. Related Proceedings

The parties state that the '489 patent was asserted in *EMA Electromechanics, Inc. v. Siemens Corporation and Siemens Industry, Inc.*, Case No. 6:21-CV-206-ADA (W.D. Tex.), which was filed on March 4, 2021 (the "206 litigation"). Pet. 1–2; Paper 4, 1. The 206 litigation was dismissed without prejudice under Fed. R. Civ. P. 12(b)(1) on December 20, 2021. Prelim. Resp. 43 n.1. The '489 patent is also asserted in *EMA Electromechanics, Inc. v. Siemens Corporation*, Case No. 6:21-cv-01001-ADA (W.D. Tex.), which was filed on September 28, 2021 (the "1001 litigation"). Ex. 3002 (Docket Sheet from 1001 litigation).

D. The '489 Patent (Ex. 1001)

The '489 patent is directed to a vacuum circuit breaker with mechanically interlocked grounding switches for use with wind farm collection circuits. Ex. 1001, 1:28–33. The '489 patent explains that in the past, when collection circuit breakers for wind farms were opened, "the collection circuit voltage would be interrupted and a transient overvoltage situation could occur in the collection circuit," which "could cause damage to the circuitry associated with the wind energy generators and other circuitry throughout the system." *Id.* at 3:18–27. To overcome this problem, the '489 patent explains, grounding transformers have been used, but these transformers resulted in core losses of energy that over time could result in significant cost. *Id.* at 3:32–40. However, without the use of a

ground transformer, the circuit must be switched to ground extremely quickly. *Id.* at 3:62–63.

According to the '489 patent, the invention seeks to provide a vacuum circuit breaker with an integral high-speed grounding switch of a relatively low cost that that minimizes energy losses and eliminates the need for ground transformers. Ex. 1001, 4:6–17. A block diagram of the system of the invention is shown in Figure 2, reproduced below.

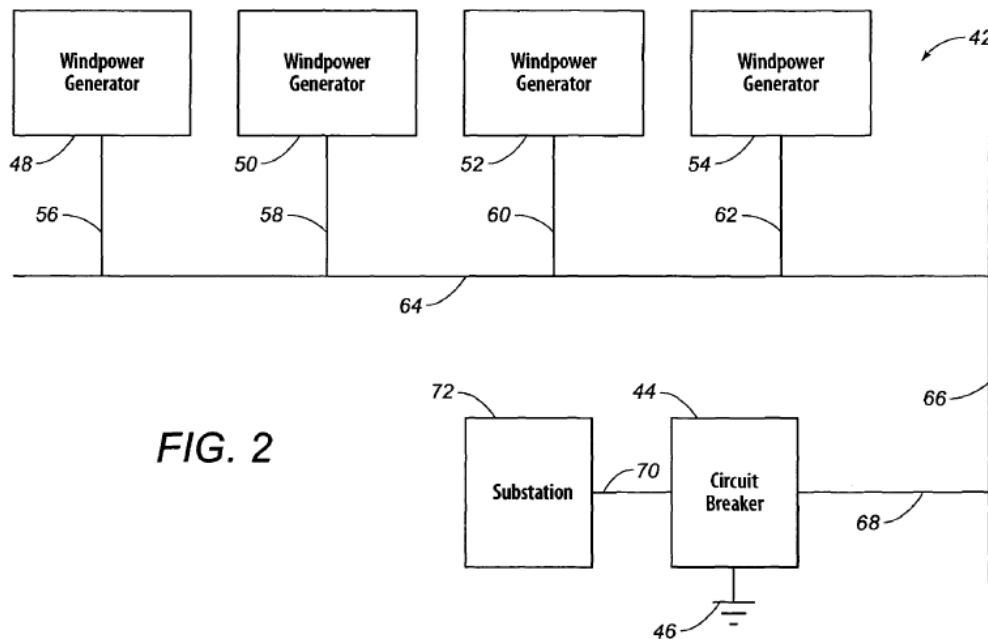


Figure 2 of the '489 patent shows a block diagram of the system of the invention. Ex. 1001, Fig. 2, 5:54–55.

As shown in in Figure 2, system 42 includes multiple windpower generators 48, 50, 52, and 54 connected to bus 64 by connectors 56, 58, 60, and 62. Ex. 1001, 6:10–12. Bus 64 is connected to main energy transfer bus 66, which transmits energy along line 68 to circuit breaker 44. *Id.* at 6:13–16. When circuit breaker 44 is closed, the energy will be delivered along line 70 to substation 72. *Id.* at 6:16–18. When circuit breaker 44 is open, it transfers energy to ground 46. *Id.* at 6:7–10.

Figure 3, reproduced below, shows circuit breaker 44 in more detail.

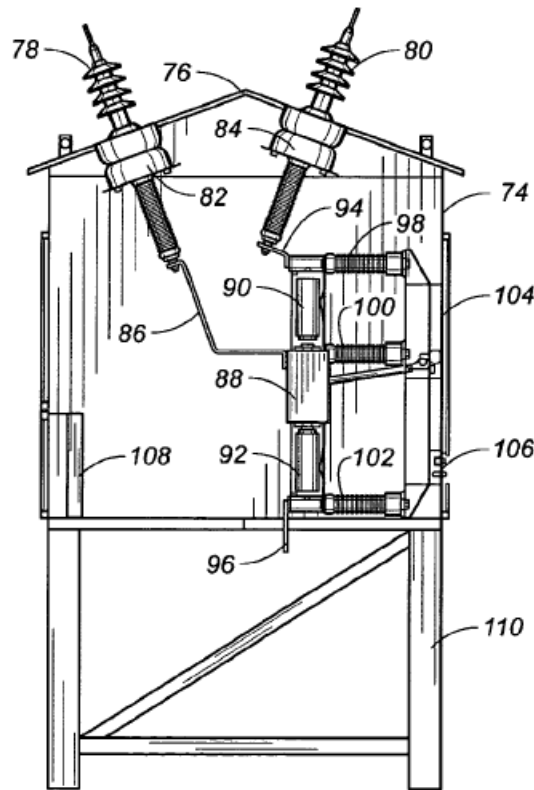


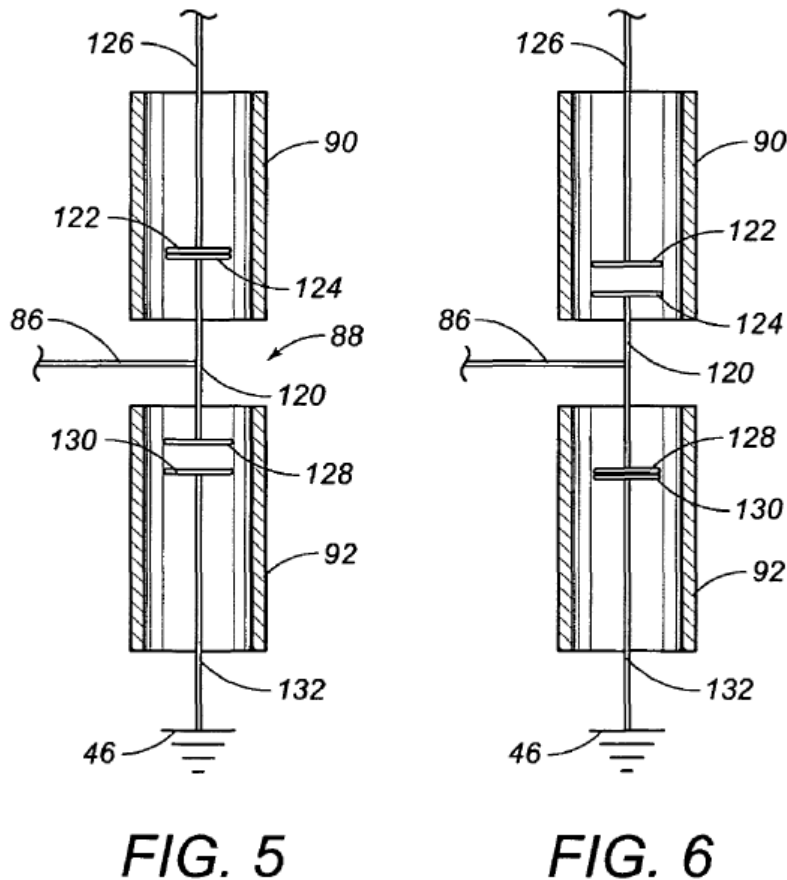
FIG. 3

Figure 3 of the '489 patent shows a side view of the circuit breaker of the invention. Ex. 1001, Fig. 3, 5:56–57.

As shown in Figure 3, circuit breaker 44 includes housing 74, and first bushing 78 and second bushing 80 extending outwardly of housing 74. Ex. 1001, 6:23–27. Bushing 78 extends to the wind farm side of the circuit, and bushing 80 extends to the substation side of the circuit. *Id.* at 6:27–29. Busbar 86 connects bushing 78 to mechanical interlock 88, which is interposed between first vacuum bottle 90 and second vacuum bottle 92. *Id.* at 6:48–51. Another busbar 92 is located at the top of first vacuum bottle 90 and electrically connects to second bushing 80. *Id.* at 6:51–53. Second

vacuum bottle 92 includes grounding bar 96 connected to ground. *Id.* at 6:53–55.

The operation of mechanical interlock 88 in Figure 3 is shown in Figures 5 and 6, reproduced below.



Figures 5 and 6 of the '489 patent show the operation of the mechanical interlock of the invention. Ex. 1001, Figs. 5–6, 5:61–67.

As shown in Figure 5, mechanical interlock 88 includes actuator arm 120 which is electrically connected to busbar 86 and extends between first vacuum bottle 90 and second vacuum bottle 92. Ex. 1001, 7:14–18. First vacuum bottle 90 is hermetically sealed in a vacuum condition, and includes first contactor 122 and second contactor 124 within its interior. *Id.* at 7:19–22. First contactor 122 is connected to second bushing 80 by

conductor 126. *Id.* at 7:22–24. Second vacuum bottle 92 includes first contactor 128, and second contactor 130 connected to ground 46 by conductor 132. *Id.* at 7:24–26. Actuator arm moves 120 between a first position, shown in Figure 5, and a second position, shown in Figure 6. *Id.* at 5:61–67.

