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Paper 47
Entered: November 19, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HAYWARD INDUSTRIES, INC.,
Petitioner,

v.

PENTAIR WATER POOL AND SPA, INC.,
Patent Owner.

Case IPR2013-00285
Patent 8,019,479 B2

Before STEPHEN C. SIU, BRIAN J. McNAMARA, and JAMES B. ARPIN, *Administrative Patent Judges.*

ARPIN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Hayward Industries, Inc. ("Petitioner") filed a Petition requesting *inter partes* review of claim 12 of U.S. Patent No. 8,019,479 B2 (Ex. 1001, "the '479 Patent"). Paper 1 ("Pet."), 1. Pentair Water Pool and Spa, Inc. ("Patent Owner") filed a Preliminary Response. Paper 5 ("Prelim. Resp."). On November 20, 2013,

we issued a Decision on Institution (Paper 8, "Dec. on Inst."), instituting *inter partes* review of claim 12 on a single ground of unpatentability. Dec. on Inst. 21. Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 19, "PO Resp."), and Petitioner filed a Reply (Paper 28, "Pet. Reply") thereto.

Petitioner filed a Motion for Observations (Paper 33) on the cross-examination testimony of Petitioner's own declarants, Hamid Toliyat, Ph.D., P.E., and Mr. Robert Schaaf; and Patent Owner filed Observations (Paper 35) on the cross-examination testimony of Petitioner's declarants. Patent Owner filed a Response to Petitioner's Motion for Observations (Paper 38), and Petitioner filed a Response to Patent Owner's Observations (Paper 40).

The parties requested and appeared at an oral hearing before the panel on August 15, 2014. The record includes a transcript of the hearing. Paper 46 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, addresses issues and evidence raised during trial. For the reasons that follow, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claim 12 of the '479 Patent is unpatentable.

A. The '479 Patent

The '479 Patent generally relates to pumping systems including pumps, motors for driving pumps, and controllers for "control[ling] a pump, and more particularly, [for] control[ling] a variable speed pumping system for a pool, a spa, or other aquatic application." Ex. 1001, col. 1, ll. 10–12. More specifically, the invention at issue in the present petition relates to a motorized pump having a controller performing certain logic operations for identifying whether a fault has occurred relating to the priming of the pump. *Id.* at col. 8, l. 47–col. 9, l. 17; *see* Pet. 5; Prelim. Resp. 2. As recited in claim 12, a pumping system comprises a

pump, a motor coupled to the pump, and a controller. Ex. 1001, Claim 12. The controller determines a current flow rate based on an input power to the motor and on whether that current flow rate is above a priming flow value, in order to determine whether the system, e.g., the pump, is primed. *Id.*; *see* Prelim. Resp. 2. If the pumping system is not primed before reaching a maximum priming time allotment, the controller indicates a priming alarm. Ex. 1001, Claim 12.

The operation of a controller of a pumping system, as recited in the challenged claim, is illustrated by the flow chart depicted in Figure 4A of the '479 Patent, reproduced below:

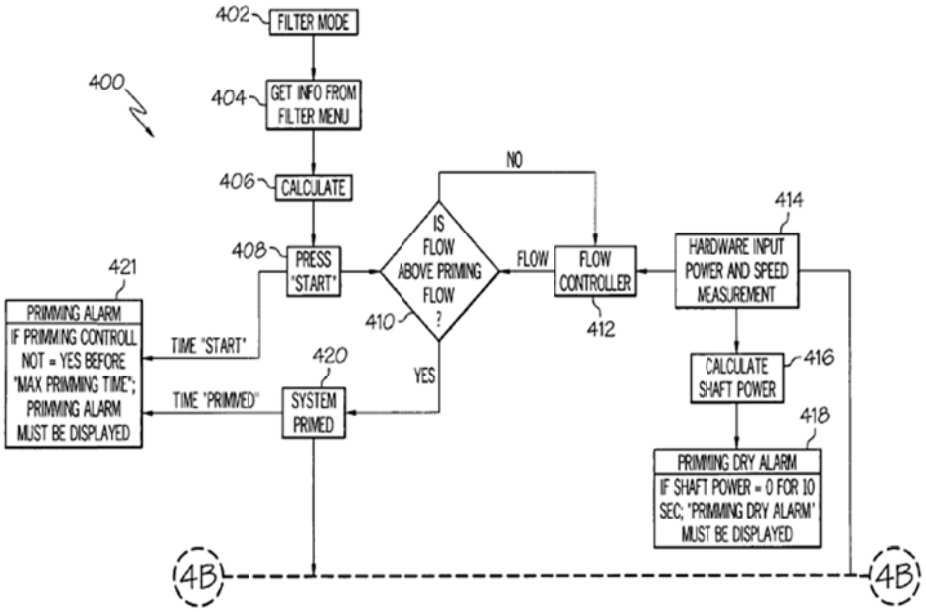

FIG. 4A

In Figure 4A of the '479 Patent, a flow chart depicts an example of process 400 for accomplishing a filter function within a filter mode for effective filtering of aquatic application 14 or 114, e.g., a pool. Ex. 1001, col. 8, ll. 35–42; *see* Ex. 1001, Figs. 1 and 2. As depicted in Figure 4A, process 400 is initiated at step 402, at which a "filter mode" is selected, and proceeds to step 404, at which filtering

information for the aquatic application is retrieved. *Id.* at col. 8, ll. 47–49. For example, the filtering information may include a value for a maximum priming time. *Id.* at col. 8, ll. 49–54. Next, process 400 proceeds to step 408, in which "START" is activated to begin cyclical operation of the filter mode. *Id.* at col. 8, ll. 62–64.

Process 400 then proceeds from step 408 to step 410, in which it is determined whether a current flow rate of the operating pump is *greater* than a priming flow value. *Id.* at col. 8, ll. 65–67. If the determination at step 410 is that the flow is *not greater* than a priming flow value, process 400 proceeds to step 412. Within step 412, a flow control process is performed in which information is provided via a hardware input, for example, in a form of current and/or voltage as an indication of power output and speed measurement of the pump motor. *Id.* at col. 8, l. 67–col. 9, l. 11. Step 416, in which a shaft power provided by the pump motor is calculated, is associated with step 414. *Id.* at col. 9, ll. 11–13. Further, at step 418, a priming dry alarm step is provided if, for example, the shaft power is zero for ten seconds. *Id.* at col. 9, ll. 13–17.

After step 412, process 400 returns to step 410, at which it is determined again whether the current flow rate is greater than a priming flow value. *Id.* at col. 9, ll. 19–22. If the current flow rate is greater than the priming flow value, process 400 proceeds from step 410 to step 420, indicating that the pumping system is primed. Steps 408 and 420 provide two pieces of information that may be utilized in step 421. Specifically, "step 408 provides a time start indication and step 420 provides a time primed indication." *Id.* at col. 9, ll. 27–28. Within step 421, process 400 determines whether the pumping system is primed prior to expiration of a maximum priming time allotment. *Id.* at col. 9, ll. 28–32. If not, a priming alarm is displayed. *Id.*

B. Illustrative Claim

Independent claim 12 is the sole claim challenged by Petitioner and is reproduced below:

> 12. A pumping system for at least one aquatic application, the pumping system comprising:
>
> a pump;
>
> a motor coupled to the pump; and
>
> a controller in communication with the motor, the controller determining a current flow rate based on an input power to the motor, the controller determining whether the current flow rate is above a priming flow value in order to determine whether the pumping system is primed, the controller indicating a priming alarm if the pumping system is not primed before reaching a maximum priming time allotment.

C. References, Declarations, and Depositions

Petitioner and Patent Owner primarily rely upon the following references, declarations, and depositions:

Exhibit	References, Declarations, and Depositions
1003	US 6,468,042 B2 to Møller (Ex. 1003 or "Møller '042")
1018	Declaration of Ali Emadi, Ph.D.
1021	US 5,819,848 to Rasmuson (Ex. 1021 or "Rasmuson")
1037	Declaration of Hamid Toliyat, Ph.D., P.E.
1038	Declaration of Robert Schaaf
1039	US 4,021,700 to Ellis-Anwyl ("Ex. 1039" and/or "Ellis-Anwyl")
1040	US 4,473,338 to Garmong ("Ex. 1040" and/or "Garmong")
1041	US 4,767,280 to Markuson ("Ex. 1041" and/or "Markuson")
1042	Deposition of Gary R. Wooley
1043	Deposition of E. Randolph Collins, Ph.D.
1044	Deposition of Hamid Toliyat, Ph.D., P.E.[1]
1045	Deposition of Robert Schaaf[2]
2004	Declaration of E. Randolph Collins, Ph.D.

