

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIVERSAL IMAGING INDUSTRIES, LLC,
Petitioner,

v.

LEXMARK INTERNATIONAL, INC.,
Patent Owner.

IPR2019-01368
Patent 9,335,698 B2

Before JUSTIN T. ARBES, DAVID C. McKONE, and
GREGG I. ANDERSON, *Administrative Patent Judges*.

ARBES, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

Petitioner Universal Imaging Industries, LLC, filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 17 and 18 of U.S. Patent No. 9,335,698 B2 (Ex. 1001, “the ’698 patent”) pursuant to 35 U.S.C. § 311(a). Patent Owner Lexmark International, Inc., filed a

Preliminary Response (Paper 6, “Prelim. Resp.”) pursuant to 35 U.S.C. § 313. Pursuant to 35 U.S.C. § 314(a), the Director may not authorize an *inter partes* review unless the information in the petition and preliminary response “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.” For the reasons that follow, we do not institute an *inter partes* review.

B. Related Matters

The parties indicate that the ’698 patent is the subject of the following district court case: *Lexmark International, Inc. v. Universal Imaging Industries, LLC*, Case No. 8:18-cv-01047-EAK-AEP (M.D. Fla.). See Pet. 1; Paper 5, 3. Petitioner has filed petitions challenging other patents also asserted in the district court case in Cases IPR2019-01369, IPR2019-01378, IPR2019-01380, IPR2019-01381, IPR2019-01383, IPR2019-01385, IPR2019-01387, IPR2019-01388, and IPR2019-01389.

C. The ’698 Patent

The ’698 patent discloses “methods for providing a page countdown for a replaceable unit of an image forming device,” such as a toner cartridge of a printer or copier. Ex. 1001, col. 1, ll. 20–29. According to the ’698 patent, when a replaceable unit begins running out of toner, “[u]sers often face a dilemma of choosing the best time to replace the[] unit[].” *Id.* at col. 1, ll. 29–32. “[I]f the user waits too long to replace the unit, print quality defects may occur from a lack of the image forming substance available in the device,” but “if the user replaces the unit too soon, usable image forming substance remaining in the replaceable unit being removed

may be wasted.” *Id.* at col. 1, ll. 32–37. The ’698 patent describes a method for “provid[ing] a user with an indication of the remaining life of a replaceable unit with improved precision.” *Id.* at col. 1, ll. 60–63.

Figure 1 of the '698 patent is reproduced below.