When actuator arm 120 is in its first position, as shown in Figure 5, contactors 122 and 124 are brought together so as to be in electrical connection, causing power passing along busbar 86 to be transmitted through the interior of first vacuum bottle 90 through conductor 126 to bushing 80. Ex. 1001, 7:27–32. In this position, the circuit to ground through second vacuum bottle 92 is open. *Id.* at 7:32–33. This is the normal operating condition of circuit breaker 44 when power is passed directly through to substation 72. *Id.* at 7:33–36.

In the event of an interruption, failure, or problem, circuit breaker 44 will open the circuit to the substation so that the electrical energy passing through busbar 86 is passed to ground 46, as shown in Figure 6. Ex. 1001, 7:37–40. When this happens, actuator arm 120 separates first contactor 122 from second contactor 124, electrically isolating first contactor 122 from second contactor 124 and from power coming from busbar 86. *Id.* at 7:40–45. At the same time, actuator arm 120 brings together contactor 128 and contactor 130 in the second vacuum bottle, establishing an electrical connection between them, and switching the power from busbar 86 to ground. *Id.* at 7:46–49.

E. Illustrative Claims

Of challenged claims 1–20, claims 1, 7, and 17 are independent. For purposes of the issues raised at this stage of the proceeding, claim 1 is illustrative and is reproduced below.

1. [preamble] A circuit breaker apparatus comprising:
 - [a] a housing;
 - [b] a first bushing outwardly of said housing;
 - [c] a second bushing extending outwardly of said housing;
 - [d] a first vacuum bottle positioned in said housing and having a pair of contactors therein, one of said pair of contactors being electrically connected to said second bushing;
 - [e] a second vacuum bottle positioned in said housing and having a pair of contactors therein, one of said pair of contactors of said second vacuum bottle being electrically interconnected to ground; and
 - [f] mechanical linkage movable between a first position and a second position, said first position electrically connecting said first bushing to said second bushing, said second position electrically connecting said first bushing to ground.

Ex. 1001, 8:21–38 (bracketed paragraph identifiers added).

F. Applied References

Petitioner relies upon the following references:

Anger, PCT Int’l Pub. No. WO 2007/031040 A1, published Mar. 22, 2007 (Ex. 1004);

Certified English translation of Ex. 1004 (Ex. 1005, “Anger”);

Marchand, US 6,242,708 B1, issued Jun. 5, 2001 (Ex. 1006, “Marchand”);

Takahashi, JP3683089, published Aug. 17, 2005 (Ex. 1007);

Certified English translation of Ex. 1007 (Ex. 1008,
“Takahashi”);

Field, US 3,502,834, issued Mar. 24, 1970 (Ex. 1009,
“Field”); and

Hamm, US 5,059,753, issued Oct. 22, 1991 (Ex. 1024,
“Hamm”).

Pet. v–vi, 4. Petitioner also submits the Declaration of Mark Ehsani, Ph.D.
(Ex. 1003).

G. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–20 of the
'489 patent based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References/Basis
1–13, 15–20	103(a) ¹	Anger, Field
1–13, 15–20	103(a)	Takahashi, Marchand
14	103(a)	Anger, Field, Hamm
14	103(a)	Takahashi, Marchand, Hamm

II. DISCUSSION

A. Discretion Under 35 U.S.C. § 314(a) Based on Related District Court Proceeding

In the Preliminary Response, Patent Owner contends that we should exercise our discretion to deny the Petition in favor of the parallel litigation in the Western District of Texas. Prelim. Resp. 42–45.

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. § 103 that became effective after the filing of the application that led to the '489 patent. Therefore, we apply the pre-AIA version of 35 U.S.C. § 103.

The Board has held that the advanced state of a parallel district court action is a factor that may weigh in favor of denying a petition under § 314(a). *See NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 at 20 (PTAB Sept. 12, 2018) (precedential) (“*NHK*”); Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019), 58 & n.2, *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated> (“Trial Practice Guide”). We consider the following factors to assess “whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding”:

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
2. proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;
4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board’s exercise of discretion, including the merits.

Apple Inc. v. Fintiv Inc., IPR2020-00019, Paper 11 at 5–6 (PTAB March 20, 2020) (precedential) (“*Fintiv*”). In evaluating these factors, we “take[] a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.* at 6.

We consider each of these factors below.

1. Factor 1 — Stay of Related Litigation Proceeding

It appears that neither party has requested a stay of the related district court proceeding. Prelim. Resp. 43. Given the particular circumstances of this case, we lack sufficient information to determine, at this stage, the likelihood that the district court might grant a motion to stay, should one be requested. *See Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative) (“*Sand Revolution*”) (“In the absence of specific evidence, we will not attempt to predict how the district court in the related district court litigation will proceed because the court may determine whether or not to stay any individual case, including the related one, based on a variety of circumstances and facts beyond our control and to which the Board is not privy.”). Accordingly, we determine that this factor does not weigh either for or against exercising our discretion to deny institution in this case.

2. Factor 2 — Proximity of Court’s Trial Date

In its Preliminary Response, Patent Owner states that the district court had yet to set a trial date. Prelim. Resp. 43. Since the Preliminary Response was filed, however, the district court entered a scheduling order in the 1001 litigation stating that it “expects to set” a trial date of February 27, 2023. Ex. 3001 (Scheduling Order), 5.

Our final written decision in this case will be issued no later than March 18, 2023, which is less than one month after the potential trial date in the parallel proceeding, which has yet to be formally set. Because the potential trial date is within a month of the date for our final written decision, it is not certain whether our final written decision or the district

court's decision will ultimately issue first. Accordingly, we find that this factor is neutral.

3. Factor 3 — Investment in the Parallel Proceeding

According to the docket sheet in the 1001 litigation, a claim construction hearing was held on February 9, 2022, and a claim construction order was issued on February 16, 2022. Ex. 3002 (Docket Sheet), 4. The record does not reflect the extent to which there is any overlap between the issues considered in the claim construction order and those in this *inter partes* review proceeding. The district court's scheduling order also states that fact discovery opened on February 25, 2022 and will close on September 9, 2022. Ex. 3001, 3. Expert discovery is set to close on November 4, 2022, and the deadline for filing dispositive motions is November 18, 2022. *Id.* at 4.

Petitioner argues that it was diligent in filing this Petition six months after Patent Owner served the Complaint in the 206 litigation on March 4, 2021. Pet. 88. As noted above, the 206 litigation was dismissed, and the 1001 litigation was not filed until September 28, 2021, which was after the Petition was filed. Prelim. Resp. 43 n.1; Ex. 3002, 6–7. Patent Owner does not argue that the Petition was not diligently filed. Prelim. Resp. 44.

We find that the parallel proceeding is still at a relatively early stage, and we are not persuaded that the actions that have occurred so far represent the type of significant investment that would support exercising our discretion to deny institution. *See Sand Revolution*, Paper 24 at 11 (observing that “much work remains in the district court case as it relates to invalidity: fact discovery is still ongoing, expert reports are not yet due, and substantive motion practice is yet to come”). We also credit Petitioner's

diligence in filing its Petition. In light of these facts, we determine that this factor weighs against exercising our discretion to deny the Petition.

4. Factor 4 — Overlap With Issues Raised in the Parallel Proceeding

Patent Owner argues that the issues in this proceeding overlap with those in the district court litigation, and that all of the references raised in this proceeding were included within Petitioner's Preliminary Invalidity Contentions in the district court. Prelim. Resp. 44.

Petitioner argues that it has not yet served final invalidity contentions in the district court litigation, so the question of overlap is premature.

Pet. 89. Petitioner also contends that, although this IPR challenges all the claims of the '489 patent, it is unlikely that Patent Owner will assert all of the claims of the '489 Patent at trial because the district court's schedule requires the parties to meet and confer to narrow the asserted claims and prior art at two different stages of the case. *Id.* (citing Ex. 1020). Petitioner further submits a stipulation agreeing that if this IPR is instituted, it will not pursue the same prior art grounds in the district court. *Id.*; Ex. 1023; *Sand Revolution*, Paper 24 at 12.

Based on the fact that the claims and prior art that will ultimately be tried in the district court are uncertain at this relatively early stage of the case, and that Petitioner's stipulation mitigates to some degree the concerns of duplicative efforts and conflicting decisions between the district court and the Board, we find that this factor weighs slightly against exercising discretion to deny institution.

5. *Factor 5 — Commonality of Parties in the Parallel Proceedings*

There is no dispute that Petitioner and Patent Owner are both parties to the parallel proceeding. Pet. 89; Prelim. Resp. 45. However, because the currently scheduled trial date is less than a month before the deadline for a final written decision in this case, it is unclear which will happen first. Accordingly, we find that this factor is neutral.

6. *Factor 6 — Other Circumstances*

Patent Owner argues that “other circumstances weigh against institution, including the deficient merits of” the Petition. Prelim. Resp. 45. As discussed below, however, we determine that Petitioner has demonstrated a reasonable likelihood of unpatentability of at least claim 1 of the ’489 patent. Therefore, we find that this factor is neutral.

7. *Conclusion*

As noted in *Fintiv*, we consider the above factors as part of “a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Fintiv*, Paper 11 at 6. Considering the *Fintiv* factors as part of a holistic analysis, we are not persuaded that the interests of the efficiency and integrity of the system would be best served by invoking our authority under 35 U.S.C. § 314(a) to deny institution of trial.

B. *Claim Construction*

A claim “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (2020).

Petitioner proposes constructions for the following limitations of the challenged claims which use the term “means”:

(1) “An actuating means for moving said mechanical linkage between said first position and said second position” (claim 2): Petitioner contends that this is a means-plus-function limitation, and that the claimed “actuating means” should be construed as “an actuator, latches, springs, or magnets, and their equivalents” that correspond to the function of “moving said mechanical linkage between said first position and said second position.” Pet. 6 (citing Ex. 1003 ¶¶ 69–71).

(2) “A means for moving said actuator arm between a first position . . . and a second position . . .” (claim 7): Petitioner contends that this limitation is a means-plus-function limitation, and that the claimed “means” should be construed as “an actuator, latches, springs, or magnets, and their equivalents” that correspond to the function of “moving said actuator arm between a first position . . . and a second position . . .” connecting the respective contactors as claimed. Pet. 7 (citing Ex. 1003 ¶¶ 72–74) (alterations in original).