[1] Also filed as Ex. 2011.
[2] Also filed as Ex. 2010.

2005	Declaration of Gary R. Wooley

D. Ground of Unpatentability

This *inter partes* review involves the following ground of unpatentability:

References	Basis	Claim
Rasmuson and Møller '042[3]	35 U.S.C. § 103(a)	12

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, "[a] claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears." 37 C.F.R. § 42.100(b); *see also Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012) (*Claim Construction*). Under the broadest reasonable construction standard, a claim term is presumed to have an ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A patentee may act as his or her own lexicographer by providing a special definition for a claim term in the specification with "reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Generally, in the absence of such a special definition or other considerations, "limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

In our Decision on Institution, we provided constructions for various terms of the challenged claim. Dec. on Inst. 9–16. In particular, we construed the verb

[3] The order of these references is not determinative of our decision. Dec. on Inst. 20 (citing *In re Bush*, 296 F.2d 491, 496 (CCPA 1961)); s*ee* Pet. Reply 13–14.

phrases "is primed" and "is not primed" to describe the primed status of the system at start-up, at restart, or when a loss of prime condition is determined, by comparison of the "current flow rate" to a "priming flow rate." *Id.* at 16. Further, we construed the "maximum priming time allotment" as the period between start-up, restart, or the determination of a loss of prime and the determination that the system "is primed" or "is not primed." *Id.* Similarly, we construed the "maximum priming time allotment" to mean the maximum time allowed for the system to prime after start or restart or after a loss of prime condition is determined. *Id.*

Patent Owner argues that our constructions of these "prime" related terms are unreasonable and inconsistent with the Specification of the '479 Patent. PO Resp. 1, 5, 15. In particular, Patent Owner argues that we "did not properly construe portions of Claim 12 in the context of the entire claim taken as a whole and the relevant '479 Patent specification." *Id.* at 6.

1. "Is Primed" and "Is Not Primed"

Patent Owner argues that each of our constructions of the "prime" related terms incorporates an unreasonable broadening to include a "loss of prime" determination. *Id.* at 8. Further Patent Owner argues that, "[u]nder the proper broadest reasonable construction, the [language] of Claim 12 does not encompass the 'loss of prime' determination scenario interjected by the preliminary construction offered by the Board." *Id.* (citing Ex. 2004 ¶¶ 33–34, 36, 39–40).

In our Decision on Institution, we noted that the Specification of the '479 Patent does not define expressly the verb "to prime" or the adjective "priming." Dec. on Inst. 11. Patent Owner does not contest this, nor does Patent Owner identify an express definition of these terms in the Specification. As we noted, a relevant definition of the verb "to prime" is "to pour or admit liquid into (a pump)

to expel air and prepare for action." *Id.* (quoting RANDOM HOUSE WEBSTER'S COLLEGE DICTIONARY 1047 (2d Random House ed. 1999) (Ex. 3001)).

Nevertheless, Patent Owner argues that

> The Board's construction of the root word "prime" is fundamentally flawed to the extent that it is founded in the erroneous "loss of prime" concept, which is not applicable to the language of Claim 12. The "loss of prime" concept centers on prime already having been established and subsequently "lost." In other words, the baseline assumption is that prime existed before the subsequent loss of prime. *To the contrary, Claim 12 begins monitoring the priming status at motor/pump startup and triggers an alarm if prime has not been achieved before a certain period (i.e., the maximum priming time allotment") has expired.*

PO Resp. 9 (citing Ex. 2004 ¶¶ 35, 37, 40) (emphasis added).

Patent Owner argues that the word "prime," as used in claim 12, must be understood in terms of the depiction of an embodiment of a pumping system in Figure 4A of the '479 Patent, reproduced above. *See supra* Sec. I.A. We agree that claim terms must be construed in the context of and consistent with the disclosure in the specification, and we have done that here. Referring to Figure 4A, we determined that, "[i]f the current flow rate is greater than the priming flow value, process 400 proceeds from step 410 to step 420, indicating that the pumping system is primed." Dec. on Inst. 6. Patent Owner maintains, however, that once process 400 proceeds to step 420, process 400 logically will not employ priming alarm 421, unless and until step 408, i.e., the "PRESS 'START'" step, of process 400 is performed. PO Resp. 9–10. In other words, once process 400 determines via priming alarm 421 that the pump is primed, the primed state of the pumping system persists, unless priming dry alarm 418 is triggered. *Id.* at 10.

Patent Owner argues that, given a proper contextual understanding of the phrase "the controller determining whether the current flow rate is above a priming

flow value in order to determine whether the pump system is primed" in view of the Specification, the phrase should be construed as describing *only* the *initial* priming control. *Id.* (emphasis omitted). Specifically, and in connection with Figure 4A, Patent Owner argues that the controller repeatedly compares the current flow rate to a priming flow. *Id.* (citing Ex. 1001, col. 9, ll. 19–35 ("the process 400 returns to step 410 in which the query concerning the flow being above a priming flow is repeated")). Therefore, Patent Owner argues that this phrase is construed properly to require that priming alarm step 421 is performed repeatedly *after* step 408 ("PRESS 'START'") until priming alarm step 421 has determined either that the system is primed or that the maximum priming time allotment has been exceeded, after which "a priming alarm is displayed, and the process 400 is interrupted and does not proceed any further until the situation is addressed and corrected." *Id.* at 10 (quoting Ex. 1001, col. 9, ll. 29–35); *see* Ex. 2004 ¶ 38. Patent Owner insists that the *only* disclosure of the "priming flow value" in either Figure 4A or 4B is in connection with the *initial* priming control provided by priming alarm step 421. PO Resp. 10–11. Further, Patent Owner argues that claim 12 is limited strictly to the disclosure of Figure 4A and to the associated disclosure of columns 8 and 9 of the Specification. *Id.* at 14–15; Tr. 43:17–23.

In addition, Patent Owner argues that the start of the priming alarm procedure at step 421 is not triggered by a loss of prime, but instead by the "PRESS 'START'" at step 408. PO Resp. 11 (citing Ex. 1001, col. 9, ll. 25–28, Fig. 4A). Patent Owner maintains that any construction that is not limited to this *initial* priming control after the "Press 'Start'" of step 408 reads the language of claim 12 out of context of the Specification of the '479 Patent. *Id.* Further, Patent Owner argues that the Specification of the '479 Patent does not disclose the scenario in which prime is lost after step 420, and priming alarm step 421 is

performed again. According to Patent Owner, the concept of triggering priming alarm 421 at any point after the system primed 420 step is unsupported by the Specification of the '479 Patent. *Id.* During the Oral Hearing, however, Patent Owner acknowledged that the priming alarm could be triggered when the shaft power approaches zero, consistent with the language of unchallenged claim 13 and the depiction of Figures 4A and 4B. Tr. 45:6–46:2.