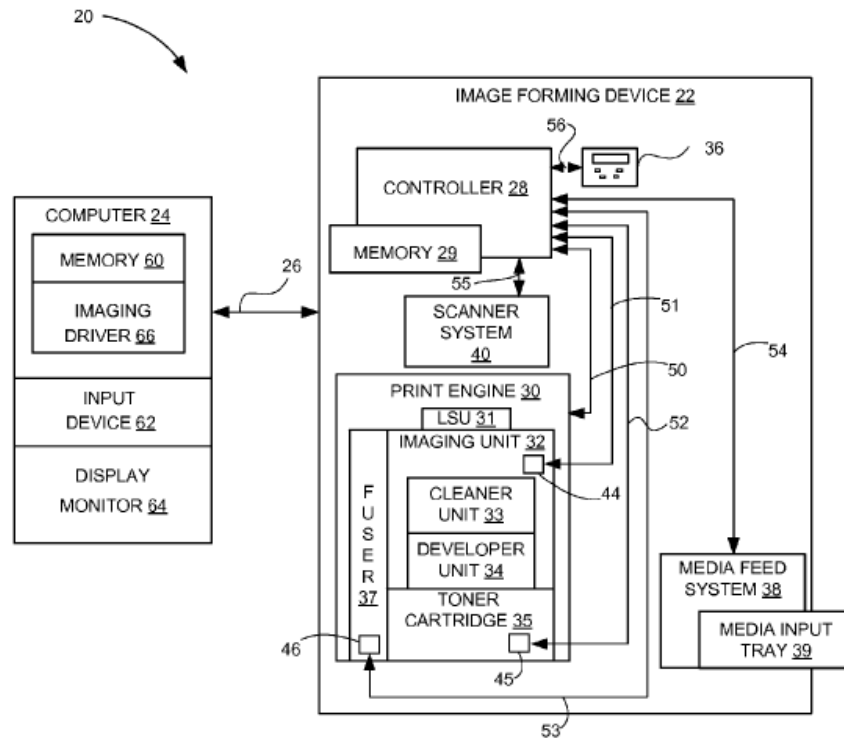


FIGURE 1

Figure 1 depicts image forming device 22 in communication with computer 24. *Id.* at col. 3, ll. 27–32. Print engine 30 of image forming device 22 includes imaging unit 32, developer unit 34, and removable toner cartridge 35 (having processing circuitry 45 with memory). *Id.* at col. 4, ll. 8–13, 48–50. Developer unit 34 “houses a toner reservoir (or toner sump) and a toner delivery system . . . that provides toner from the toner sump to a developer roll.” *Id.* at col. 4, ll. 50–55. Toner is “periodically transferred from a reservoir in toner cartridge 35 to resupply the toner sump in developer unit 34.” *Id.* at col. 4, ll. 61–65. As shown in Figures 2 and 3,

[o]nce toner cartridge 200 runs out of usable toner it must be replaced or refilled. However, when toner cartridge 200 runs out

of usable toner, a buffer amount of toner remains in toner sump 305. The toner remaining in toner sump 305 allows image forming device 22 to continue printing even though no usable toner remains in toner cartridge 200. Image forming device 22 can continue printing until toner sump 305 runs out of usable toner. In this manner, toner sump 305 provides the user with a window to replace toner cartridge 200 without wasting toner.

Id. at col. 9, ll. 27–36.

Developer unit 301 “includes a toner level sensing system that measures the amount of toner present in toner sump 305.” *Id.* at col. 7, ll. 18–20. “[W]hen the toner level sensing system determines that the toner level in toner sump 305 is below a predetermined threshold deemed ‘low,’ controller 28 initiates a toner addition cycle” to transfer toner from toner cartridge 200 to toner sump 305. *Id.* at col. 8, ll. 13–37. “The toner level sensing system also determines when no usable toner remains in toner cartridge 200 rendering toner cartridge 200 empty for practical purposes.” *Id.* at col. 7, ll. 23–25. It does so by determining the toner level in toner sump 305 after a toner addition cycle. *Id.* at col. 8, ll. 60–62. If the toner level sensing system determines that “toner sump 305 has not been refilled to the level anticipated, the toner level sensing system concludes that toner cartridge 200 is out of usable toner.” *Id.* at col. 8, ll. 62–66. At that point, “to help the user determine when to replace toner cartridge 200, . . . controller 28 displays a page countdown on user interface 36 of image forming device 22 and/or display monitor 64 of computer 24,” which “informs the user of the number of pages . . . that may be printed before toner sump 305 will run out of the buffer amount of toner.” *Id.* at col. 9, ll. 45–53. The ’698 patent describes tracking the “number of [printable elements (pels)] printed with toner cartridge 200” since the toner level sensing system determined that toner cartridge 200 is out of usable toner,

converting that value to “an amount of toner” used, and calculating the number of pages remaining based on the amount of toner used. *Id.* at col. 10, ll. 15–52.

D. Challenged Claims

Claims 17 and 18 of the ’698 patent recite:

17. A toner cartridge for use in an electrophotographic image forming device, the toner cartridge comprising:

a housing having a reservoir for storing toner; and

electronic memory on the housing, the electronic memory stores a record of whether the reservoir is out of useable toner, an estimated number of pages remaining for a page countdown for display by the image forming device of a number of pages remaining for the toner cartridge, and an amount of toner used by the image forming device after the image forming device declares the reservoir out of useable toner.

18. A memory device mountable on a toner cartridge of an electrophotographic image forming device, comprising memory cells that store a record of whether the toner cartridge is out of useable toner, an estimated number of pages remaining for a page countdown for display by the image forming device of a number of pages remaining for the toner cartridge, and an amount of toner used by the image forming device after the image forming device declares the reservoir out of useable toner.