(3) “Means for passing power from said power supply to said substation when said actuator arm is in said first position” (claim 10): Petitioner contends that this limitation is a means-plus-function limitation, and that the claimed “means” should be construed as “the line between the power supply and the actuator arm, the actuator arm, and the line between the substation and the first contactor of the first vacuum bottle” that correspond to the function of “passing power from said power supply to said substation when said actuator arm is in said first position.” Pet. 7–8 (citing Ex. 1003 ¶¶ 75–77).

(4) “Means for mechanically and selectively connecting the contactor of the bus to the contactor of the circuit and for connecting the contactor of

the bus to the contactor for the line” (claim 17): Petitioner contends that this limitation is a means-plus-function limitation, and that the claimed “means” should be construed as “an actuator, latches, springs, or magnets, and their equivalents” that correspond to the function of “mechanically and selectively connecting” the referenced contactors as claimed. Pet. 9 (citing Ex. 1003 ¶¶ 78–80). Petitioner further argues that one of ordinary skill in the art “would understand that ‘mechanical and selective’ characterizes the nature of the connection and the selection made by the means structure, which includes “those components that impart motion within the circuit breaker to make the connection between the contactors.” *Id.* at 9–10 (citing Ex. 1003 ¶¶ 78–80).

Patent Owner does not dispute Petitioner’s constructions for the above “means” elements in claims 2, 7, and 10. Prelim. Resp. 11–12. On the present record, we find these constructions to be sufficiently supported by the ’489 patent specification, and will apply them for purposes of deciding whether to institute trial.

Patent Owner, however, argues that Petitioner’s construction of the “means for mechanically and selectively connecting” element of claim 17 is flawed. Prelim. Resp. 11–12. According to Patent Owner, the “latches, spring, magnets, their equivalents, or any combination of them” identified by Petitioner as the corresponding structure “do not create a mechanical connection between the contactor of the bus to the contactor of the circuit or between the contactor of the bus to the contactor for the line.” *Id.* at 12. Instead, Patent Owner contends, the “actuator arm” is “the corresponding structure to achieve that function, so it must be separately included.” *Id.*

Based on the present record, Patent Owner's argument that the "actuator arm" should be included in the "means for mechanically and selectively connecting" element appears reasonable because the actuator arm is the component that actually connects the contactors. However, as discussed further below in Section II.E.3, Petitioner has established a reasonable likelihood of unpatentability for claim 1 and, therefore, we need not resolve this claim construction dispute concerning claim 17 for purposes of institution. The parties may address this issue further during the trial, if appropriate.

We determine that it is not necessary to provide an express interpretation of any other claim terms at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

C. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, objective evidence

of non-obviousness.² *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of prior art elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–417.

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b) (2020). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

D. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the time of the alleged invention “would have had at least a BS in Electrical Engineering (or similar engineering discipline) and at least two years work experience in the field of power electronics, power generation and transmission, or a related field.” Pet. 6 (citing Ex. 1003 ¶ 18). Patent Owner does not propose a level of ordinary skill in the art at this stage of the proceeding. *See generally* Prelim. Resp.

² At this stage of the proceeding, Patent Owner has not presented objective evidence of non-obviousness.

For purposes of this Decision, we adopt Petitioner's assessment of the level of ordinary skill in the art because we find it to be supported by the '489 patent and the asserted prior art.

E. Ground 1: Asserted Obviousness of Claims 1–13 and 15–20 Based on Anger in view of Field

Petitioner contends that claims 1–13 and 15–20 would have been obvious over Anger in view of Field. Pet. 12–45. Patent Owner disagrees, arguing that Petitioner has failed to establish that the prior art teaches or suggests various elements of the claims. Prelim. Resp. 15–29.

1. Overview of Anger (Ex. 1005)

Anger discloses a vacuum interrupter, as shown in Figure 1, reproduced below:

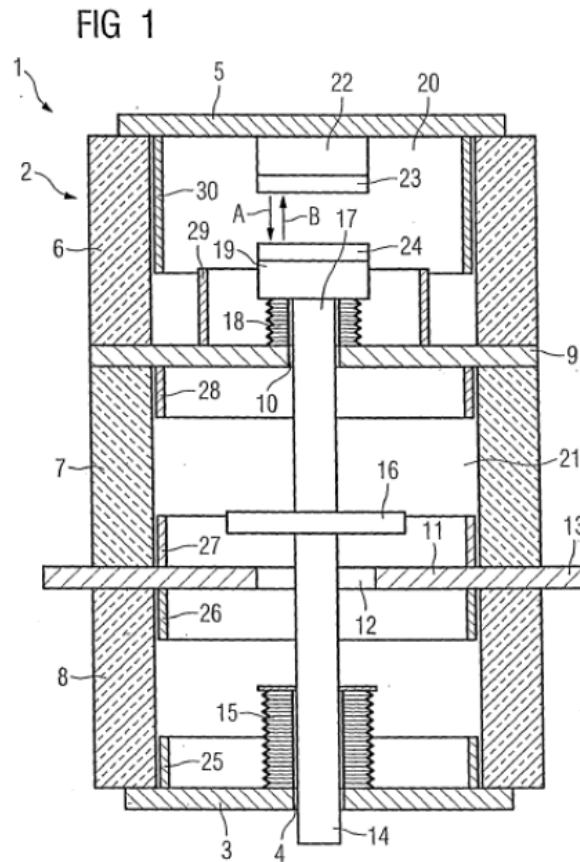


Figure 1 of Anger depicts a vacuum interrupter. Ex. 1005, Fig. 1, 8:8.

As shown in Figure 1, vacuum interrupter 1 comprises housing 2, a first contact system having movable contact piece 19 and fixed contact piece 22, and a second contact system having ground contact 16 and ground mating contact piece 11. Ex. 1005, code (57). Movable contact piece 19 and ground contact 16 are connected via movable contact rod 14. *Id.* at Fig. 1, code (57). Vacuum interrupter 1 is divided into first interior 20 having the first contact system and second interior 21 having the second contact system. *Id.*

In the position shown in Figure 1, movable contact piece 19 and fixed contact piece 22 are separated from each other, and ground contact 16 is also separated from mating contact 11. *Id.* at 9:20–10:1. When movable contact

rod 14 is moved in the direction of arrow B, movable contact piece 19 and fixed contact piece 22 are moved into contact with each other. *Id.* at 10:1–4. When movable contact rod 14 is moved in the direction of arrow A, the connection between movable contact piece 19 and fixed contact piece 22 is broken, and ground contact 16 is moved into contact with mating contact 11. *Id.* at 10:5–10.

2. *Overview of Field (Ex. 1009)*

Field is directed to a vacuum recloser device having “individual vacuum interrupters” and “a skeletal housing for the device which is lightweight, yet sufficiently rugged to withstand all operating and environmental requirements.” Ex. 1009, 1:14–18. The device includes vacuum interrupters located within the housing, and bushings mounted to the housing through which electrical conductors pass in and out of the housing. *Id.* at 6:1–50, Figs. 1–2.

3. *Analysis of Independent Claim 1*

a) 1[preamble]: “[a] circuit breaker apparatus comprising:”

Petitioner asserts that, to the extent the preamble of claim 1 is limiting, Anger discloses the preamble. Pet. 12–13. Petitioner argues that “Anger discloses a ‘vacuum interrupter’ (*i.e.*, a ‘circuit breaker apparatus’),” and that “[t]he terms ‘circuit breaker’ and ‘interrupter’ are used synonymously by [persons of ordinary skill] in the relevant art.” *Id.* at 13 (citing Ex. 1005, 1:3–2:5; Ex. 1003 ¶¶ 30, 105).

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding the preamble at this stage of the proceeding.³

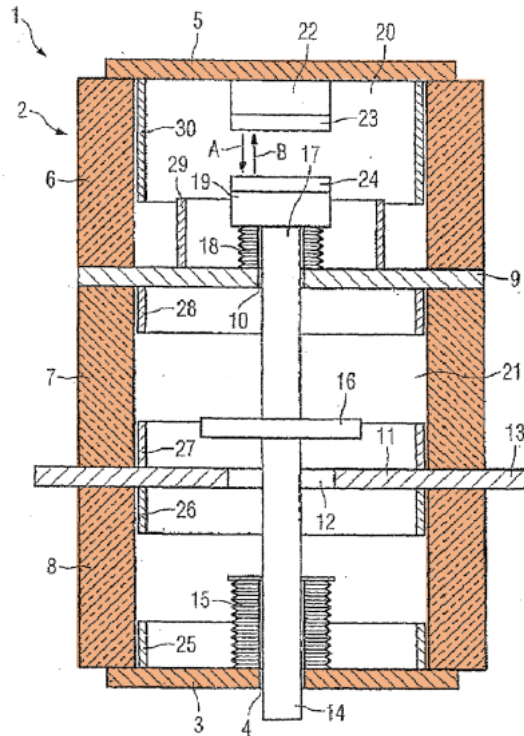
b) $l[a]$: “a housing;”

1[b]: “a first bushing outwardly of said housing;”

1[c]: “a second bushing extending outwardly of said housing;”

Petitioner argues that Anger discloses a housing, as shown in its highlighted version of Anger's Figure 1, reproduced below.

FIG. 1

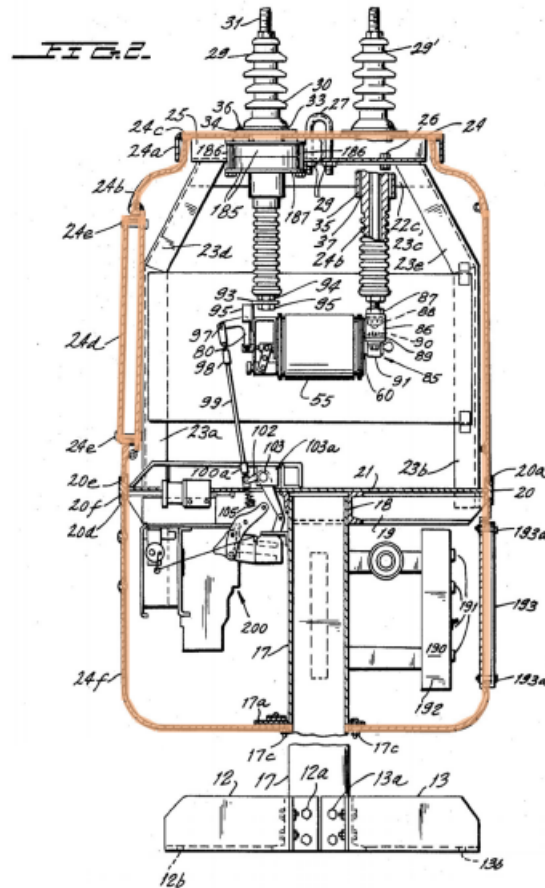


Petitioner's highlighted version of Figure 1 of Anger. Pet. 13.