Petitioner replies to Patent Owner's arguments noting that claim 12 recites the words "is primed" and "is not primed," rather than "has become primed" or "has become not primed." Pet. Reply 1. Petitioner contends that the language of claim 12 does not distinguish between the start-up of the pump, during which prime is acquired initially, and the operation of the pump, during which there may be a loss of prime. *Id.* Moreover, Petitioner contends that claim 12 does not include any limitation suggesting the order of the recited steps and that claim 12 does not recite that the priming flow value only may be considered *before* regular operation. *Id.*

In particular, Petitioner contends that, with regard to Figure 4A, the Specification of the '479 Patent discloses consideration of the priming flow rate at step 410 *before* normal operation of the pump's flow control at step 412, and that the Specification also discloses consideration of the priming flow rate at step 410 *after* the normal operation of the pump's flow control at step 412. *Id.* at 2 (citing Ex. 1001, col. 8, l. 65–col. 9, l. 7; col. 9, ll. 19–24). Moreover, referring to Figures 4A and 4B, Petitioner contends that these figures depict that the process flow may proceed uninterrupted from step 412 to step 410 in order to make the priming flow comparison. *Id.* (citing Ex. 1001, col. 3, ll. 26–27, Figs. 4A and 4B). Thus, Petitioner contends that, when the comparison occurs at step 412 *after* the pump already has been running, the comparison with a priming flow rate would indicate

an unprimed condition after normal operation of the pump, i.e., a loss of prime condition. *Id.*

Finally, Patent Owner argues that the Specification of the '479 Patent indicates that consideration of the priming flow is "repeated." PO Resp. 10 (citing Ex. 1001, col. 9, ll. 19–35). According to Patent Owner, this repeated consideration is consistent with the evaluation of initial priming status, rather than operational priming status. *Id.* at 10–11. Even though the Specification may describe this possibility (Ex. 1001, Fig. 4A), Petitioner contends correctly that claim 12 does not recite such repeated consideration of the "priming flow" (Pet. Reply 2). Thus, Petitioner contends that the plain language of claim 12 supports our construction of the terms "is primed" and "is not primed" and that our construction is not inconsistent with the Specification of the '479 Patent. *Id.*

With respect to the meaning of "primed," we conclude that claim 12 does not makes clear by its language that the word "primed" should be understood to mean "initially primed" or primed after the pressing of a "Start" button. As Patent Owner acknowledged at Oral Hearing, the claim language does not mention the term "initial" or "start" (Tr. 38:23–40:6) and, despite Patent Owner's argument regarding the appropriate interpretation of "primed" in view of the Specification, we are not persuaded that the Specification limits "primed" in the manner argued by Patent Owner. Consequently, we conclude that the Specification does not express a clear intent to deviate from the plain meaning of the word "primed." *See Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) ("It is not enough for a patentee to simply disclose a single embodiment or use a word in the same manner in all embodiments, the patentee must clearly express an intent to redefine the term" (citations omitted; internal quotation marks omitted)).

We are persuaded by Petitioner that our construction of the terms "is primed" and "is not primed," as set forth in our Decision on Institution represents "the broadest reasonable meaning of the words in their ordinary usage, as those words would be understood by one of ordinary skill in the art, taking into account any definitions supplied by [patentee's] Specification" (*In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997)), and we confirm that construction here (Dec. on Inst. 11 (citing Ex. 3001)). Despite Patent Owner's arguments, we are not persuaded that patentee has supplied here such a definition limiting "primed" to "become primed" or "initially primed" with sufficient clarity, deliberateness, and precision. *Paulsen*, 30 F.3d at 1480.

In addition, if Figures 4A and 4B of the '479 Patent depict embodiments covered by claims 12 and 13, respectively, the use of variants of the word "prime" in each claim is relevant to the interpretation of that word in the other claim. The Federal Circuit has acknowledged that other claims of the patent can be valuable sources of enlightenment as to the meaning of a term of a challenged claim. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). Because claim terms generally are used consistently throughout a patent, the usage of a term in one claim may illuminate the meaning of the same term in other claims. *See Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed. Cir. 2001). Absent a clear showing in the Specification or in the claim language itself, that patentee intended that the word has different meanings in each claim, we construe the word consistently across the claims.

Finally, in construing the language of claim 12, we do not incorporate limitations from the Specification into that claim. Patent Owner argues that we should construe claim 12 to limit the definition of the terms "is primed" or "is not primed" to determining whether the pumping system is primed initially or at start

up and to determining repeatedly whether the pumping system is primed initially or at start up. As we noted above, in the absence of such a special definition or other considerations, "limitations are not to be read into the claims from the specification." *Van Geuns*, 988 F.2d at 1184. Moreover, "interpreting what is *meant* by a word *in* a claim is not to be confused with adding an extraneous limitation appearing in the specification, which is improper." *In re Cruciferous Sprout Litigation*, 301 F.3d 1343, 1348 (Fed. Cir. 2002) (internal quotation marks and citations omitted).

We are not persuaded that the single embodiment of the pumping system in Fig. 4 A of the '479 Patent controls the interpretation of claim 12. Although the Specification should be used to interpret the meaning of a claim, it should not be used to import unnecessary limitations into the claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc). In particular, the Federal Circuit has "expressly rejected the contention that if a patent describes a single embodiment, the claims of the patent must be construed as being limited to that embodiment." *Id.* at 1323.

For the reasons set forth above, for this final decision, we construe the verb phrases "is primed" and "is not primed" to describe the primed status of the system at start-up, at restart, or when a loss of prime condition is determined, by comparison of the "current flow rate" to a "priming flow rate."

2. "Maximum Priming Time Allotment"

With respect to our initial construction of the term "maximum priming time allotment," Patent Owner contends that we present two constructions of this term which are inconsistent with each other. PO Resp. 7–8. In particular, we construed the "maximum priming time allotment" as the period between start-up, restart, or the determination of a loss of prime *and* the determination that the system "is

primed" or "is not primed." Dec. on Inst. 16. Further, we construed the "maximum priming time allotment" also to mean the maximum time allowed for the system to prime after start or restart or after a loss of prime condition is determined. *Id.* Specifically, Patent Owner contends that the "maximum priming time allotment" logically must have a start and an end, i.e., to quantify the time allotment. *See* Ex. 2004 ¶¶ 35, 37, 40. Patent Owner contends that "[t]he first construction establishes a *variable* period (i.e., the period ending with the 'determination that the system 'is primed' or 'is not primed'') whereas the second construction establishes a *fixed* period (i.e., the period ending at the expiration of the 'maximum time allowed')." PO Resp. 7–8 (emphasis added); *see* Ex. 2004 ¶¶ 35, 37, 40. Patent Owner maintains instead that the "maximum priming time allotment" must have a beginning time and an ending time and that the controller must determine whether the pumping system is primed at least once prior to the expiration of the "maximum priming time allotment." PO Resp. 16–17.

We agree with Patent Owner that, although the *absolute* duration of the "maximum priming time allotment" may vary, e.g., may be programmable (*id.*; *see* Pet. Reply 3), the "maximum priming time allotment" must have a beginning time and an ending time (PO Resp. 16–17). Thus, in a relative sense, we agree that the duration of the "maximum priming time allotment" is *fixed*. We disagree, however, that the beginning time for the "maximum priming time allotment" is when the pump motor is activated or when the "Start" button is pressed. PO Resp. 18–20. As Patent Owner acknowledges, claim 12 does not expressly recite the activation or starting of the recited motor or the pressing of a button to start the motor. Tr. 39:22–40:6; 42:13–25. Nevertheless, Patent Owner argues that our construction fails to reflect accurately the context of the Specification of the '479 Patent, in which the term must be construed. For instance, Patent Owner argues

that the Specification of the ’479 Patent provides no disclosure to support the scenario in which the “maximum priming time allotment” is measured, triggered, or determined by a loss of prime. PO Resp. 8 (citing Ex. 2004 ¶¶ 33–34, 36, 39–40). To the contrary, Patent Owner argues that the Specification only describes the maximum priming time allotment in the context of priming alarm step 421, which is triggered by “PRESS ‘START’” at step 408 of Figure 4A. *Id.* at 9 (citing Ex. 1001, col. 9, ll. 19–35). Once the start button is pressed at step 408, priming alarm step 421 implements an iterative comparison (steps 408, 410, and 412) of the flow to the priming flow value until either the flow exceeds the priming flow value or the maximum priming time allotment is exceeded. *Id.* We agree that the term covers this process, but we are not persuaded that it is limited to this process.

Although Figure 4A of the Specification describes an example in which the pumping system determines whether the pumping system is primed after start up, linked Figure 4B of the Specification describes an example in which the pumping system determines whether the pumping system remains primed during operation. PO Resp. 12–14; Pet. Reply 2. As noted above, Patent Owner argues that the right side of Figure 4A relates solely to claim 12 (Tr. 43:17–23) and that the left side of Figure 4A and linked Figure 4B relate solely to claim 13 (*id.* at 50:17–51:4). Nevertheless, Patent Owner fails to identify anything in the Specification (or in the prosecution history) of the ’479 Patent that states this distinction. In the context of the Specification, linked Figures 4A and 4B represent overlapping, rather than clearly distinct, concepts.