E. Evidence

Petitioner relies on the following prior art:

U.S. Patent No. 8,626,005 B2, filed Sept. 28, 2010, issued Jan. 7, 2014 (Ex. 1004, “Hiraike”);

U.S. Patent No. 5,995,774, issued Nov. 30, 1999 (Ex. 1007, “Applegate”);

U.S. Patent No. 5,802,420, issued Sept. 1, 1998 (Ex. 1006, “Garr”);

U.S. Patent No. 5,636,032, issued June 3, 1997 (Ex. 1003, “Springett”); and

U.S. Patent Application Publication No. 2012/0213538 A1, published Aug. 23, 2012 (Ex. 1013, “Tomaru”).¹

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 17 and 18 of the ’698 patent are unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §	References/Basis
17, 18	103(a) ²	Springett, Hiraike
17, 18	103(a)	Springett, Tomaru
17, 18	103(a)	Garr, Springett, Applegate

II. ANALYSIS

A. Legal Standards

A claim is unpatentable for obviousness if, to one of ordinary skill in the pertinent art, “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.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a)). The

¹ Petitioner refers to Tomaru as “U.S. Patent Publication 2012/0213538” in its Petition, but filed an incorrect document as Exhibit 1005. See Pet. 2. We refer herein to the correct document filed as Exhibit 1013 and labeled “REPLACEMENT FOR 1005.”

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Because the challenged claims of the ’698 patent have an effective filing date before the effective date of the applicable AIA amendment, we refer to the pre-AIA version of 35 U.S.C. § 103. See Ex. 1001, codes (22), (60), (63).

question of obviousness is resolved on the basis of underlying factual determinations, including “the scope and content of the prior art”; “differences between the prior art and the claims at issue”; and “the level of ordinary skill in the pertinent art.”³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

A patent claim “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S. at 418. An obviousness determination requires finding “both ‘that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (citation omitted); *see KSR*, 550 U.S. at 418 (for an obviousness analysis, “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does”). “Although the *KSR* test is flexible, the Board ‘must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to *how* or *why* the references would be combined to produce the claimed invention.’” *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (citation omitted). Further, an assertion of obviousness “cannot be sustained by mere conclusory statements; instead, there must be some

³ Additionally, secondary considerations, such as “commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.” *Graham*, 383 U.S. at 17–18. Neither party, however, has presented any such evidence for us to consider.

articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)); accord *In re NuVasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016) (stating that ““conclusory statements”” amount to an “insufficient articulation[] of motivation to combine”; “instead, the finding must be supported by a ‘reasoned explanation’” (citation omitted)); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.”).

B. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art at the time of the ’698 patent would have had “a bachelor’s degree in electrical and/or computer engineering with training and one or more years of experience in embedded systems, including both hardware and embedded software design.” Pet. 5 (citing Ex. 1002 ¶¶ 23–26). Patent Owner argues that an ordinarily skilled artisan would have had “a bachelor’s degree in electrical and/or computer engineering with one or more years of work experience in printer design, including hardware and/or embedded software design for printer applications.” Prelim. Resp. 8–9 (citing Ex. 2001 ¶ 32). The parties’ proposed definitions differ in that Petitioner’s definition requires experience with “embedded systems,” whereas Patent Owner’s definition more specifically requires experience with “printer design.” The Specification of the ’698 patent states that the disclosure relates to “image forming devices” and lists “printers and copiers” as two examples of such devices. Ex. 1001,

col. 1, ll. 19–26. All of the claims of the '698 patent also recite an “electrophotographic image forming device.” Based on the record presented, including our review of the '698 patent and the types of problems and solutions described in the '698 patent and cited prior art, we find that a person of ordinary skill in the art would have had a bachelor's degree in electrical and/or computer engineering and one or more years of experience working with image forming devices, including hardware and/or embedded software design for such devices. We apply this level of ordinary skill in the art for purposes of this Decision.

C. Claim Interpretation

We interpret the challenged claims

using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b) (2019). Petitioner does not propose any interpretations for the challenged claims. Pet. 5. Patent Owner addresses two terms in its Preliminary Response: “out of useable toner” and “toner used by the image forming device after the image forming device declares the reservoir out of useable toner.” Prelim. Resp. 9–16. We have reviewed the parties' papers and conclude that no term requires interpretation to determine whether to institute an *inter partes* review in this proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“Because we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy,’

we need not construe [a particular claim limitation] where the construction is not ‘material to the . . . dispute.’” (citations omitted)).

D. Obviousness Ground Based on Springett and Hiraike

Petitioner contends that claims 17 and 18 are unpatentable over Springett and Hiraike under 35 U.S.C. § 103(a), citing the testimony of Harry Direen, Ph.D., P.E., as support. Pet. 14–22 (citing Ex. 1002). Patent Owner makes various arguments in response, citing the testimony of Jeffrey J. Folkins, Ph.D., as support. Prelim. Resp. 19–35, 52–54 (citing Ex. 2001). We are not persuaded that Petitioner has established a reasonable likelihood of prevailing on its asserted ground for the reasons explained below.