³ Because we are persuaded that Petitioner has shown that the prior art teaches the subject matter recited in the preamble, we need not decide whether the preamble is limiting for purposes of this Decision.

According to Petitioner, Figure 2 above shows Anger's housing 2 colored in orange. Pet. 13. Petitioner asserts that housing 2 of Anger is formed around the separate vacuum containments of the vacuum interrupter, which include first internal area 20 and second internal area 21. *Id.* (citing Ex. 1005, 7:2–7, 8:19–21).

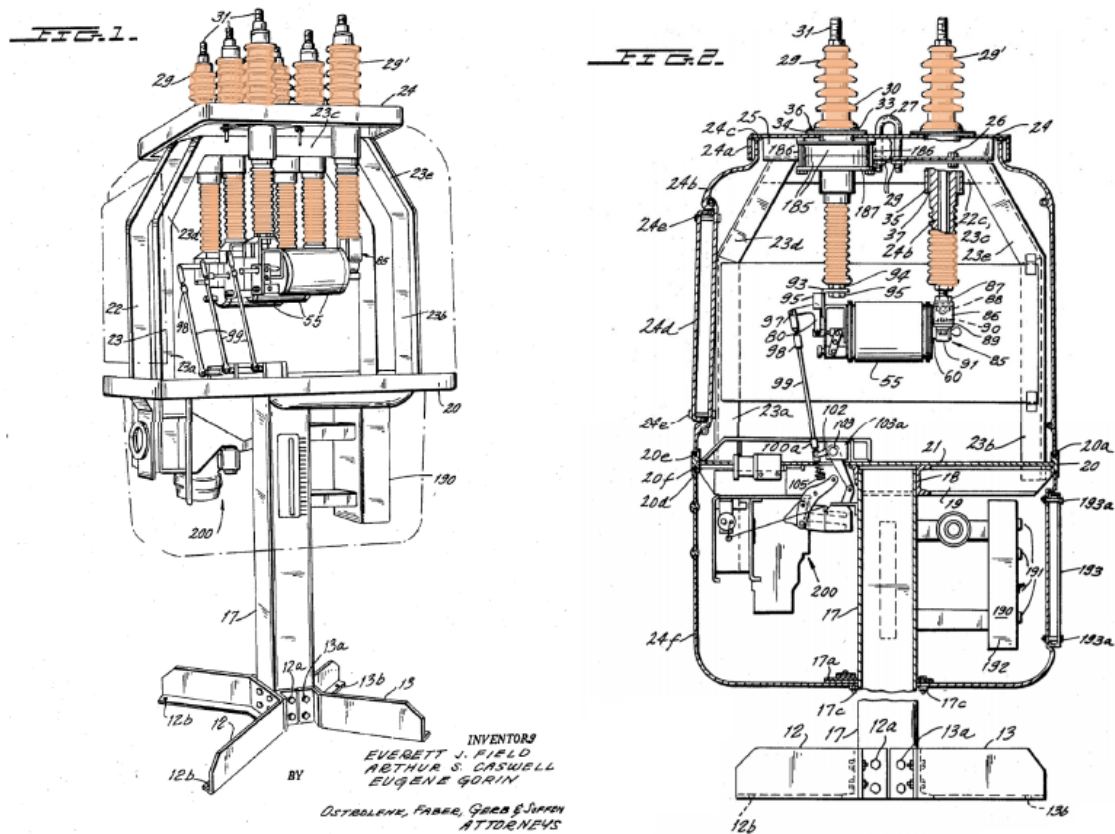
Petitioner also argues that, even if Anger's housing 2 did not constitute the claimed "housing," such a housing is disclosed by Field. Pet. 14. Petitioner illustrates this housing in a highlighted version of Field's Figure 2, reproduced below.



Petitioner's highlighted version of Figure 2 of Field. Pet. 14. According to Petitioner, "Field discloses separate vacuum interrupters for each phase of a multiphase system that are contained within an 'enclosure

24b' with a 'cover 24.'" Pet. 14 (citing Ex. 1009, 6:1–50). Field's enclosure and cover are highlighted in orange in the figure above. *Id.*

Petitioner further argues that Field discloses first and second bushings extending outwardly of the housing. Pet. 16–18. Petitioner illustrates these bushings in a highlighted version of Field's Figures 1 and 2, reproduced below.



Petitioner's highlighted versions of Field's Figures 1 and 2. Pet. 17. According to Petitioner, Field discloses bushings 29 and 29', highlighted in orange, which extend from the housing. Pet. 17–18. According to Petitioner, Field's vacuum interrupters are electrically connected between the bushings, with one of the bushings being connected to a power source and one of the bushings being connected to an output or load. *Id.* at 16 (citing Ex. 1009, 1:39–48, 7:63–65).

Petitioner argues that it would have been obvious to a person of ordinary skill “to use Anger’s teaching of a multi-contact vacuum interrupter with Field’s disclosure of specific hardware (*i.e.*, an external enclosure and bushings) associated with a vacuum recloser.” Pet. 14–15 (citing Ex. 1003 ¶¶ 107–111). Petitioner asserts that both Anger and Field are directed to vacuum circuit breakers/interrupters, with Anger focusing on the internal workings of the vacuum interrupter, and Field describing how individual vacuum interrupters are positioned within an external housing and how power is connected to the vacuum interrupters via bushings extending through the housing. *Id.* at 15 (citing Ex. 1005, 1:3–3:2, 6:15–16, 7:3–18, 7:63–65). According to Petitioner, one of ordinary skill “would have recognized that Anger’s vacuum interrupter would have been placed inside of an external housing for the purpose of protecting individuals from accidental contact with the live vacuum interrupter components and to protect the vacuum interrupter itself from external elements.” *Id.* at 16 (citing Ex. 1003 ¶¶ 33–34, 110–111; Ex. 1009, 15:75–16:10).

Additionally, Petitioner argues that one of ordinary skill would have been motivated to use Field’s bushings with Anger’s system because “it is standard engineering practice to use bushings when bringing medium or high-voltage into or out of an enclosure,” because “[t]he bushings serve to insulate conductors passing into the enclosure, and typically include structure that allows the bushing and conductor to be connected to the enclosure or housing.” Pet. 17 (citing Ex. 1003 ¶¶ 54–58). Thus, according to Petitioner, one of ordinary skill “would have considered the bushings necessary to provide the insulation needed to create distance between the

medium or high-voltage conductor and the grounded housing, which prevents arcing.” *Id.* at 17–18 (citing Ex. 1003 ¶¶ 54–58).

Patent Owner argues that one of ordinary skill would not have combined Anger with Field because the vacuum interrupter of Anger is not for use with medium or high voltage systems. Prelim. Resp. 15. To support this argument, Patent Owner asserts that “Anger’s failure to disclose bushings reveals that it is not directed to medium or high-voltage,” and “[n]owhere in Anger is the use of either medium or high-voltage discussed.” *Id.* at 16. Patent Owner also argues that Dr. Ehsani’s testimony is conclusory and unsupported by evidence. *Id.* Additionally, Patent Owner argues that Petitioner’s assertion that it was “standard engineering practice to use bushings when bringing medium or high-voltage into or out of an enclosure,” and Dr. Ehsani’s testimony that “electrical current at medium- or high-voltage . . . would necessarily enter through an electrical bushing,” actually support Patent Owner’s argument “that Anger is not for use with medium or high-voltage,” because otherwise Anger would disclose such bushings. *Id.*

We determine that Petitioner has made a sufficient showing at this stage of the proceeding that claim elements 1[a]–1[c] would have been obvious over the combination of Anger and Field. With regard to Patent Owner’s argument that one of ordinary skill would not have combined Anger with Field because “[t]he vacuum interrupter of Anger is not for use with medium or high voltage systems,” we note that Petitioner has submitted testimony from Dr. Ehsani that “Anger relates to vacuum interrupters for use in transmission of **medium-voltage** electrical power,” and that one of ordinary skill “would understand that the electrical conductor” in Anger

“that carries electrical current at *medium- or high-voltage* (i.e., the conductor to which an electrical load is connected) would necessarily exit the housing through an electrical bushing.” Ex. 1003 ¶¶ 84, 120 (emphasis added). Patent Owner does not point to any evidence that Anger is not suitable for use with medium voltage power other than Anger’s silence about voltage levels. Prelim. Resp. 15–17. On the present record, Anger’s mere silence about voltage levels does not indicate that the device is not suitable for use with medium level voltages, particularly in light of Dr. Ehsani’s testimony to the contrary.

On the present record, Patent Owner’s argument that “Anger’s failure to disclose bushings reveals that it is not directed to medium or high voltage” (Prelim. Resp. 16) is countered by the testimony of Dr. Ehsani that because “Anger is focused on the narrower vacuum interrupter itself, it does not specifically show any external enclosures around the illustrated vacuum interrupter,” or “any of the bushings or connections that would allow external line and load connections to the vacuum interrupter when positioned within an external enclosure or housing.” Ex. 1003 ¶ 107. Patent Owner does not directly discuss or rebut Dr. Ehsani’s testimony on this point. Prelim. Resp. 15–17.