We do not find that the Specification provides an express definition of the term. In the only use of the term, the Specification states that:

> Within step 421, a determination concerning a priming alarm is made. Specifically, if priming control (i.e., the system is determined to be primed), is not reached prior to a *maximum priming time allotment*, a

> priming alarm is displayed, and the process 400 is interrupted and does not proceed any further until the situation is addressed and corrected.

Ex. 1001, col. 9, ll. 28–34 (emphasis added). Referring to Figures 4A and 4B, however, step 421 receives input regarding both initial and operational priming status. *See* Ex. 1001, Fig. 4A (steps 408 and 414). Thus, we determine that this description does not limit the term exclusively to either usage.

On this record, we are unwilling to construe the term "maximum priming time allotment" narrowly, as proposed by Patent Owner. Instead, we are persuaded that, given our construction of the terms "is primed" and "is not primed," the beginning of the "maximum priming time allotment," i.e., "*the moment when the timer starts ticking* can be at or in relation to a start *or* a restart *or* a loss of prime event." Pet. Reply 3. Therefore, for this final decision, we construe the term "maximum priming time allotment" to mean the "maximum time allowed for the system to prime after start or restart or after a loss of prime condition is determined."

For this final decision, we adopt and apply the foregoing constructions, as well as our constructions of other claim terms, as set forth in our Decision on Institution. Dec. on Inst. 9–16. All remaining claim terms and phrases recited in the challenged claims need not be construed expressly here.

B. Asserted Grounds of Unpatentability

1. Introduction

Patent Owner alleges specific disputes involving material facts in this case. PO Resp. 3–4. Petitioner disagrees with Patent Owner on each of these disputes. Pet. Reply vii. Patent Owner contends that we may conclude that claim 12 is not unpatentable if we agree with Patent Owner's claim construction or if we determine that the combination of Rasmuson and Møller '042 does not render the

claim unpatentable. Tr. 36:13–37:12. In view of the foregoing claim construction, Patent Owner's arguments to distinguish claim 12 over Rasmuson and Møller '042 based on Patent Owner's proposed claim constructions now are moot.[4] *See* PO Resp. 21–28. Thus, it only remains to be resolved whether the combination of the teachings of Rasmuson and Møller '042 render claim 12 obvious.

2. Rasmuson and Møller '042

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter 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) objective evidence of nonobviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We instituted this *inter partes* review on Petitioner's asserted grounds of unpatentability that claim 12 of the '479 Patent is rendered obvious over Rasmuson and Møller '042. To support these asserted grounds, Petitioner provides detailed explanations, and the declaration of Dr. Emadi,[5] to show how the combined

[4] Patent Owner also argues that Rasmuson teaches away from the *initial* priming control as recited in claim 12 of the '479 Patent. PO Resp. 37–40; *see also* Paper 35 ¶¶ 31–33 (Rasmuson not related to priming at all); *but see* Paper 40, 14–15. However, because we conclude that claim 12 is not limited to *initial* priming control, but also encompasses loss of prime control, we are not persuaded by Patent Owner's teaching away arguments.

[5] Dr. Emadi provided a declaration with the Petition and was cross-examined on this declaration. However, Dr. Emadi suffered a heart attack in April 2014, and

references teach or suggest all of the claim limitations of claim 12. *See* Pet. 30–33.

Petitioner argues that Rasmuson discloses each and every element of the invention recited in claim 12, except that Rasmuson teaches determining "current flow rate" by use of a flow sensor, rather than determining "current flow rate based on an input power to the motor." Pet. 22. In particular, Petitioner maps Rasmuson to the elements of claim 12 in Claim Chart 4, but notes that Rasmuson

> discloses that the controller 46 is in communication with a flow transducer 30. [*See, e.g.*, Ex. 1021, col. 5, ll. 11–15.] The flow transducer 30 measures the "flow rate of the fluid being discharged by the pump" and transmits an electrical signal representative of this flow rate to the controller 46. [*See id.* at ll. 41–44 and 52–54.]

Pet. 23–25.

Petitioner argues that Møller '042 discloses a pumping system that regulates and assesses flow rate. *Id.* at 30. Like Rasmuson, Møller '042 discloses a pumping system including a pump, a motor coupled to the pump, and a controller in communication with the motor. *Id.* at 31 (citing Ex. 1003, Abstract; Fig. 5; col. 1, ll. 8–14). In particular, Møller '042 describes that its controller relates the measured input power to an actual value for a delivery variable in order to regulate the flow rate of the pump. *Id.* (citing Ex. 1003, col. 3, ll. 33–42). Specifically, Møller '042 states that, "the input power P, specifically the effective power and not the apparent or reactive power, *of the motor is measured as [a] parameter for the actual value of the delivery variable*." Ex. 1003, col. 3, ll. 39–42 (emphasis added). In addition, the Specification of the '479 Patent makes clear that

> The disclosures of [U.S. Patent No. 6,354,805 B2 to Møller and Møller '042] are incorporated herein by reference. In short summary, direct sensing of the pressure and/or flow rate of the water is not

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Dr. Toliyat replaced him for the purpose of offering a rebuttal declaration and sitting for cross-examination thereon. Paper 40, 10 n.2.

> performed, but instead one or more sensed or determined parameters associated with pump operation are utilized as an indication of pump performance. *One example of such a pump parameter is input power. Pressure and/or flow rate can be calculated/determined from such pump parameter(s).*

Ex. 1001, col. 6, ll. 17–32 (emphasis added). Thus, as the Specification of the '479 Patent acknowledges, Møller '042 discloses the measurement of the input power to the pump motor and the determination of flow rate based on such measurement. Pet. 31–32.

Petitioner further argues that a person of ordinary skill in the relevant art would have reason to modify the teachings of Rasmuson in view of the teachings of Møller '042 to achieve the invention recited in claim 12. *Id.* at 33. In particular, Petitioner argues that it would have been obvious to a person of ordinary skill in the relevant art to apply the known power measuring techniques of Møller '042 to improve Rasmuson's pumping system and, specifically, to improve Rasmuson's pumping system by providing a power measuring technique that eliminates "the need for a probe to be placed in the water, which may become contaminated, or require piping to be cut." *Id.*; *see also KSR*, 550 U.S. at 417 ("[W]hen a patent 'simply arranges old elements with each performing the same function it had been known to perform' and yields no more than one would expect from such an arrangement, the combination is obvious." (citations omitted)).

a. Alleged Deficiencies in Rasmuson

Patent Owner argues that, even under the claim construction set forth in the Decision on Institution (and substantially confirmed above), the combination of the teachings of Rasmuson and Møller '042 do not teach or suggest a "controller indicating a priming alarm if the pumping system is not primed before reaching a maximum priming time allotment." PO Resp. 28–30. Petitioner relies on

Rasmuson to teach or suggest this limitation. Pet. 23. In particular, Patent Owner argues that Rasmuson teaches the use of a "set flow" potentiometer in combination with a "cut-off delay" potentiometer to set a desired flow and a desired cut-off delay, respectively. PO Resp. 28 (citing Ex. 1021, col. 6, ll. 56–65; col. 7, ll. 5–15). If the measured flow drops below the "set flow" rate for a *time* equal to or greater than the set "cut-off delay," Rasmuson's motor cut-off switch is activated. *Id.* (citing Ex. 1021, col. 7, ll. 15–21).

Patent Owner argues that the low flow, i.e., the failure to reach the set flow rate within the permitted time, is due to the presence of gas in the oil well environment in which Rasmuson's pump is used. *See id.* at 28–29. Consequently, Patent Owner argues that Rasmuson's low flow is not due to a loss of prime, but instead is due to flow abnormalities caused by "inherent fluctuations to flow, such as the presence of gas." *Id.* at 29. Thus, Rasmuson's pump may continue to operate despite the presence of some gas. *Id.* As Patent Owner notes,

> when setting the desired cut-off delay, Rasmuson expressly discloses that "*[t]he desired cut-off delay is dependent on the amount of gas in the flow* through the downhole flow meter. [Ex. 1021, col. 7, ll. 23–25.] For example, in the case of a well having low gas content, Rasmuson describes "the setting may be as low as one second." [*id.* at col. 7, ll. 27–29.]

PO Resp. 29 (emphasis added).