1. Springett

Springett discloses a method for “informing a user of a current status of the amount of marking material in a printing system.” Ex. 1003, col. 1, ll. 6–8. Springett describes a “conventional printing system” with a toner cartridge in which the amount of toner is “stored as a weighted pixel count in a [read-only memory (ROM)], [erasable programmable read-only memory (EPROM)], or other non-volatile memory” and reduced by a calculated amount as pages are printed. *Id.* at col. 1, ll. 23–55. “The process continues until a calculated remaining toner amount of zero is attained, which should coincide with the toner cartridge being empty.” *Id.* at col. 1, ll. 48–50. Springett’s disclosed method comprises the following steps: “calculating a number of pixels being rendered in a present job,” “calculating an amount of marking material used to render the present job,” “calculating a total area coverage to date,” “calculating an expected number of pages that the marking material cartridge can render based on the total area coverage,” and

“displaying the number of pages remaining in the marking material cartridge.” *Id.* at col. 2, ll. 37–50, col. 5, ll. 23–43, Fig. 3.

2. *Hiraike*

Hiraike discloses “[a] printing apparatus capable of reducing the frequency of detection of a recording agent remaining amount and obtaining accurate information of the recording agent remaining amount.” Ex. 1004, code (57). Hiraike states that known printing apparatuses used toner cartridges having “a nonvolatile memory that stores information of, e.g., recording agent such as toner.” *Id.* at col. 1, ll. 11–31. Hiraike describes central processing unit (CPU) 21 of printer 10 determining whether the toner remaining amount stored in nonvolatile memory 60 of cartridge 50 is “equal to or less than a threshold value,” “display[ing] that the toner remaining amount is small” if so, and then completing a printing process. *Id.* at col. 4, ll. 43–56, col. 5, ll. 10–12, Fig. 3 (steps S202–204, S210).

CPU 21 then again “accesses the nonvolatile memory 60 of the cartridge 50 to refer to the toner remaining amount information . . . and determines whether there is no toner remaining amount in the cartridge 50.” *Id.* at col. 5, ll. 13–17, Fig. 3 (steps S211–212). Hiraike states that

[i]t should be noted that in this invention a state where there is no toner remaining amount does not indicate that toner is entirely exhausted, but indicates that toner is exhausted to an extent where proper printing quality cannot be realized (e.g., faint or blurred printing can be caused) when printing is performed in the toner exhausted state. In other words, in this invention, printing can be continued even if it is determined that there is no toner remaining amount. In this specification, a state where there is a toner remaining amount does not indicate that there is a slight amount [of] toner, but indicates that there is sufficient toner to an extent where proper printing quality can be realized (e.g., faint

or blurred printing can be prevented) when printing is performed in the toner remaining state. Thus, in this invention, a state where there is no toner remaining amount means that the toner remaining amount is less than a predetermined value, and a state where there is a toner remaining amount means that the toner remaining amount is greater than the predetermined value, which is larger than zero but less than the threshold value in S203.

Id. at col. 5, ll. 17–36. Hiraike discloses that if the toner remaining amount detection process determines that “there is no sufficient toner remaining amount, the frequency of execution of the toner remaining amount detection is increased such that the detection is executed each time printing of one sheet has been performed or attempted,” but if the process determines that “there is a sufficient toner remaining amount, the frequency of execution of toner remaining amount detection is decreased or returned to a predetermined frequency.” *Id.* at col. 7, ll. 1–11. “It is therefore possible to reduce the frequency of execution of the recording agent remaining amount detection and obtain accurate information of the recording agent remaining amount.” *Id.* at col. 7, ll. 11–14.