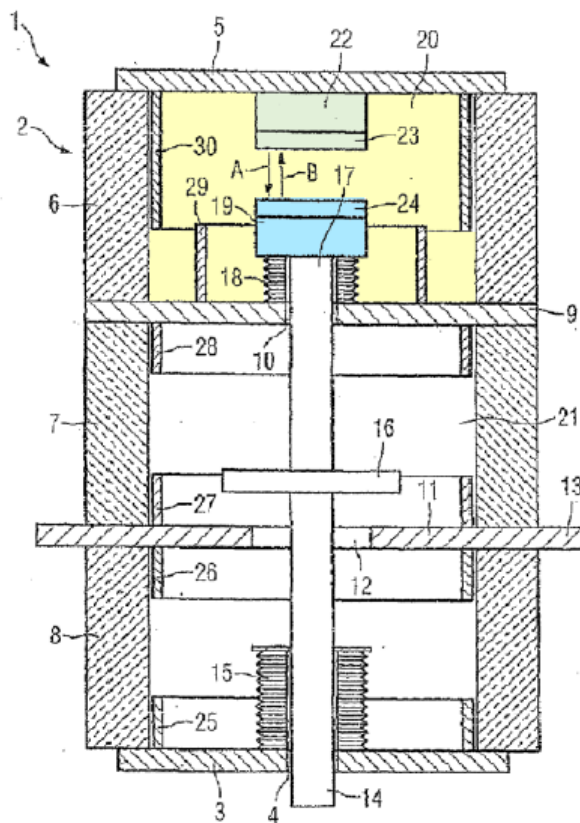
We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation at this stage of the proceeding.

c) 1[d]: “a first vacuum bottle positioned in said housing and having a pair of contactors therein, one of said pair of contactors being electrically connected to said second bushing;”

1[e]: “a second vacuum bottle positioned in said housing and having a pair of contactors therein, one of said pair of contactors of said second vacuum bottle being electrically interconnected to ground;”

Petitioner argues that Anger’s vacuum interrupter includes a vacuum sealed “first internal area” that corresponds to the claimed “first vacuum bottle,” as shown in its annotated version of Anger’s Figure 1, reproduced below.

FIG. 1

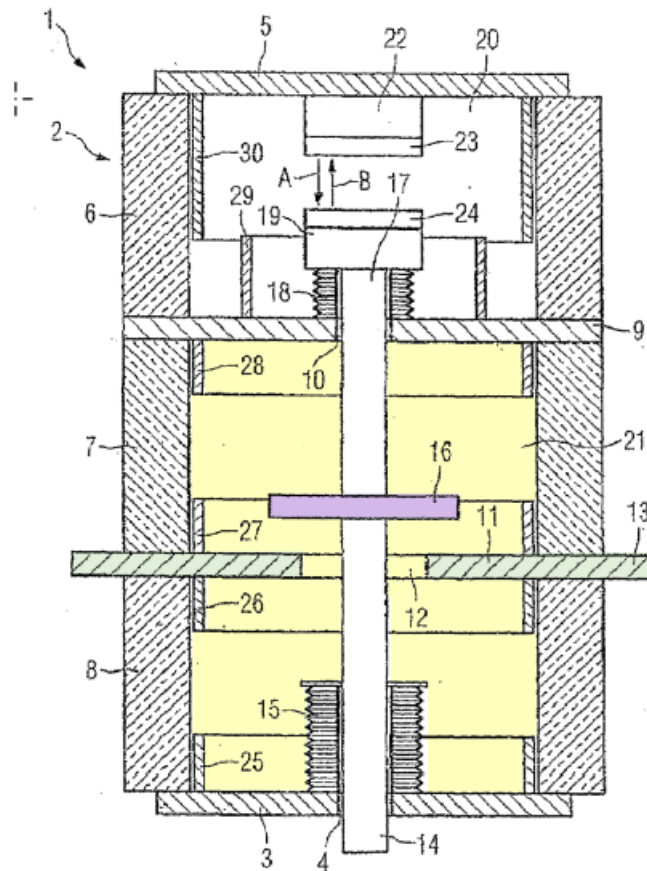


Petitioner’s highlighted version of Figure 1 of Anger showing a vacuum sealed “first internal area” highlighted in yellow. Pet. 19.

Referring to its highlighted version of Figure 1, Petitioner argues that Anger's vacuum interrupter includes a vacuum sealed "first internal area (20)" highlighted in yellow. Pet. 18. According to Petitioner, "first internal area 20 has a fixed contact piece (22/23)" highlighted in green, and "a movable contact piece (19/24)" highlighted in blue, with "the movable contact piece (19/24) affixed to the movable contact rod 14." *Id.*

Petitioner argues that Anger discloses a "second vacuum bottle" by referring to another highlighted version of Anger's Figure 1, reproduced below.

FIG. 1



Petitioner's highlighted version of Figure 1 of Anger showing a vacuum sealed "second internal area" highlighted in yellow. Pet. 19.

Petitioner argues that, as shown in its highlighted Figure 1 above, Anger discloses a “second internal area (21),” highlighted in yellow, “which corresponds to the claimed ‘second vacuum bottle’ and contains a grounding contact (16) and a mating contact (11).” Pet. 19 (citing Ex. 1005, 11:10–20, Fig. 1).

Petitioner argues that, although Anger describes each of vacuum-sealed spaces 20 and 21 as an “area,” a person of ordinary skill would have considered each of these sealed chambers in which a vacuum is maintained as being the same as a vacuum bottle. Pet. 19 (citing Ex. 1003 ¶¶ 126, 135–141). Petitioner asserts that “[t]he first internal area (2) (as well as the second internal area (21)) functions identically to a vacuum bottle” because “Anger discloses that the first contact system is held in the interior of the housing using vacuum-tight separating means which divide the interior of the housing into a first internal area (20) having the first contact system (19/24, 22/23) and a second internal area (21) having the second contact system (11, 16).” *Id.* at 19–20 (citing Ex. 1005, code (57), Fig. 1).

Petitioner also argues that “Anger describes the sealed nature of the first and second internal areas and the benefits of the internal areas having separately maintained vacuums.” *Id.* at 20 (citing Ex. 1005, 2:13–20). According to Petitioner, “[t]he separated nature of Anger’s first and second internal areas, and the vacuums maintained within each area, is identical to the structure and function of the two claimed vacuum bottles.” *Id.*

Petitioner further argues that, even if internal areas 20 and 21 are not vacuum bottles, one of ordinary skill would have found it obvious “to implement Anger’s vacuum interrupter/integrated grounding switch in a two-bottle configuration.” Pet. 20 (citing Ex. 1003 ¶¶ 127–133). According

to Petitioner, “[i]t was common at the time of the ’489 Patent’s priority date for circuit breakers to have dual vacuum bottles with a pair of contacts in each bottle.” *Id.* (citing Ex. 1003 ¶ 128). Petitioner asserts that, “[i]n the early 2000s, the market was demanding circuit breakers that were smaller and less expensive,” and a known approach for accomplishing this “was to reduce the number of moving components within a vacuum bottle/chamber.” *Id.* at 21 (citing Ex. 1003 ¶ 131). “Because it was well-known to include both ‘power-supply’ and ‘grounding’ sets of contacts in a circuit breaker,” Petitioner contends, “it would have been obvious to put these respective sets of contactors in separate vacuum bottles/chambers, so as to reduce manufacturing expenses.” *Id.* (citing Ex. 1003 ¶ 131). Petitioner further asserts that “[a]n added benefit of such an arrangement was to increase the electrical isolation between the two sets of contactors, thus decreasing unwanted interactions between the two,” and that “Anger describes the benefits of such a separation of the sets of contactors.” *Id.* (citing Ex. 1003 ¶¶ 131–132; Ex. 1005, 2:13–3:2).

Patent Owner disagrees, arguing that “[i]nternal spaces 20, 21 of Anger are not vacuum bottles, and instead are voids having no physical structure.” Prelim. Resp. 18. Additionally, Patent Owner argues, “Petitioner already identified the structure surrounding internal spaces 20, 21 (i.e., housing 2 of Anger) as disclosing the housing of independent claim 1[a],” and “cannot simultaneously rely upon housing 2 of Anger as disclosing the claimed housing and simultaneously disclosing the claimed first and second vacuum bottles.” *Id.*

With respect to Petitioner’s obviousness argument, Patent Owner argues that these arguments are unsupported by evidence, and that neither

Petitioner nor Dr. Ehsani comes forward with evidence showing how incorporating vacuum bottles in Anger would: (1) reduce the number of moving parts; (2) reduce manufacturing costs; or (3) respond to market forces calling for lower manufacturing expenses. Prelim. Resp. 18–23.

Based on the present record, we have questions concerning Petitioner’s argument that Anger’s internal spaces 20 and 21 are “vacuum bottles,” as claimed. Neither party provides a claim construction of the term “vacuum bottle,” and thus it is unclear on this record whether Anger’s internal spaces fall within the scope of this claim term. Petitioner also does not introduce evidence that would address Patent Owner’s argument that internal spaces 20 and 21 are not vacuum bottles because they are merely “voids with no physical structure.” *See* Prelim. Resp. 18. During the trial, the parties may address the proper construction of “vacuum bottle,” and whether Anger’s internal spaces 20 and 21 are “vacuum bottles” as properly construed.

We find, however, that Petitioner has presented sufficient evidence at this stage of the proceeding that these limitations would have been obvious to one of ordinary skill in the art. Petitioner’s argument is supported by Anger’s statement that the reason for using separate internal areas that are electrically- and vacuum-isolated from one another is to avoid the problem that can occur when the arc formed by breaking the circuit interacts with the grounded mating contact piece (Ex. 1005, 4:13–20), and Dr. Ehsani’s testimony that one of ordinary skill “would have understood that another known way to solve this problem” was “to place the two pairs of contactors in separate vacuum bottles,” which is “a straightforward solution when starting with separate vacuum compartments” (Ex. 1003 ¶¶ 127–128).

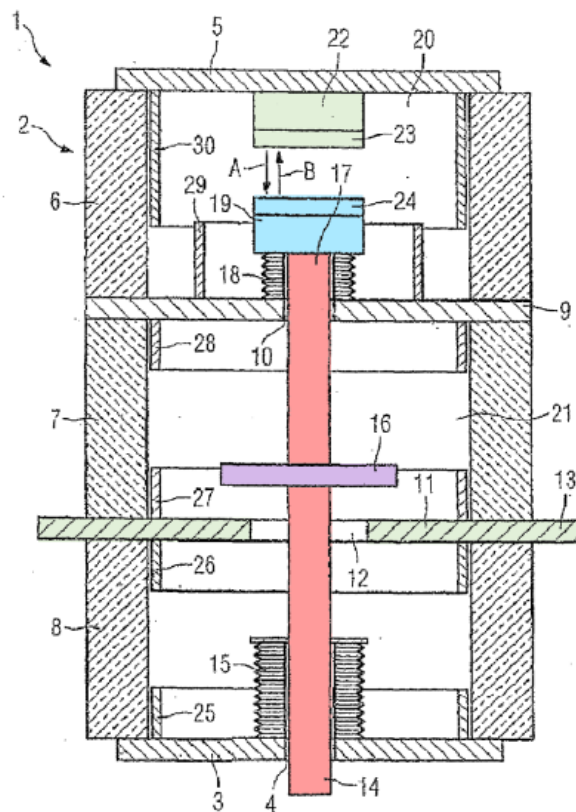
Further support is provided by Dr. Ehsani’s testimony that there were “existing and well-known vacuum bottles” and “existing actuating mechanisms” that could have been used, and that using these existing vacuum bottles would have led to increased modularity and reduced manufacturing costs of the overall device. Ex. 1003 ¶¶ 129–130. We note that the present record does not contain expert testimony to the contrary.