As explained in our Decision on Institution, loss of prime may be due to the presence of too little fluid or too much gas in the pump. Dec. on Inst. 12 (citing Pet. 8); *see* Ex. 1018 ¶¶ 29–30. Although Patent Owner's declarants, Dr. Collins and Dr. Wooley, testify that Rasmuson does not teach determining whether the pump is or is not primed *at start up* (*see* Pet. Reply 5 (citing Ex. 2005 ¶ 27; Ex. 2004 ¶ 48; Ex. 1042 ¶ 28; Ex. 1043, 155:13–19)), Dr. Wooley acknowledges

that Rasmuson teaches priming control during operation. Pet. Reply 4–5 (citing Ex. 1042, 153:6–8). Therefore, we are persuaded the activation of the motor cut-off switch due to the presence of too much gas in the flow teaches or suggests a motor shut down due to the loss of prime.

b. Sufficiency of Reasons to Combine Rasmuson and Møller '042

Patent Owner next argues various reasons why a person of ordinary skill in the relevant art would not have combined the teachings of Rasmuson and Møller '042 to achieve the pumping system recited in claim 12. PO Resp. 30–59. After consideration of the parties' remarks and supporting evidence, we are not persuaded by Patent Owner's arguments and conclude that a person of ordinary skill in the relevant art would have had reason to combine the references in the manner proposed by Petitioner.

Petitioner contends that the measurement of input power, as taught by Møller '042, is a proxy for Rasmuson's flow transducer's measurement of actual flow rate and would represent an improvement on Rasmuson's methods and systems for measuring flow.[6] Pet. 33; *see* Ex. 1018 ¶ 61 ("The controller of the Møller '042 Patent correlates the input power to a delivery variable of the pump (flow rate or pressure)." (citing Ex. 1003, col. 3, ll. 33–42)); Ex. 1037 ¶ 38 ("In many cases, using power-sensing techniques is a better option than using a flow transducer . . .").[7] In particular, Petitioner contends that "providing a power

[6] Patent Owner argues that Møller '042 teaches away from Rasmuson because Rasmuson teaches *direct* flow measurement and Møller '042 teaches *indirect* flow measurement. PO Resp. 58–59. We do not find a clear teaching away from the substitution of one flow measurement means for its *functional* equivalent. For the reasons set forth above, we are not persuaded by those arguments.

[7] Dr. Schaaf testified that the use of power meters was less invasive than the installation of flow sensors at the pump and that, after utilizing a controller that measured electrical power to detect loss of prime, pump life was increased from

measuring technique [eliminates] the need for a probe to be placed in the water, which may become contaminated, or require piping to be cut." Pet. 33; *see* Ex. 1037 ¶¶ 29–40; *see also KSR*, 550 U.S. at 417 (arrangement of known elements according to their understood functions).

i. Lack of Improvement

Patent Owner argues that, contrary to Petitioner's contentions, combining the teachings of Møller '042 with those of Rasmuson would not improve the pumping methods and systems taught by Rasmuson. PO Resp. 30–32. This argument assumes that a person of ordinary skill in the art would not modify the teachings of Rasmuson to employ a less effective flow sensor. In particular, Patent Owner argues that Rasmuson's pumping methods and systems are intended for use in well pumps that "encounter variable friction loads that *may or may not* have an impact on flow rate." *Id.* at 30 (emphasis added). Nevertheless, Patent Owner's arguments are directed to pumps experiencing variable friction loads that impact flow rate. In particular, Patent Owner asserts alleged deficiencies of the use of input power as a proxy for actual flow rate. *Id.* (citing Ex. 2004 ¶¶ 62–65; Ex. 2005 ¶¶ 32–34).

In particular, Patent Owner argues that

> a worn pump *driven by a long, thin rod* (*e.g.*, "a rotary sucker rod string 23 which . . . is driven by a rotary electric motor 24 which is mounted to the wellhead 26") interjects a variable friction load into the overall system, which manifests as a fluctuating electrical load on the motor. *See, e.g.*, [Ex. 1021, col. 4, l. 67–col. 5, l. 3.]

PO Resp. 30. Patent Owner contends that input power to such pumps would vary almost constantly. *Id.* Patent Owner acknowledges that such varying input power

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about six months to about eighteen months. Ex. 1038 ¶ 19; *but see* Paper 35 ¶¶ 16–18 (alleged reasons not to combine).

might have some relation to the flow rate, but Patent Owner argues that it cannot always be reliably correlated to current flow. *Id.* at 30–31.

Patent Owner's arguments are based, in large part, on the testimony of Dr. Collins and Dr. Wooley. *Id.* (citing Ex. 2004 ¶¶ 62–65; Ex. 2005 ¶¶ 32–34). Dr. Collins testified that Rasmuson's methods and systems are for use in a system in which "[t]he motor is located at the surface while the pump is located at the bottom of the well." Ex. 2004 ¶ 50. Rasmuson, however, is not limited to such pumps. During Dr. Collins's deposition, Petitioner noted that Rasmuson also describes the use of electrically energized submersible pumps in which the motor and the pump are located together. *See* Pet. Reply 10 (citing Ex. 1021, col. 1, ll. 33–43). Dr. Collins acknowledged that he had not applied Rasmuson's teachings regarding electrically energized submersible pumps in at least paragraphs 50 and 65 of his declaration. Ex. 1043, 142:16–143:7. Similarly, Dr. Wooley also narrowly interprets the relationship between Rasmuson's pump and pump motor. Dr. Wooley testifies that "[t]he pump system disclosed in Rasmuson includes a rod pump with a motor at the top of the well and the pump at bottom, with potentially thousands of feet between them." Ex. 2005 ¶ 42; *see also id.* ¶¶ 35, 41 (discussing disadvantages of pumps driven by long thin rods). For the reasons noted above, Rasmuson simply is not limited to such pumps. Therefore, we discount the testimony of Dr. Collins and Dr. Wooley regarding the relationship between Rasmuson's motor and pump.

In addition, in paragraph 65 of his declaration, Dr. Collins testified that "[t]he flow sensor in Rasmuson is located at the surface, separated by hundreds or thousands of feet from the pump itself." Ex. 2004 ¶ 65. We note, however, that Rasmuson describes that the flow sensor need not be separated from the pump, and, if separate, the separation and the transmission of electrical signals to a

controller are not significant factors. Ex. 1021, col. 1, ll. 18–20 ("a flow transducer that continuously measures pump discharge flow *at a location immediately adjacent* the pump and transmits electrical signals representing pump flow"). Again, this inconsistency causes us to discount the testimony of Dr. Collins regarding the required relationship between the flow transducer and the pump.

Finally, Patent Owner argues that the inherent variability and inapplicability of input power measurements between pumps in an oilfield setting make input power an unsuitable proxy for flow transducers. PO Resp. 31–32; *but see* Paper 33, 2 (citing Ex. 1045, 79:1–24 (discussing empirical relationships between input power and flow rate between wells)); Paper 38 ¶ 8 (citing Ex. 2010, 79:25–80:1). In particular, Patent Owner relies on Dr. Wooley's testimony that "[a] lookup table as [Dr.] Emadi describes would only be good for that exact set of conditions, one particular well at one point in time. However, this approach would not work given the ever changing variables in an oil well application as discussed throughout my declaration." Ex. 2005 ¶ 43; *see* PO Resp. 31. Dr. Wooley concluded that "using lookup tables in the manner described by [Dr.] Emadi would be impractical in oil pumping systems including the applications disclosed in Rasmuson." Ex. 2005 ¶ 43.