3. Analysis

Petitioner first addresses claim 18, relying on Springett, Hiraike, or both for the limitations of the claim. Pet. 14–21. For example, Petitioner argues that Springett teaches a “memory device” (“ROM, EPROM, or other non-volatile memory”) mountable on a toner cartridge and comprising “memory cells.” *Id.* at 14–16. Petitioner also cites Hiraike for the same limitations. *Id.* at 15–16. Claim 18 recites that the “memory cells” store three things: “a record of whether the toner cartridge is out of useable toner,” “an estimated number of pages remaining for a page countdown for display by the image forming device of a number of pages remaining for the

toner cartridge,” and “an amount of toner used by the image forming device after the image forming device declares the reservoir out of useable toner” (the “used toner” limitation). Petitioner argues that Springett and Hiraike both teach storing “a record of whether the toner cartridge is out of useable toner,” citing Springett’s disclosure of continuing its process of reducing a calculated amount of toner until an “amount of zero is attained” and Hiraike’s disclosure of determining a “no toner remaining amount.” *Id.* at 16–17 (citing Ex. 1003, col. 1, ll. 47–50; Ex. 1004, col. 5, ll. 13–23, Fig. 3 (steps S211–212)) (emphasis omitted). Petitioner relies on Springett alone for the recited storing of an “estimated number of pages remaining,” citing Springett’s disclosure of calculating and displaying a “number of pages remaining in the marking material cartridge.” *Id.* at 17–19 (citing Ex. 1003, col. 2, ll. 44–50, Fig. 2, Fig. 3 (step S109)).

With respect to the used toner limitation, Petitioner appears to rely on a combination of Springett and Hiraike. *Id.* at 19–21. Petitioner argues that Springett teaches “storing an amount of toner used by the imag[e] forming device” and continuing to calculate until the toner cartridge is empty, and Hiraike teaches “storing an amount of toner used by the image forming device *after* the image forming device declares the reservoir out of useable toner.” *Id.* (emphasis added). Thus, although not entirely clear from the Petition, Petitioner’s position appears to be that both references broadly teach storing an amount of toner used, and Hiraike teaches the timing aspect of the used toner limitation—i.e., the amount of toner being stored is the amount used *after* the image forming device has declared the reservoir out of useable toner.

As to the combination of Springett and Hiraike, Petitioner argues that both references are “directed to more precise systems for measuring,

monitoring, and reporting on toner usage levels in printing systems” and “address dealing with a toner cartridge in an ‘empty’ mode,” and both references are classified in the same U.S. and international patent classification groups. *Id.* at 14. Petitioner also states that a person of ordinary skill in the art would have been motivated to combine the references’ teachings to “address more precise toner levels in printing systems as the toner level depletes” and “provide a more precise estimate of ‘provid[ing] a user with information concerning the number of pages remaining in a marking material cartridge.’” *Id.* at 14, 21 (quoting Ex. 1003, col. 2, ll. 27–31). Patent Owner responds that Petitioner’s reasoning is insufficient. Prelim. Resp. 32–35. Having reviewed the arguments of both parties, we agree with Patent Owner.⁴

First, as Patent Owner points out, the fact that the references contain similar disclosures (e.g., printing systems that measure the level of toner in a toner cartridge over time) does not explain why a person of ordinary skill in the art would have had reason to incorporate any particular aspect of Hiraike into the apparatus of Springett. *See id.* at 32–33. At most, it is merely a “prerequisite” to the obviousness analysis and helps show that the references are sufficiently similar that a person of ordinary skill in the art could have combined their teachings, not that such an individual would have done so to achieve a memory device having the features set forth in the claim. *See id.* (emphasis omitted); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed.

⁴ Patent Owner makes a number of other arguments in its Preliminary Response, including that Petitioner has not shown that the cited references teach the used toner limitation referenced above. Prelim. Resp. 24–32, 37–41, 46–50. We need not reach these issues, however, because Petitioner has not shown a reasonable likelihood of prevailing on its asserted grounds for the reasons explained herein.

Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”); *Johns Manville Corp. v. Knauf Insulation, Inc.*, IPR2018-00827, Paper 9 at 10–11 (PTAB Oct. 16, 2018) (informative) (“Mere compatibility of the references is . . . not sufficient.”); *see also Securus Techs., Inc. v. Global Tel*Link Corp.*, 701 F. App’x 971, 977 (Fed. Cir. 2017) (unpublished) (holding that “a broad characterization of [two references] as both falling within the same alleged field,” without more, was not “a sufficient rationale to support an obviousness conclusion,” as “[s]uch short-cut logic would lead to the conclusion that any and all combinations of elements known in th[e] broad field would automatically be obvious, without the need for any further analysis”); *Microsoft Corp. v. Enfish, LLC*, 662 F. App’x 981, 990 (Fed. Cir. 2016) (unpublished) (holding that the fact that two references “were directed to the same art or same techniques” was “inadequate to show persuasively that a relevant skilled artisan would have been motivated to combine the references”).