Consequently, we determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding limitations 1[d] and 1[e] at this stage of the proceeding.

d) 1[f]: “*mechanical linkage movable between a first position and a second position, said first position electrically connecting said first bushing to said second bushing, said second position electrically connecting said first bushing to ground.*”

Petitioner argues that Anger in combination with Field discloses this limitation. Petitioner argues that Anger discloses the claimed “mechanical linkage” in the form of a movable contact rod, as shown in red in Petitioner’s highlighted version of Anger’s Figure 1, reproduced below.

FIG. 1



Petitioner’s highlighted version of Figure 1 of Anger showing a “movable contact rod” highlighted in red. Pet. 23–24.

Referring to its highlighted version of Figure 1, Petitioner argues that Anger “discloses a movable contact rod (14) (which is operated by a non-depicted ‘actuating device’) that is ‘conductively connected’ to an electrical power supply,” and that movable contact rod 14 “forms the claimed ‘mechanical linkage’ that moves between the claimed first and second positions.” Pet. 23 (citing Ex. 1005, 6:8–7:16; Ex. 1003 ¶¶ 142–147).

Petitioner further argues that Anger describes a first position of movable contact rod 14 in which fixed contact (22/23) is connected to movable contact (19/24), and a second position of movable contact rod 14 in which grounding contact 16 is connected to mating contact 11. Pet. 24

(citing Ex. 1005, 1:21–22, 2:4–5). Referring to its arguments concerning the combination of Anger and Field for elements 1[c]–1[d], Petitioner further argues that in the first position of movable contact rod 14, the input/power-side bushing (first bushing) is electrically connected to the output/load-side bushing (second bushing), and in the second position the first bushing is electrically connected to ground via grounding contact 16 and mating contact 11. *Id.* at 24–25 (citing Ex. 1003 ¶¶ 144–145).

Patent Owner does not present argument directed to this limitation in its Preliminary Response.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation at this stage of the proceeding.

e) Summary for Claim 1

For the foregoing reasons, we are persuaded that Petitioner’s cited evidence and reasoning demonstrates a reasonable likelihood that Petitioner would prevail in its contentions regarding claim 1.

4. Independent Claim 7

Claim 7 is similar to claim 1 in many respects, and Petitioner relies on similar arguments and evidence as for claim 1. Pet. 31–34. Patent Owner, however, raises an additional dispute concerning claim 7’s language requiring “an actuator arm *connected at one end* to said second contactor of said first vacuum bottle and to said first contactor of said second vacuum bottle.” Prelim. Resp. 23–26 (emphasis added). Patent Owner appears to argue that this language requires that one of the ends of the actuator arm must be connected to *both* the second contactor of the first vacuum bottle and the first contactor of the second vacuum bottle. *Id.* at 24. Petitioner, on

the other hand, appears to read the claim language to require that one end of the actuator arm must be connected to the second contactor of the first vacuum bottle, but not to require that the connection between the actuator arm and the first contactor of the second vacuum bottle be at that same end of the actuator arm. Pet. 33–34. Neither party performs a claim construction analysis for this limitation. *See id.* at 6–10; Prelim. Resp. 10–12.

Because, as discussed above, we determine that Petitioner has established a reasonable likelihood of unpatentability as to claim 1, we need not resolve Patent Owner’s argument as to claim 7 for purposes of institution. *See PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (indicating that a decision whether to institute an *inter partes* review “require[s] a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”). During the trial, the parties may address the proper construction of claim 7’s limitation requiring “an actuator arm connected at one end to said second contactor of said first vacuum bottle and to said first contactor of said second vacuum bottle,” and whether that claim language is met by the cited prior art.

5. *Independent Claim 17*

Claim 17 is similar to claim 1 in many respects, and Petitioner relies on similar arguments and evidence as for claim 1. Pet. 40–43. Patent Owner raises two additional disputes as to claim 17. Prelim. Resp. 26–28.

The first dispute centers on claim 17’s limitation requiring “a circuit suitable for passing energy from said bus to the substation.” Petitioner argues that, in the proposed combination, when Anger’s actuator arm 14 is in the first position, a connection is made between contacts 19/24 and 22/23

for passing energy “via a bus (*i.e.*, an electrical conductor) to a load (*e.g.*, a substation).” Pet. 42. Petitioner also relies on Dr. Ehsani’s testimony that Field discloses that the vacuum interrupted can be placed at a substation. *Id.*; Ex. 1003 ¶ 226. As support for his testimony, Dr. Ehsani references Field’s statement that “[t]he skeletal frame serves as a pedestal during manufacturing and handling prior to installation as well as providing suitable attachment means to a floating substation pad at the final site.” Ex. 1003 ¶ 226 (quoting Ex. 1009, 3:65–68).

Patent Owner argues that Petitioner misinterprets Field’s reference to a “floating substation pad,” and that this term “does not refer to a substation as claimed.” Prelim. Resp. 27. Instead, Patent Owner contends, “Field uses ‘substation’ in combination with ‘pad’ to describe a mounting point or base for the skeletal frame of Field.” *Id.* According to Patent Owner, “[a] substation as claimed does not refer to a pad, but instead refers to ‘an area or group of equipment containing switches, circuit breakers, buses, and transformers for switching power circuits and to transform power from one voltage to another or from one system to another.’” *Id.* (quoting Ex. 2002, 963). Patent Owner argues that Petitioner fails to identify where such a “substation” is taught by either Field or Anger. *Id.*

Because, as discussed above, we determine that Petitioner has established a reasonable likelihood of unpatentability as to claim 1, we need not resolve Patent Owner’s argument as to claim 17 for purposes of institution. *See PGS Geophysical*, 891 F.3d at 1354. However, we note that Dr. Ehsani testifies that one of ordinary skill would understand Field’s discussion of a “floating substation pad” “to mean that the vacuum interpreter is placed between the power source and the substation,” and that

it would have been obvious to a person of ordinary skill for the load of the system to be a substation. Ex. 1003 ¶¶ 202, 226, 236. At this stage of the proceeding, Patent Owner does not provide contrary evidence showing why it would not have been obvious in the Anger/Field combination for the load to be a substation, but rather merely argues that neither reference expressly discusses a substation. Prelim. Resp. 27. During the trial, the parties may further address this argument.

The second dispute raised by Patent Owner is whether Petitioner's proposed combination meets claim 17's "means for mechanically and selectively connecting . . ." limitation. Prelim. Resp. 28. As discussed in Section II.A, above, Patent Owner argues that the corresponding structure for this limitation includes the actuator arm. *See* § II.A., *supra*; Prelim. Resp. 11–12. Patent Owner further argues that, because Petitioner's proposed construction of this limitation is flawed, Petitioner has failed to establish that the proposed combination discloses this element of claim 17. Prelim. Resp. 28.

As noted above, Patent Owner's inclusion of the actuator arm in the corresponding structure for the "means for mechanically and selectively connecting . . ." limitation appears reasonable. *See* § II.A, *supra*. However, Petitioner argues that Anger's movable contact rod 14 is an "actuator arm," and Patent Owner does not appear to dispute this in its Preliminary Response. Pet. 33; *see generally* Prelim. Resp. The parties may further address this issue during the trial.

6. *Dependent Claims 2–6, 8–13, 15–16, and 18–20*

Petitioner contends that dependent claims 2–6, 8–13, 15–16, and 18–20, which depend from claims 1, 7, or 17, are obvious over Anger and Field.

Pet. 25–31, 34–40, 43–45. Patent Owner does not provide any separate argument against these claims at this stage of the proceeding. Prelim.

Resp. 28. Although Patent Owner does not address the dependent claims, it appears that some of the potential defects it raises for the independent claims may also affect the analysis of the dependent claims. However, because we determine that Petitioner has established a reasonable likelihood of unpatentability of claim 1, we need not resolve those issues at this time. *See PGS Geophysical*, 891 F.3d at 1354. The parties may address these claims further during the trial.

F. Ground 2: Asserted Obviousness of Claims 1–13 and 15–20 Based on Takahashi in view of Marchand

Petitioner contends that claims 1–13 and 15–20 would have been obvious over Takahashi in view of Marchand. Pet. 45–83. Patent Owner disagrees, arguing that Petitioner has failed to establish that the prior art teaches or suggests various elements of the claims. Prelim. Resp. 29–41.

1. Overview of Takahashi (Ex. 1008)

Takahashi relates to switchgear for distributing power received from a switch bar to various types of load devices. Ex. 1008 ¶ 2. The switchgear includes, within a single grounded vacuum container, stationary electrodes for a main circuit at one end, and stationary electrodes for a ground circuit at the other end. *Id.* at code (57). The switchgear also includes a movable conductor that moves in a linear manner between the stationary electrodes. *Id.*

2. Overview of Marchand (Ex. 1006)

Marchand discloses a modular three position vacuum isolator switch that can connect a stationary contact to either of two moveable contacts, one

of which is connected to a power source, and the other of which is connected to ground. Ex. 1006, code (57). The switch can also be moved to an intermediate position that is out of electrical engagement with either of the moveable contacts. *Id.*

3. *Analysis of Independent Claim 1*

a) *1[preamble]: “[a] circuit breaker apparatus comprising:”*

Petitioner asserts that, to the extent the preamble of claim 1 is limiting, Takahashi discloses the preamble. Pet. 45. Petitioner argues that “Takahashi discloses a ‘switchgear,’ and that “[t]he terms ‘circuit breaker’ and ‘switchgear’ are used synonymously” by persons of ordinary skill in the art. *Id.* (citing Ex. 1008 ¶ 1; Ex. 1003 ¶ 257).