Petitioner's declarant, Dr. Toliyat, testified that the use of empirical relationships to correlate input power to flow rate for the purpose of determining loss of prime are not undermined by the use of these relationships in oilfield applications. Ex. 1037 ¶¶ 27–29; Paper 33, 3–4 (citing Ex. 1044, 64:24–69:19); *but see* Paper 35 ¶¶ 22–26 (loss of prime conditions); Paper 38 ¶ 10 (citing Ex. 2011, 62:25–63:10). Moreover, Dr. Toliyat bases his opinion, in part, on the descriptions of the use of such empirical relationships in unapplied, prior art

references: Ellis-Anwyl (Ex. 1039), Garmong (Ex. 1040), and Markuson (Ex. 1041). *See* Ex. 1037 ¶¶ 41–62. Further, Dr. Schaaf testified that, based on his years of experience in the oil production industry, power input to electrical submersible pumps was used as a proxy for flow transducers in order to calculate flow rate so as to detect loss of prime conditions. Ex. 1038 ¶¶ 17–19, 27; Paper 33, 2 (citing Ex. 1045, 59:9–61:4), 3 (citing Ex. 1045, 106:3–110:6); *but see* Paper 35 ¶¶ 7–15 (effects on empirical correlations), 19–21 (loss of prime conditions); Paper 38 ¶¶ 1–6 (regarding whether input power to the motor is a viable proxy for flow rate). As we noted above, Dr. Wooley bases his opinion, in part, on a misunderstanding of the spatial relationship between Rasmuson's pumps and motors. Ex. 2005 ¶ 42. For the foregoing reasons, we are persuaded by Petitioner that a person of ordinary skill in the art would have found the measurement of power input to determine flow rate to be a proxy for and an improvement over the use of a flow transducer.[8]

ii. Principle of Operation and Intended Purpose

Patent Owner also argues that the modification of the Rasmuson pump in view of the teachings of Møller '042 (1) would impermissibly change the principle of Rasmuson's operation or (2) would render Rasmuson unsatisfactory for its intended purpose. PO Resp. 22–37. After reviewing the parties' remarks and supporting evidence, we are not persuaded that the proposed combination of the teachings of Rasmuson in view of the teachings of Møller '042 is impermissible for either reason.

Patent Owner correctly states that "Rasmuson's principle of operation relies on sensing 'pump discharge flow and to deenergize the pump . . . in the event

[8] For these reasons, we are not persuaded by Patent Owner's arguments with respect to Examination Guidelines A–D and F of MPEP § 2143. PO Resp. 45–51.

pump discharge flow rate should fall below a predetermined set point for any number of reasons.'" *Id.* at 33 (quoting Ex. 1021, col. 2, ll. 30–34). Specifically, however, Patent Owner argues that the operation of Rasmuson's methods and systems "explicitly relies on an actual, *physical* measurement of flow" by flow transducers. PO Resp. 32 (emphasis added). We do not agree that Rasmuson's principle of operation is limited by the device used to measure the discharge flow rate.

Patent Owner argues that using the measurement of input power as a proxy for a flow transducer would change Rasmuson's principle of operation for several reasons. First, Patent Owner argues that calculations of flow rate based on input power are not as accurate as the flow rate determined by a flow transducer in view of the unique attributes of the oilfield environment in which Rasmuson is used. *Id.* at 33–35 (citing Ex. 2005 ¶¶ 33–35, 37–42). Nevertheless, consideration of these unique characteristics of particular pieces of equipment and particular environmental conditions unnecessarily narrows Rasmuson's principles of operation. *See* Ex. 1021, col. 2, ll. 30–34. Moreover, to the extent that Patent Owner relies on Dr. Wooley's understanding of Rasmuson, as discussed above, Dr. Wooley's understanding of Rasmuson is too narrow. *See supra* Sec. II.B.2.b.i. Further, as noted above, Petitioner's declarants, Dr. Emadi, Dr. Toliyat, and Dr. Schaaf, have testified persuasively that measurement of power input is and has been an accurate proxy for flow transducers to detect loss of prime. *See, e.g.*, Ex. 1018 ¶¶ 24–25; Ex. 1037 ¶¶ 27–29; Ex. 1038 ¶¶ 17–19. Second, Patent Owner argues that Rasmuson's methods and systems provide for the flow transducer to be mounted to the flow line near the wellhead or at the surface of the well, "which is hundreds or thousands of feet above the pump." PO Resp. 35–36 (citing Ex. 1021, col. 5, ll. 11–12; Ex. 2005 ¶ 65; Ex. 2004 ¶¶ 41–42). However, as discussed

above, Rasmuson also describes an embodiment in which the discharge flow rate is measured adjacent to the pump. Ex. 1021, col. 1, ll. 18–20. Third, Patent Owner again asserts that, because Rasmuson requires a long rod connecting the pump to the motor, the measurement of motor input power is not a suitable proxy for a flow transducer. PO Resp. 36–37 (citing Ex. 2005 ¶ 65; Ex. 2004 ¶¶ 41–42). As discussed above, however, Rasmuson also describes an embodiment that employs an electrical submersible pump combining the pump and the motor. Ex. 1021, col. 1, ll. 33–43. Consequently, we are not persuaded that the modification of Rasmuson in view of Møller '042 impermissibly changes a principle of Rasmuson's operation.

Patent Owner also argues that the proposed modification of Rasmuson would render Rasmuson unsatisfactory for its intended purpose. In particular, Patent Owner argues that "Rasmuson is concerned with accommodating for 'the presence of gas within the crude oil,' and protecting a 'pump [that has] become worn' or is experiencing 'excessive load, due to fouling by solid components of the well fluid or due to the presence of deposits in the pump from the well fluid.'" PO Resp. 33 (quoting Ex. 1021, col. 1, ll. 55–58; col. 2, ll. 1–5, 10–14). Patent Owner, however, proposes too narrow a description of Rasmuson's intended purpose. Patent Owner describes specific problems that embodiments of Rasmuson's methods and systems are designed to handle, but Rasmuson's intended purpose is more broadly to control pumps experiencing low flow rates of operation. *See* Ex. 1021, col. 1, ll. 6–31. We are persuaded that modifying the teachings of Rasmuson to use the measurement of motor power input to calculate flow rate instead of or in addition to the use of a flow transducer for the same purpose would not render Rasmuson unsatisfactory for its intended purpose.

iii. Allegation that Rasmuson Is Not Analogous Art to Claim 12

Patent Owner argues that Rasmuson is not analogous art to claim 12 of the '479 Patent. In particular, Patent Owner argues that Rasmuson is neither from the same field of endeavor as the claimed invention nor is it reasonably pertinent to the problem faced by the patentee. PO Resp. 40–43 (citing *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004)). For the following reasons, we conclude that Rasmuson is analogous art to the pumping system recited in the challenged claim.

Patent Owner argues that "Rasmuson states that it 'relates generally to pumps that are located downhole within wells for pumping well fluid, typically petroleum products and water, which enter the wells from oil bearing subsurface formations.'" PO Resp. 41 (quoting Ex. 1021, col. 1, ll. 6–9); *see* PO Resp. 40–42.[9] In particular, Patent Owner argues that Rasmuson relates to downhole pumps joined by a long rod to motors located at the surface. As discussed above, however, Rasmuson describes multiple pump types, including pumps driven by a long rod or shaft separating the pump from the pump motor (Ex. 1021, col. 4, l. 67–col. 5, l. 3) and electrical submersible pumps (*id. at* col. 1, ll. 6–9, 33–43). Further, claim 12 broadly recites "[a] pumping system for at least one aquatic application, the pumping system comprising: *a pump* . . ." (emphasis added). Suitable pump types are described broadly in the Specification of the '479 Patent. *See, e.g.*, Ex. 1001, col. 4, ll. 27–38.

Moreover, Patent Owner argues that Rasmuson relates to oil rather than aquatic applications and that claim 12 is limited to aquatic applications. Despite Patent Owner's arguments to the contrary (*see* Tr. 68:15–69:12), we are not

[9] Patent Owner argues that, as a result of statements during prosecution, Rasmuson relates *solely* to downhole pumps. PO Resp. 40 (citing Ex. 2006, 9). However, the cited statements relate to the distinguishing Rasmuson's claims over applied art.

persuaded that the reference to "at least one aquatic application" in the preamble of claim 12 is a limitation. "In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim." *Catalina Marketing Int'l., Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). "Conversely, a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.'" *Id.* (quoting *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)). Here, we determine that the body of the claim describes a structurally complete invention and that the preamble neither recites structure nor is necessary to give life meaning or vitality to claim 12. Therefore, we are not persuaded by Patent Owner's arguments that Rasmuson is not analogous art based on the type of pumps described in Rasmuson or the aquatic applications for which the recited pumping systems are suitable.