Second, with respect to Petitioner’s contentions regarding improved precision, Petitioner does not explain why or how incorporating aspects of Hiraike’s toner remaining amount detection process into the apparatus of Springett would improve the precision of either monitoring the toner level or estimating a number of pages remaining for Springett’s cartridge. *See* Pet. 14, 21. Springett already is capable of “calculating a total area coverage to date” and “calculating an expected number of pages that the marking material cartridge can render based on the total area coverage.” Ex. 1003, col. 2, ll. 40–50; *see* Pet. 17–19. Petitioner does not explain, for example, why Hiraike’s toner remaining amount detection process would have been

considered an improvement or advancement to the functionality of Springett. Nor does Petitioner explain in sufficient detail how Springett would be modified to incorporate the relied upon teachings from Hiraike and allegedly achieve greater precision. *See* Pet. 14, 19–21. Further, we agree with Patent Owner that the premise of Petitioner’s argument is incorrect, as Hiraike is not actually “directed to [a] more precise system[] for measuring, monitoring, and reporting on toner usage levels” as Petitioner contends. *See id.* at 14; Prelim. Resp. 34. Hiraike instead adjusts the *frequency* of measuring the toner level in its cartridge based on how much toner remains. Ex. 1004, col. 6, l. 55–col. 7, l. 14. In other words, Hiraike performs the same detection process, but more often if the toner level is below a certain amount. *See id.* Petitioner’s conclusory assertions in the Petition are insufficient to show a reason to combine Springett and Hiraike.

Finally, Dr. Direen’s testimony is similar to what Petitioner argues in the Petition, and does not provide any additional explanation as to why or how a person of ordinary skill in the art would have combined the references’ teachings. *Compare* Ex. 1002, App. 1002-A, 17, *with* Pet. 14, 21. Dr. Direen opines that “[i]t would be obvious for a [person of ordinary skill in the art] to combine Springett and Hiraike as they both deal with printers and determining end-of-life parameters associated with toner or ink.” Ex. 1002, App. 1002-A, 17. Again, the fact that the references have some common teachings is not sufficient to establish a reason to combine their teachings to achieve the memory device set forth in the claim. Dr. Direen also testifies that a person of ordinary skill in the art “understands that *any* appropriate information generated by the printer controller *can* be stored in the nonvolatile memory attached to the printer cartridge.” *Id.* at 19 (emphases added). This does not support a conclusion, however, that a

person of ordinary skill in the art would have had reason to combine the teachings of Springett and Hiraike to store the specific information recited in claim 18, namely the amount of toner used after the image forming device has declared the reservoir to be out of useable toner.

Petitioner has not set forth a sufficient rationale for combining the teachings of Springett and Hiraike in reaching a conclusion of obviousness as to claim 18. Claim 17 recites limitations similar to those of claim 18, adding “a housing having a reservoir for storing toner” and reciting “electronic memory” rather than “memory cells.” Petitioner asserts the same alleged reasons to combine for both claims. *See* Pet. 14, 21–22. Accordingly, Petitioner has not shown a reasonable likelihood of prevailing on its assertion that claims 17 and 18 are unpatentable over Springett and Hiraike.

E. Obviousness Ground Based on Springett and Tomaru

Petitioner contends that claims 17 and 18 are unpatentable over Springett and Tomaru under 35 U.S.C. § 103(a), and Patent Owner makes various arguments in response. *See* Pet. 22–31; Prelim. Resp. 35–43, 52–54. We are not persuaded that Petitioner has established a reasonable likelihood of prevailing on its asserted ground.

1. Tomaru

Tomaru discloses an “image formation apparatus” with a toner cartridge, “toner-amount detector configured to detect a toner amount in the toner cartridge,” and display unit that displays a “used condition . . . when the image formation apparatus is in a small-amount mode where the toner amount is smaller than a threshold.” Ex. 1013, code (57). Toner-amount

detector 12 detects the toner amount in toner tank 1812A and displays it in “percent figures.” *Id.* ¶ 43. Tomaru discloses that

[w]hen the toner amount is 100%, toner amount is at the maximum amount. When the toner amount is 0%, no toner is left in toner tank 1812A (i.e., the toner amount in toner tank 1812A is zero). Generally, in image formation apparatus 10, the toner amount decreases gradually from 100%. Once the toner amount falls below a toner-amount threshold (a predetermined amount, e.g., 10%), monitor 173 of image formation apparatus 10 judges that image formation apparatus 10 is in the empty mode. Note that when the toner amount is equal to or greater than 10%, image formation apparatus 10 is in the normal mode. On the basis of the toner amount detected by toner-amount detector 12, monitor 173 creates toner-rate display screen TRD such as [the] one shown in FIG. 4, and makes display unit 162 display toner-rate display screen TRD thus created.