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding the preamble at this stage of the proceeding.

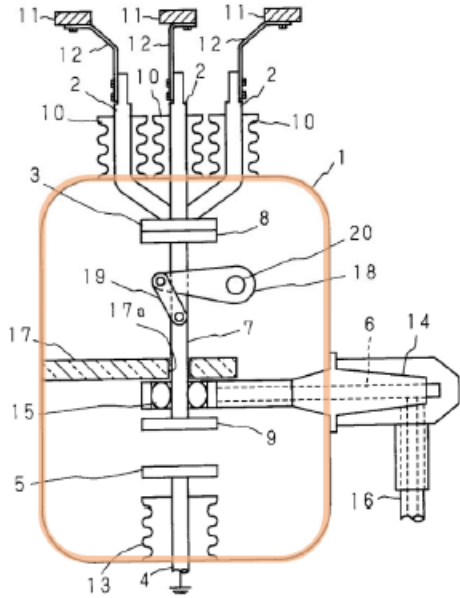
b) *1[a]: “a housing;”*

1[b]: “a first bushing outwardly of said housing;”

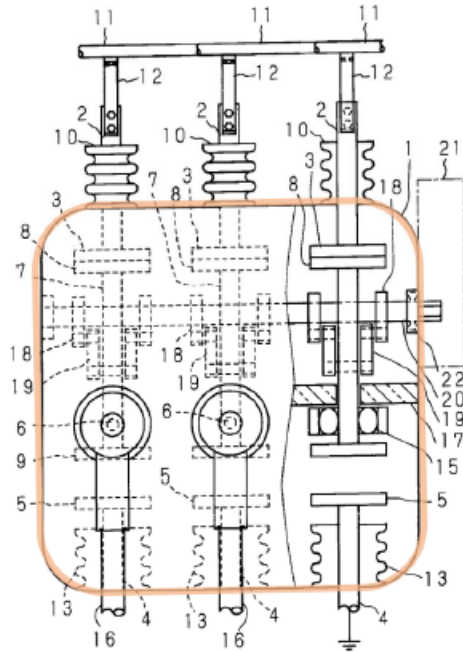
1[c]: “a second bushing extending outwardly of said housing;”

Petitioner argues that Takahashi discloses a housing in the form of a grounded vacuum container, as shown in Petitioner’s highlighted version of Takahashi’s Figures 1 and 2, reproduced below.

[FIG. 1]



[FIG. 2]



Petitioner's highlighted version of Figures 1 and 2 of Takahashi showing a grounded vacuum container highlighted in yellow. Pet. 46.

In Figures 1 and 2 above, Petitioner argues that Takahashi discloses a housing in the form of grounded vacuum container 1, highlighted in yellow, which includes a pair of stationary electrodes 3 and 5, and a pair of movable electrodes 8 and 9. Pet. 45 (citing Ex. 1008 ¶ 24). Petitioner also argues that Takahashi discloses bushings 10, 13, and 14, which provide support and insulation for conductors passing into and out of the housing. *Id.* (citing Ex. 1003 ¶ 259). Petitioner further argues that Takahashi’s bushing 14 discloses the claimed “first bushing outwardly of said housing,” and Takahashi’s bushing 10 discloses the “second bushing extending outwardly of said housing.” *Id.* at 46–48.

Patent Owner does not present argument directed to this limitation in its Preliminary Response.

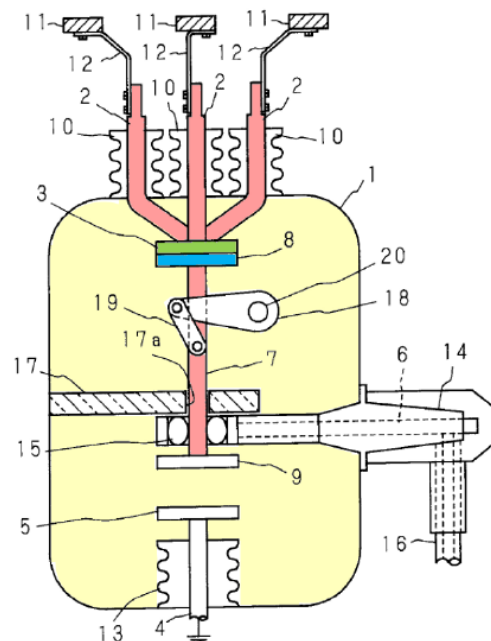
We determine that, on the record before us, Petitioner's cited evidence sufficiently supports its contentions regarding these limitations at this stage of the proceeding.

c) 1[d]: “a first vacuum bottle positioned in said housing and having a pair of contactors therein, one of said pair of contactors being electrically connected to said second bushing;”

1[e]” “a second vacuum bottle positioned in said housing and having a pair of contactors therein, one of said pair of contactors of said second vacuum bottle being electrically interconnected to ground;”

Petitioner argues that these limitations are disclosed by the combination of Takahashi and Marchand. Pet. 48–55. Petitioner relies on a highlighted version of Takahashi's Figure 1, reproduced below, to illustrate the relevant disclosures of Takahashi.

[FIG. 1]

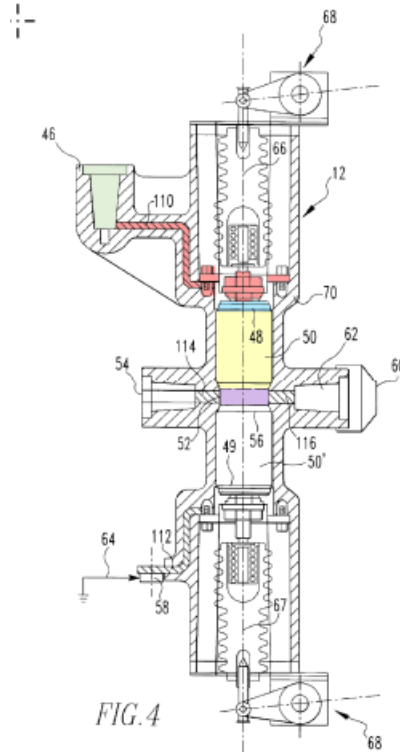


Petitioner's highlighted version of Figure 1 of Takahashi showing a vacuum tight portion, electrodes, and conductors. Pet. 49.

Petitioner argues that Takahashi discloses a vacuum-tight portion of the vacuum interrupter, highlighted in yellow, within the housing. *Id.* at 48. According to Petitioner, this vacuum-tight portion includes within it movable electrode 8 (blue) attached to conductor 7 (red), and stationary electrode 3 (green) attached to conductor 2 (red). *Id.* (citing Ex. 1008 ¶¶ 24–27, 29, 32–33).

Petitioner acknowledges that “Takahashi discloses using a single vacuum containment/chamber for the vacuum switchgear instead of a first vacuum bottle (and a second vacuum bottle) positioned in the grounded container [housing].” Pet. 49. “However,” Petitioner asserts, it would have been obvious for one of ordinary skill “to implement the vacuum switchgear of Takahashi in a two-vacuum-bottle configuration, such as that disclosed by Marchand.” *Id.* (citing Ex. 1003 ¶¶ 267–277).

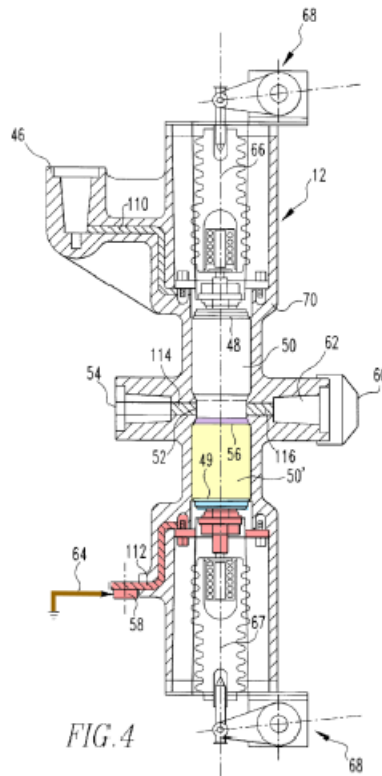
To illustrate Marchand’s “first vacuum bottle,” Petitioner refers to its highlighted version of Marchand’s Figure 4, illustrated below.



Petitioner's highlighted version of Figure 4 of Marchand showing a first vacuum bottle highlighted in yellow. Pet. 50.

Referring to its highlighted version of Figure 4, Petitioner argues that Marchand's housing 70 includes first vacuum bottle 50 (yellow) that contains fixed contact 52 (purple) and moving contact 48 (blue), in which moving contact 48 is electrically connected to second bushing 46 (green).

To illustrate the "second vacuum bottle," Petitioner prepares another highlighted version of Marchand's Figure 4, illustrated below.



Petitioner’s highlighted version of Figure 4 of Marchand showing a second vacuum bottle highlighted in yellow. Pet. 51.

Referring to this figure, Petitioner argues that Marchand discloses that housing 70 includes second vacuum bottle 50’ (yellow) containing fixed contact 56 (purple) and moving contact 49 (blue), in which moving contact 49 is connected to ground 64 (brown). Pet. 50 (citing Ex. 1006, 5:14–39; Ex. 1003 ¶ 272). According to Petitioner, “movement of the contacts in Marchand allows switching between either a connection between conductor 114 and 110 (power to load), or a connection between conductor 114 and conductor 112 (power to ground). *Id.* at 51 (citing Ex. 1006, 5:14–65).

Petitioner argues that one of ordinary skill “would have found it obvious to place a dual-bottle configuration into Takahashi’s housing such that each vacuum bottle was positioned around one of the pairs of Takahashi’s electrodes/contactors (the first bottle having electrodes 3/8, and

the second bottle having electrodes 5/9).” Pet. 52. According to Petitioner, “[t]he evacuated space inside each bottle would provide arc protection for making and breaking contacts without the need to evacuate Takahashi’s entire housing.” *Id.* (citing Ex. 1003 ¶ 268). Petitioner further argues that one of ordinary skill would have been motivated to use two vacuum bottles instead of Takahashi’s evacuated space because doing so would result in lower manufacturing, maintenance, and replacement costs. *Id.* at 52–54 (citing Ex. 1003 ¶¶ 268–269, 274–276). Petitioner argues that another motivation for this modification would have been to reduce the number of ingress and egress points to the evacuation space, which would lessen the opportunity for a loss of vacuum. *Id.* at 53–54 (citing Ex. 1003 ¶ 268).