Nevertheless, even if the reference to aquatic applications in the preamble of claim 12 were found somehow to limit the claim, we are not persuaded that this limitation would render Rasmuson non-analogous art. Patent Owner argues that the Specification of the '479 Patent describes the pumping system "in the context of variable speed centrifugal pump for use *in pools, spas, and other aquatic pump applications*." PO Resp. 42 (citing Ex. 1001, col. 4, ll. 4–13; col. 8, l. 13–col. 10, l. 56) (emphasis added). Patent Owner argues that "[t]he field of oil and gas well production and the field of pool, spa, and aquatic systems are vastly different, with little, if any, overlap from the perspective of one of ordinary skill in the art of either field." PO Resp. 42 (citing Ex. 2004 ¶¶ 42–43, 45–51, 53–54; Ex. 2005 ¶¶ 11–23).

Petitioner contends, and we agree, that Patent Owner's definition of "aquatic

application" is too narrow and is not supported by the Specification of the '479 Patent. Pet. Reply 6–7. As Petitioner notes, the Specification of the '479 Patent provides an inclusive definition of "aquatic application," stating that "the phrase 'aquatic application' is used generally herein to refer to *any* *reservoir*, tank, container *or* *structure*, *natural or man-made*, having a fluid, capable of holding a fluid, to which a fluid is delivered, or *from which a fluid is withdrawn*." Pet. Reply 7 (quoting Ex. 1001, col. 3, l. 54–58); *but see* Paper 35 ¶ 27 (Dr. Toliyat's understanding of "reservoir" in oilfield applications). Further, the Specification explains that "liquids other than water are also within the scope of the present invention" and "applications that include liquids other than water are also within the scope of the present invention." *Id.* Rasmuson describes that water, as well as oil, may be operated on by Rasmuson's methods and systems. Pet. Reply 7 (citing Ex. 1021, col. 1, ll. 5–10; col. 4, ll. 51–57). Moreover, as Patent Owner's declarant, Dr. Wooley, explains, "[a]t times, salt water from the reservoir can come into the wellbore and can even dwarf the amount of oil being pumped." Ex. 2005 ¶ 17; *see* Ex. 1042. Therefore, we determine that Rasmuson's methods and systems are for an aquatic application as that term is defined in the '479 Patent.

Although we need not reach the second prong of the test for analogous art, we note that Patent Owner argues that Rasmuson is directed to a problem that is not reasonably pertinent to claim 12 of the '479 Patent because of Patent Owner's proposed construction limiting claim 12 to the detection of priming status at start up. PO Resp. 42–43. Given our claim construction discussed above, we are not persuaded by these arguments. *See* Pet. Reply 8 (Rasmuson relates to "priming control"). Therefore, we conclude that Rasmuson is analogous art.

iv. Combination Based on Improper Hindsight

Patent Owner argues that Petitioner has relied on hindsight reasoning to piece together portions of Rasmuson and Møller '042 to achieve the pumping system recited in claim 12. PO Resp. 55–57. In particular, Patent Owner argues that claim 12 was intended to solve "the problem of priming control at start up," and that Petitioner's reason for combining Rasmuson and Møller '042 solves a different problem. *Id.* at 56. Moreover, Patent Owner argues that neither Rasmuson nor Møller '042 is directed to the problem allegedly solved by claim 12. *Id.* at 56–57.

Initially, we note that

> Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill [in the art] at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.

In re McLaughlin, 443 F.2d 1392, 1395 (CCPA 1971). Further, in view of our claim construction, we do not agree that the problem solved by claim 12 may be narrowly limited to priming control at start up. Petitioner argues that Møller '042 teaches a known alternative to Rasmuson's flow transducers for determining flow rate. Pet. 30–33; Pet. Reply 5. Moreover, Petitioner's declarants, Dr. Emadi, Dr. Toliyat, and Dr. Schaaf, testified that a person of ordinary skill in the art, at the time of the invention of the pumping system recited in claim 12, would have reason, apart from the disclosure of the '479 Patent, to substitute for or augment Rasmuson's flow transducer by the methods and apparatus taught by Møller '042.[10] *See, e.g.*, Ex. 1018 ¶ 62; Ex. 1037 ¶ 30; Ex. 1038 ¶¶ 14, 27. Therefore, we

[10] In view of this discussion, we are not persuaded by Patent Owner's arguments

are not persuaded that Petitioner relied on impermissible hindsight in combining the teachings of Rasmuson and Møller '042.

From our review of the record and in view of the foregoing discussion, we conclude that Petitioner demonstrates by a preponderance of the evidence that independent claim 12 of the '479 Patent is rendered obvious by the combination of the teachings of Rasmuson and Møller '042.

C. Motion to Exclude Evidence

Patent Owner filed a Motion to Exclude certain evidence (Paper 34 ("Mot. to Excl.")). Petitioner filed an Opposition to Patent Owner's Motion to Exclude (Paper 39 ("Opp. to Excl.")), and Patent Owner filed a Reply to Petitioner's Opposition (Paper 41 ("Excl. Reply"). In particular, Patent Owner moves to exclude Petitioner's exhibits, as follows:

Petitioner's Exhibits	Proposed Grounds for Exclusion
Danfoss, VLT® AQUA Drive, "The ultimate solution for Water, Wastewater, & Irrigation" (May 2007) (Ex. 1034; "the Danfoss Brochure")	FRE 401–403
Danfoss, VLT® SALT Drive Systems, Increase oil & gas production, Minimize Energy Consumption (marked Copyright 2011) (Ex. 1035; "the Danfoss Senorless Artificial Lift")	FRE 401–403
Declaration of Hamid Toliyat, Ph.D., P.E. (Ex. 1037; "the Toliyat Declaration")	FRE 401–403, 702
Declaration of Robert Schaaf (Ex. 1038; "the Schaaf Declaration")	FRE 401–403, 702
U.S. Patent No. 4,021,700, issued May 3, 1977 (Ex. 1039; "Ellis-Anwyl")	FRE 401–403, 801–807
U.S. Patent No. 4,473,338 issued September 25, 1984 (Ex. 1040; "Garmong")	FRE 401–403, 801–807
U.S. Patent No. 4,767,280 issued August 30,	FRE 401–403, 801–807

with respect to Examination Guidelines A and G of MPEP § 2143. PO Resp. 44–45, 53–55.

Petitioner's Exhibits	Proposed Grounds for Exclusion
1988 (Ex. 1041; "Markuson")	

Mot. to Excl. 2–5; *see also* Ex. 2014 ¶¶ 2–5 (objections served by Patent Owner). As the moving party, Patent Owner bears the burden of establishing that it is entitled to the relief requested, namely, the exclusion of the identified exhibits. For the reasons set forth below, Patent Owner's Motion to Exclude these exhibits is *denied* or *dismissed as moot*.

1. The Danfoss Brochure (Ex. 1034) and the Danfoss Senorless Artificial Lift (Ex. 1035)

Patent Owner argues that each of the Danfoss Brochure (Ex. 1034) and the Danfoss Senorless Artificial Lift (Ex. 1035) was created after the priority date of the '479 Patent. Mot. to Excl. 5. Petitioner does not contest that the effective dates of these exhibits are after the priority date of the '479 Patent. Opp. to Excl. 6, 12–13. Nevertheless, we do not rely on Exhibit 1034 or Exhibit 1035 in reaching our decision herein. Accordingly, with respect to these exhibits, we dismiss the Motion to Exclude as moot.

2. The Toliyat Declaration (Ex. 1037), Ellis-Anwyl (Ex. 1039), Garmong (Ex. 1040), and Markuson (Ex. 1041)

Patent Owner objects to the Toliyat Declaration "as lacking foundation, assuming facts not in evidence, containing testimony on matters as to which the witness lacks personal knowledge, containing hearsay, and conclusory." Mot. to Excl. 3 (citing Ex. 2013 ¶ 4). Patent Owner, however, fails to identify specifically, which portions of the Toliyat Declaration are the subject of each of these objections, yet Patent Owner seeks to exclude the entirety of Ex. 1037. Mot. to Excl. 3, 9–10. We will not go through the Toliyat Declaration to determine which portions of the exhibit Patent Owner believes to be excludable under each of these

objections. Because Patent Owner bears the burden of establishing its entitlement to the relief it requests, this is something that Patent Owner should have done in its Motion to Exclude.