Id. Display unit 162 displays the percent of amount remaining and mode (e.g., “normal mode” if equal to or greater than 10%, “empty mode” if less than 10%). *Id.* ¶¶ 43, 45, Figs. 4, 6. Tomaru also discloses measuring and displaying a “damage-progress rate” that is based on the number of rotations of the photosensitive member of the image drum unit and indicative of “a progress rate up to a serviceability limit point in the empty mode at which further continuous use of the image drum unit in the empty mode may damage the image drum unit.” *Id.* ¶¶ 38, 39, 45, 72, Figs. 3, 4, 6.

2. Analysis

Petitioner’s arguments regarding the combination of Springett and Tomaru are similar to those regarding the combination of Springett and Hiraike addressed above. With respect to the used toner limitation of claim 18, Petitioner relies on Springett as teaching “storing an amount of toner used by the imag[e] forming device” and continuing to calculate until the

toner cartridge is empty, and on Tomaru (rather than Hiraike) as teaching “storing an amount of toner used by the image forming device *after* the image forming device declares the reservoir out of useable toner.”

Pet. 27–30 (emphasis added).

As to the combination of Springett and Tomaru, Petitioner again argues that both references are “directed to more precise systems for measuring, monitoring, and reporting on toner usage levels in printing systems,” “address dealing with a toner cartridge in an ‘empty’ mode,” and are classified in the same U.S. and international patent classification groups. *Id.* at 22–23. Petitioner states that a person of ordinary skill in the art would have been motivated to combine their teachings to “address more precise toner levels in printing systems as the toner level depletes,” but includes no further explanation as to why or how incorporating aspects of Tomaru’s detection process into the apparatus of Springett would do so. *See id.* at 23. Further, like Hiraike, which involves changing the frequency of detection, rather than improving precision in that detection, Tomaru is concerned with preventing damage to an image drum unit by determining when the toner level falls below a predetermined “empty mode” level (e.g., 10% of capacity), rather than improving precision. *See* Ex. 1013 ¶¶ 36, 43–45. Thus, Petitioner’s alleged reason to combine is both conclusory and unsupported by the cited references. Finally, Dr. Direen’s testimony regarding the combination of Springett and Tomaru is identical to his testimony regarding the combination of Springett and Hiraike. *Compare* Ex. 1002, App. 1002-A, 17, 19, *with id.*, App. 1002-B, 22, 26–27.

We are not persuaded that Petitioner has provided a sufficient rationale for combining the teachings of Springett and Tomaru, for the same reasons set forth above regarding Springett and Hiraike. *See supra* Section

II.D.3. Petitioner has not shown a reasonable likelihood of prevailing on its assertion that claims 17 and 18 are unpatentable over Springett and Tomaru.

F. Obviousness Ground Based on Garr, Springett, and Applegate

Petitioner contends that claims 17 and 18 are unpatentable over Garr, Springett, and Applegate under 35 U.S.C. § 103(a), and Patent Owner makes various arguments in response. *See* Pet. 31–40; Prelim. Resp. 43–54.

We are not persuaded that Petitioner has established a reasonable likelihood of prevailing on its asserted ground.

1. Garr

Garr discloses a printer that “predicts how many pages can be printed before the toner or ink cartridge becomes empty . . . based upon the previous printing history of the printer while using this particular toner cartridge.”

Ex. 1006, code (57). Print engine 36 receives from toner cartridge 90 a signal “indicative as to the amount of toner remaining in the cartridge,” calculates the amount of remaining toner, determines the “gradation level” or “bucket” for that amount (e.g., in “one-eighth intervals” representing a number of pages that can be printed), and displays a corresponding gauge to the user. *Id.* at col. 13, l. 9–col. 14, l. 54, Fig. 7.