Patent Owner argues that “Petitioner has not explained in detail how Takahashi would be modified to incorporate the vacuum bottles of Marchand.” Prelim. Resp. 29. According to Patent Owner, Petitioner fails to provide sufficient detail as to “how Takahashi, which utilizes a single vacuum chamber to enclose numerous components (e.g., all three pairs of moving contacts, rotating operating shaft 20, etc.), would be extensively redesigned to eliminate the grounded vacuum container 1 and to incorporate vacuum vessels 50, 50’ of Marchand.” *Id.* at 29–30. Patent Owner also argues that Petitioner fails to provide sufficient evidence to support its assertion that combining Takahashi and Marchand would: (1) reduce maintenance costs; (2) reduce manufacturing costs; or (3) reduce the number of ingress/egress points. *Id.* at 30–35.

Because, as discussed above, we determine that Petitioner has established a reasonable likelihood of unpatentability as to claim 1, we need not resolve Patent Owner’s argument as to this limitation for purposes of

institution. *See PGS Geophysical*, 891 F.3d at 1354. However, we question whether Petitioner has explained in sufficient detail how Takahashi’s single vacuum chamber would have been modified by one of ordinary skill in the art to incorporate the two vacuum bottles of Marchand. The parties may further address this issue during the trial.

4. *Independent Claim 7*

Petitioner relies on similar arguments and evidence as for claim 7 as for claim 1. Pet. 66–69. As it did for Ground 1, Patent Owner argues that Petitioner fails to address claim 7’s language requiring “an actuator arm *connected at one end* to said second contactor of said first vacuum bottle and to said first contactor of said second vacuum bottle.” Prelim. Resp. 36–38 (emphasis added). As before, Patent Owner’s argument is based on its apparent construction of the claim language to require that one of the ends of the actuator arm must be connected to *both* the second contactor of the first vacuum bottle and the first contactor of the second vacuum bottle. *Id.* at 36. Petitioner, again, appears to read the claim language to require that one end of the actuator arm must be connected to the second contactor of the first vacuum bottle, but not to require that that same end also connects to the first contactor of the second vacuum bottle. Pet. 69. As noted above, neither party performs a claim construction analysis for this limitation. *See id.* at 6–10; Prelim. Resp. 10–12; § II.D.4, *supra*.

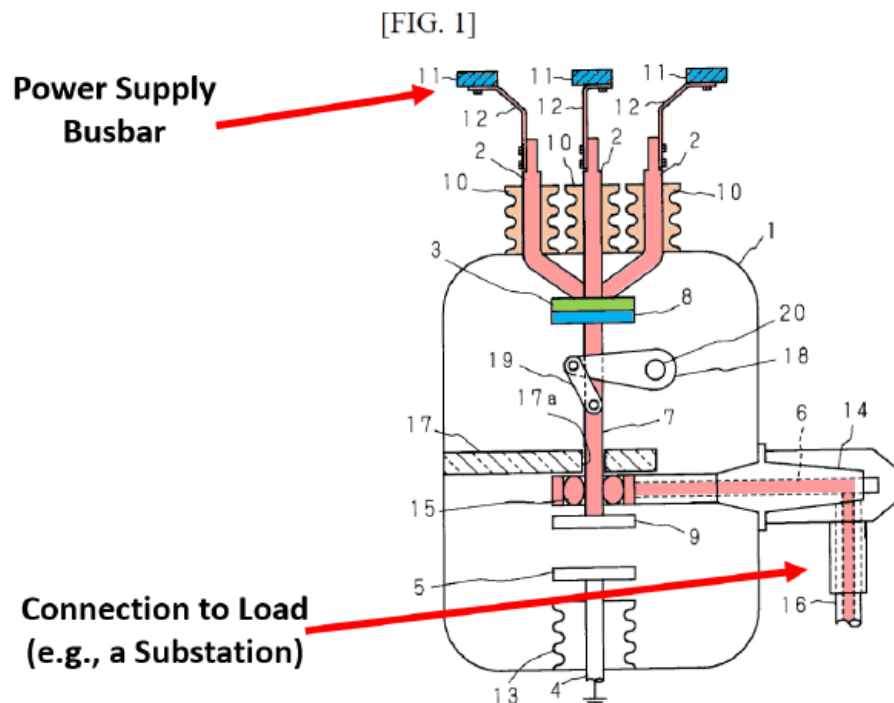
Because, as discussed above, we determine that Petitioner has established a reasonable likelihood of unpatentability as to claim 1, we need not resolve Patent Owner’s argument as to claim 7 for purposes of institution. *See PGS Geophysical*, 891 F.3d at 1354. During the trial, the parties may address the proper construction of claim 7’s limitation requiring

“an actuator arm connected at one end to said second contactor of said first vacuum bottle and to said first contactor of said second vacuum bottle,” and whether that claim language is met by the combination of Takahashi and Marchand.

5. *Independent Claim 17*

Petitioner relies on similar arguments and evidence for claim 17 as it did for claim 1. Pet. 77–82. Patent Owner raises an additional dispute, namely, whether the proposed combination discloses claim 17’s limitation requiring “means for mechanically and selectively connecting the contactor of the bus to the contactor of the circuit and for connecting the contactor of the bus to the contactor for the line.” Prelim. Resp. 38–41.

Petitioner presents the following annotated version of Takahashi’s Figure 1, reproduced below, to illustrate its arguments for claim 17.



Petitioner’s annotated version of Figure 1 of Takahashi showing the power supply busbar and the connection to the load. Pet. 80.

Petitioner argues that Takahashi “mechanically and selectively connect[s] the contactor of the bus (electrode 8) to the contactor of the circuit (electrode 3) (when movable conductor 7 is in the first position) and the contactor of the bus to the contactor of the line (electrode 5) (via conductor 7 when the movable conductor 7 is in the second position).” Pet. 82.

Petitioner further contends that it would have been obvious to modify Takahashi “to have the power supplied through the side of the enclosure through bushing 14 and electrical conductor 6 (a bus) and the load connected at the top of the enclosure through bushing 10.” *Id.* at 77.

Patent Owner argues that Takahashi does not disclose this limitation because “the contactor for the bus (i.e., main circuit stationary electrode 3) can never be connected to ground circuit stationary electrode 5,” but rather “is either connected to the circuit [load] or is open and connected to nothing.” Prelim. Resp. 39. Thus, according to Patent Owner, “[t]he design of Takahashi is fundamentally different [from] the design of the claimed invention,” because “Takahashi is designed to connect the circuit/load to ground when movable contactor 7 is in the down position,” while “the claimed invention is designed to connect the bus supplying power to ground.” *Id.* at 39–40.

Because, as discussed above, we determine that Petitioner has established a reasonable likelihood of unpatentability as to claim 1, we need not resolve Patent Owner’s argument as to this limitation of claim 17 for purposes of institution. *See PGS Geophysical*, 891 F.3d at 1354. However, based on the present record, we question whether Petitioner has sufficiently shown that the proposed combination teaches the “means for mechanically and selectively connecting” limitation. Patent Owner appears correct that

Takahashi's system connects the contactor of the circuit (load) to either the contactor of the bus or the contactor of the line (ground), but does not connect the contactor of the bus to the contactor for the line, as claim 17 requires. Moreover, although the Petition asserts that it would have been obvious to modify Takahashi to switch the positions of the bus and the circuit, the Petition does not explain in detail why one of ordinary skill would have been motivated to make such a modification. *See* Pet. 80–82. The parties may further address this issue during the trial.

6. Dependent Claims 2–6, 8–13, 15–16, and 18–20

Petitioner contends that dependent claims 2–6, 8–13, 15–16, and 18–20, which depend from claims 1, 7, or 17, are obvious over Takahashi and Marchand. Pet. 59–65, 69–77, and 82–83. Patent Owner does not provide any separate argument against these claims, at this stage of the proceeding. Prelim. Resp. 41. Although Patent Owner does not address the dependent claims, it appears that some of the potential defects it raises for the independent claims may also affect the analysis of the dependent claims. However, because we determine that Petitioner has established a reasonable likelihood of unpatentability of claim 1, we need not resolve those issues at this time. *See PGS Geophysical*, 891 F.3d at 1354. The parties may address these claims further during the trial.

G. Grounds 3 and 4: Obviousness of Dependent Claim 14 over Anger, Field, and Hamm (Ground 3) or Takahashi, Marchand, and Hamm (Ground 4)

Petitioner contends in Ground 3 that claim 14 is obvious over Anger, Field, and Hamm, and contends in Ground 4 that claim 14 is obvious over Takahashi, Marchand, and Hamm. Pet. 83–86. Claim 14 depends from claim 12, which depends from claim 10, which depends from claim 7, and

further requires “at least one first current transformer extending around said first bushing,” and “at least one second current transformer extending around said second bushing.” Ex. 1001, 9:15–22, 9:28–33, 10:1–6. Petitioner argues that Hamm discloses both the input and output bushings having one or more current transformers around them to monitor current flow through the interrupters, and that one of ordinary skill would have known the benefits of using a current transformer around both the input-side and output-side bushings. Pet. 84–86. Patent Owner does not separately present argument directed to Grounds 3 and 4 in its Preliminary Response. Prelim. Resp. 41–42.

Based on the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood that the separate limitations of claim 14 are unpatentable over the prior art under Grounds 3 and 4.

III. CONCLUSION

After considering the evidence and arguments presented in the current record, we determine that Petitioner has demonstrated a reasonable likelihood of success in proving that at least one of the challenged claims of the ’489 patent is unpatentable. Patent Owner has not persuaded us to exercise our discretion to deny institution of trial. We therefore institute trial on all challenged claims and grounds raised in the Petition.

At this stage of the proceeding, we have not made a final determination as to the patentability of any challenged claim or as to the construction of any claim term. Any final determination will be based on the record developed during trial. We place Patent Owner on express notice that any argument not asserted in a timely-filed Response to the Petition, or

in another manner permitted during trial, shall be deemed waived, even if that argument was presented in the Preliminary Response.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the '489 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '489 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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