Despite Patent Owner's failure to identify the portions of the Toliyat Declaration which allegedly are being improperly offered for the truth of the matter asserted, we understand that Patent Owner's hearsay objections are due to Dr. Toliyat's reliance on Ellis-Anwyl (Ex. 1039), Garmong (Ex. 1040), and Markuson (Ex. 1041) in reaching his conclusions as to what a person of ordinary skill in the art would have known regarding the use of input power to a motor to identify flow rate. *See* Mot. to Excl. 9–10 (citing Ex. 1037 ¶¶ 43, 55, 60). Petitioner responds that the Toliyat Declaration, especially as it relates to Ellis-Anwyl (Ex. 1039), Garmong (Ex. 1040), and Markuson (Ex. 1041), describes the knowledge of a person of ordinary skill in the relevant art as of the priority date of claim 12 of the '479 Patent. Opp. to Excl. 7 (citing *Randall Mfg v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013)). We determine that these references merely represent underlying facts upon which Dr. Toliyat relied in reaching his conclusions regarding the knowledge of one of ordinary skill as of the priority date of claim 12 of the '479 Patent. *See* Opp. to Excl. 8–9.

Patent Owner further objects to the Toliyat Declaration under FRE 702 "for failing to demonstrate that the declarant is qualified as an expert in the relevant subject matter, failing to be based upon sufficient facts or data, as the product of unreliable principles and methods, and for failing to reliably apply sound principles and methods to the facts of the case." Mot. to Excl. 3–4. Patent Owner, however, fails to identify the portions of the Toliyat Declaration that fail to be based upon sufficient facts or data, are the product of unreliable principles and methods, or fail to reliably apply sound principles and methods to the facts of the case. Initially,

we note that there is no requirement for a perfect match between the expert's experience and the field of the patent. *SEB S.A. v. Montgomery Ward & Co.*, 594 F.3d 1360, 1372–73 (Fed. Cir. 2010). Thus, as with the objections discussed above, Patent Owner fails to meet its burden with respect to these objections. Further, with regard to these objections under FRE 702, we note that under 37 C.F.R. § 42.65(a), "[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." Consequently, this objection properly goes to the weight to be given Dr. Toliyat's testimony, and not to its admissibility.

Finally, Patent Owner also objects to the Toliyat Declaration "as irrelevant under FRE 401 and 402, and as unfairly prejudicial, confusing, and misleading under FRE 403." Mot. to Excl. 4. In particular, Patent Owner argues that Dr. Toliyat's conclusions based on his analysis of Ellis-Anwyl (Ex. 1039), Garmong (Ex. 1040), and Markuson (Ex. 1041) are "legally irrelevant to the issue of obviousness." Mot. to Excl. 9–10. In order to be relevant evidence under FRE 401 and 402, the exhibit must have a tendency to make a fact of consequence more or less probable, and admission must not be otherwise prohibited. Petitioner contends, however, that the discussion of these references in the Toliyat Declaration

> confirms that one of ordinary skill in the art knew to use empirical relationships between the electrical characteristics of the pump and the flow produced by the pump in an **oil** well pump for loss of prime purposes. Contrary to the Patent Owners' arguments, it is well settled that prior art that does not itself form the basis of a rejection nevertheless remains reliable evidence of the level of skill in the art.

Opp. to Excl. 8–9 (citations omitted). Thus, Petitioner contends that, because Patent Owner challenged the applicability of the teachings of Møller '042 in an oil

well environment, Dr. Toliyat's discussion of these references is relevant rebuttal testimony regarding what a person of ordinary skill in the relevant art would know as of the priority date of claim 12 of the '479 Patent. *Id.; but see* Excl. Reply 1–2 (citing PO Resp. 30–40). We are persuaded by Petitioner that Dr. Toliyat's testimony is relevant to reasons to combine the teachings of Rasmuson and Møller '042. Finally, regarding Patent Owner's objections under FRE 403, Patent Owner again fails to identify specifically the portions of the Toliyat Declaration that it believes to be "unfairly prejudicial, confusing, and misleading" and why we would be unable to weigh this evidence without prejudice or confusion and without being misled.

For the reasons set forth above, we deny Patent Owner's Motion to Exclude with respect to the Toliyat Declaration (Ex. 1037) and Ellis-Anwyl (Ex. 1039), Garmong (Ex. 1040), and Markuson (Ex. 1041).

3. The Schaaf Declaration (Ex. 1038)

As with the Toliyat Declaration, Patent Owner objects to the Schaaf Declaration "as lacking foundation, assuming facts not in evidence, containing testimony on matters as to which the witness lacks personal knowledge, containing hearsay, and conclusory." Mot. to Excl. 4 (citing Ex. 2013 ¶ 5). In addition, Patent Owner also objects to the Schaaf Declaration "as irrelevant under FRE 401 and 402, and as unfairly prejudicial, confusing, and misleading under FRE 403." Mot. to Excl. 4. Patent Owner, however, fails to identify specifically, which portions of the Schaaf Declaration are the subject of each of these objections, yet Patent Owner seeks to exclude the entirety of Ex. 1038. Mot. to Excl. 4, 10–13. As with the Toliyat Declaration, we will not go through the Schaaf Declaration to determine which portions of the exhibit Patent Owner believes to be excludable under each of these objections. Because Patent Owner bears the burden of

establishing its entitlement to the relief it requests, this also is something that Patent Owner should have done in its Motion to Exclude.

Patent Owner further objects to the Schaaf Declaration under FRE 702 "for failing to demonstrate that the declarant is qualified as an expert in the relevant subject matter, failing to be based upon sufficient facts or data, as the product of unreliable principles and methods, and for failing to reliably apply sound principles and methods to the facts of the case." Mot. to Excl. 4. We again note that there is no requirement for a perfect match between the expert's experience and the field of the patent. *SEB S.A.*, 594 F.3d at 1372–73. Further, of these objections, Patent Owner only argues with specificity that Mr. Schaaf failed to disclose the underlying facts and data upon which his opinions are based and that, although Mr. Schaaf refers to tests and data, Mr. Schaaf failed to sufficiently explain those tests, as required by the Board's Rules. Mot. to Excl. 10–11; *see also* Paper 35 ¶ 1–3 (collected and existing oilfield data); Paper 38 ¶ 9 (describing oilfield data collected). Specifically, "Mr. Schaaf provides four examples from his work experience where he claims he observed monitoring of pump input power as a proxy for flow rate" (*id.* at 11 (citing Ex. 1038 ¶¶ 17, 22, 25)), but Mr. Schaaf does not provide evidence of these or other tests in support of his opinions (*id.* at 11–13). *See* Paper 35 ¶¶ 4–6.

In response, Petitioner contends that these "examples" and "tests" are drawn from Mr. Schaaf's 25 years of experience in the oil business and not on tests performed in preparation for his testimony. Opp. to Excl. 10–11, *see also* Paper 40, 1 ("Patent Owners err in raising 37 C.F.R. § 42.65 and associated principles. Petitioner does not rely on the Schaaf declaration for the purpose of supplying any element recited by Claim 12."). Dr. Schaaf specifically states that "[his] expert opinions are narrowly limited to [his] personal knowledge of and experience with

using input power as an indicator of flow rate in oil well applications." Ex. 1038 ¶ 4. Thus, Petitioner maintains that Mr. Schaaf's testimony is supported properly by his practical experience as evidenced by the recounted "examples" and "tests." Opp. to Excl. 11. With regard to these objections under FRE 702, we again note that under 37 C.F.R. § 42.65(a), "[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." Consequently, this objection properly goes to the weight to be given Dr. Schaaf's testimony, and not to its admissibility.

For the reasons set forth above, we deny Patent Owner's Motion to Exclude with respect to the Schaaf Declaration (Ex. 1038).

III. CONCLUSION

Based on the foregoing discussion, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 12 is unpatentable under 35 U.S.C. § 103(a) over Rasmuson and Møller '042.

IV. ORDER

In consideration of the foregoing, it is

ORDERED that Petitioner has shown by a preponderance of the evidence that claim 12 of the '479 Patent is unpatentable under 35 U.S.C. § 103(a) over Rasmuson and Møller '042;

FURTHER ORDERED that Patent Owner's Motion to Exclude Evidence is *dismissed* as moot with respect to Exhibits 1034 and 1035 and *denied* with respect to Exhibits 1037–1041; and

FURTHER ORDERED that, because this is a final decision, parties to the proceeding seeking judicial review of the decision must comply with the notice

and service requirements of 37 C.F.R. § 90.2.

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