2. Applegate

Applegate discloses an “improved electrophotographic (EP) printer . . . having a detachable process cartridge that contains a non-volatile memory device.” Ex. 1007, code (57). “The non-volatile memory comprises an [EPROM] integrated circuit, which has a new count value

incremented every time the printer produces a new printed sheet of print media.” *Id.* at col. 2, ll. 18–21. Applegate explains that

[a] toner “gas-gauge” is created which uses “bucket levels” as discrete steps to indicate how much of the measured physical toner material actually remains within the toner reservoir. After a given amount of toner material has been dispensed through the developer unit, one of the bits of the EPROM memory device is irreversibly burned, thereby providing a permanent record on the process cartridge of a certain amount of toner usage.

Id., code (57). Applegate discloses measuring the rotation of the toner wheel and detecting during printing a “‘critical’ transition . . . when one of the several points is reached where the bucket level changes, or when the toner becomes ‘low’ inside the process cartridge 100.” *Id.* at col. 21, l. 62–col. 22, l. 3. Applegate describes nine bucket transitions, including a “toner low” transition “if there are only 100 grams of toner remaining within” the toner cartridge reservoir and an “Empty” transition when “there are only 86 grams of toner material remaining.” *Id.* at col. 22, ll. 3–32, col. 23, ll. 5–11.

3. Analysis

Petitioner’s arguments regarding the combination of Garr, Springett, and Applegate are similar to those regarding the other asserted grounds. For example, Petitioner relies on Springett (alone or in addition to Garr) as teaching a “memory device” mountable on a toner cartridge and comprising “memory cells” storing “a record of whether the toner cartridge is out of useable toner” and “an estimated number of pages remaining for a page countdown for display by the image forming device of a number of pages remaining for the toner cartridge.” Pet. 32–37. With respect to the used toner limitation of claim 18, Petitioner relies on a combination of Applegate with Springett in the same manner as combining Springett with Hiraike or

Tomaru. *See id.* at 37–38. Specifically, Petitioner argues that Springett teaches “storing an amount of toner used by the imag[e] forming device” and continuing to calculate until the toner cartridge is empty, and Applegate (rather than Hiraike or Tomaru) teaches storing an amount of toner used “*after* the toner level has been set to ‘empty.’” *Id.* (emphasis added).

As to the asserted combination, Petitioner again argues that all three references are “directed to more precise systems for measuring, monitoring, and reporting on toner usage levels in printing systems,” “address dealing with a toner cartridge in an ‘empty’ mode,” and are classified in the same U.S. and international patent classification groups. *Id.* at 31–32. Petitioner states that a person of ordinary skill in the art would have been motivated to combine the references’ teachings to “address more precise toner levels in printing systems as the toner level depletes,” but includes no further explanation as to why or how incorporating aspects of Applegate’s detection process into the apparatus of Springett would do so. *See id.* at 32.

Dr. Direen’s testimony regarding the combination with Applegate and Garr is substantially the same as his testimony regarding the combination of Springett with Hiraike or Tomaru. *Compare* Ex. 1002, App. 1002-A, 17, 19, App. 1002-B, 22, 26–27, *with id.*, App. 1002-C, 16 (opining that a person of ordinary skill in the art would have been motivated to combine Applegate with Springett because “both [references] deal with printers and determining end-of-life parameters associated with toner or ink,” and motivated to combine Applegate with Garr because “both [references] deal with printers and end-of-life conditions of toner/ink cartridges”), 20 (acknowledging that Applegate “does not explicitly disclose” the used toner limitation, but opining that it would have been “obvious to a [person of ordinary skill in the art] from Applegate’s teaching that *any* appropriate printer information

can be stored within a nonvolatile memory attached to a printer cartridge” (emphases added)).

We are not persuaded that Petitioner has provided a sufficient rationale for combining the teachings of Garr, Springett, and Applegate, for the same reasons set forth above regarding the other asserted grounds. See *supra* Sections II.D.3, II.E.2. Petitioner has not shown a reasonable likelihood of prevailing on its assertion that claims 17 and 18 are unpatentable over Garr, Springett, and Applegate.

III. CONCLUSION

Based on the arguments presented in the Petition, we conclude that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the ’698 patent challenged in the Petition. Therefore, we do not institute an *inter partes* review.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied and no *inter partes* review is instituted.

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Patent 9,335,698 B2

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