

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CANON U.S.A., INC. and CANON INC.,
Petitioner,

v.

SLINGSHOT PRINTING LLC,
Patent Owner.

IPR2023-00309
Patent 7,290,864 B2

Before JO-ANNE M. KOKOSKI, GARTH D. BAER, and
JOHN D. HAMANN, *Administrative Patent Judges*.

HAMANN, *Administrative Patent Judge*.

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

I. INTRODUCTION

Canon U.S.A., Inc. and Canon Inc. (collectively “Petitioner”) filed a petition for *inter partes* review of claims 1–6 and 8–20 of U.S. Patent No. 7,290,864 B2 (Ex. 1001, “the ’864 patent”). Paper 2 (“Pet.”). Slingshot Printing LLC (“Patent Owner”) filed a Preliminary Response. Paper 5 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 (2018) and 37 C.F.R. § 42.4(a) (2022). An *inter partes* review may be instituted if “the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

Upon consideration of the papers, we determine that the information presented in the Petition demonstrates that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one challenged claim of the ’864 patent.

A. *Real Parties-In-Interest*

The parties identify themselves as the real parties-in-interest. Pet. 1; Paper 3, 1.

B. *Related Matters*

The parties identify *Slingshot Printing LLC v. Canon U.S.A., Inc.*, No. 2:22-cv-001852 (E.D.N.Y.) and *Slingshot Printing LLC v. HP Inc.*, No. 6:19-cv-00549 (W.D. Tex.) as matters that may affect, or be affected by, a decision in this proceeding. Pet. 1; Paper 3, 1.

C. The '864 Patent

The '864 patent relates to heater chips in printheads having a reduced number of bondpads. Ex. 1001, 1:6–8. As background, the '864 patent explains that “[a] printhead is the device in printers, copiers, and multi-function products which sprays droplets of ink onto a sheet of paper,” and “[a] number of [such] products utilize heater chips in their printheads for discharging ink drops from one or more ink vias.” *Id.* at 1:13–17. “Inkjet heater chips typically contain one or more ink vias as well as arrays of heaters located next to an ink via,” according to the '864 patent. *Id.* at 1:17–19. “The heaters provide thermal energy that causes the discharge of a droplet of ink.” *Id.* 1:19–20. The '864 patent explains that “[c]hip bondpads are used to power the heaters by providing electric current to the heaters,” and that “[e]ach chip bondpad usually has a corresponding tab circuit connection, tab trace, and electrical connection to the printing device.” *Id.* at 1:21–24.

According to the '864 patent, “[t]ypically, in inkjet heater chips with one ink via, heater chip bondpads supply power only to heaters located on the same side of the ink via as the chip bondpads,” and “[s]imilarly, in inkjet heater chips containing multiple ink vias, a given bondpad supplies power to heaters on one side of the ink via or the other, but not both.” *Id.* at 1:29–34. The '864 patent explains that “[b]ondpads consume chip area,” and “[t]he on-chip routing of heater power from the bondpad to the heater arrays is also a contributing factor to overall chip size.” *Id.* at 1:34–36. “The higher number of chip bondpads and power routes also increase[s] the cost of the heater chip.” *Id.* at 1:37–38. “Therefore, what is needed is a way to

minimize the number of chip bondpads necessary to power the heater arrays on the chip,” according to the ’864 patent. *Id.* at 1:38–40.

In response, the ’864 patent discloses “a heater chip that includes heater power trace routes from a single bondpad to at least two different heater arrays located on both sides of an ink via,” which “minimizes the number of bondpads necessary to be fabricated on a heater chip and saves a significant amount of heater chip space.” *Id.* at 3:30–38. Figure 3, shown below, illustrates such an embodiment. *Id.* at 3:13–16.

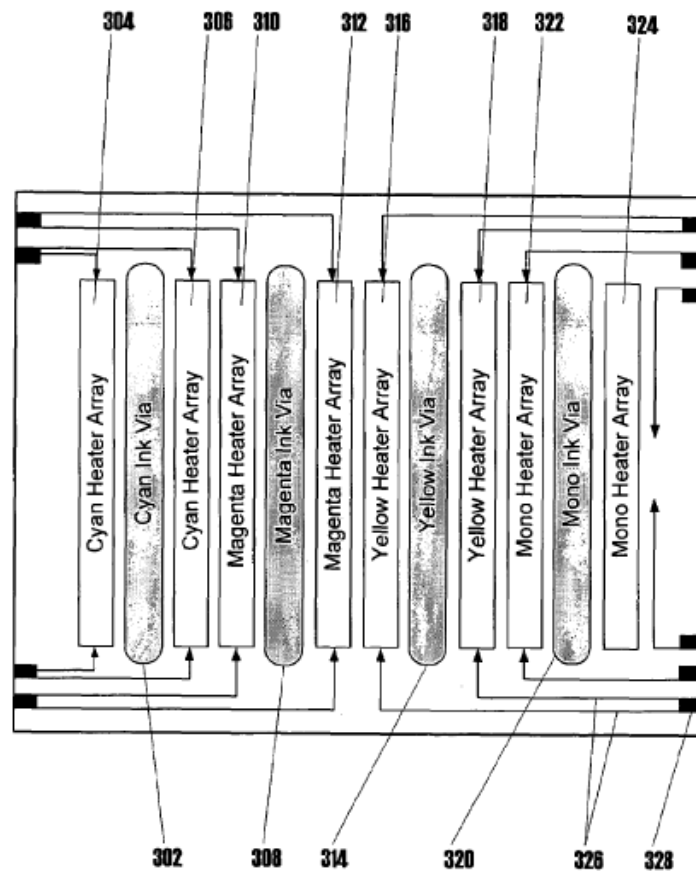


FIG. 3

Figure 3 “shows a block diagram of the configuration of heater arrays and routing of the connections to bondpads on a heater chip with multiple ink

vias in accordance with” the ’864 patent. *Id.* This figure illustrates a heater chip having “four ink vias each disposed between two heater arrays.” *Id.* at 4:30–32. “In particular, a cyan ink via 302 is positioned between a first heater array 304 and a second heater array 306; a magenta ink via 308 is positioned between a first heater array 310 and a second heater array 312; a yellow ink via 314 is positioned between a first heater array 316 and a second heater array 318; and a monochrome (K) ink via 320 is positioned between a first heater array 322 and a second heater array 324.” *Id.* at 4:32–39. The ’864 patent discloses that “[w]ith the heater arrays positioned on both sides of at least a portion of the ink vias, the ink vias may provide smaller ink drops in order to achieve higher printing resolutions.” *Id.* at 4:54–56.

In addition, with “the heater arrays on each side of their corresponding ink via, . . . the amount of heaters needed to be fired simultaneously in each array has been reduced,” and “[t]hus the amount of current needed to be supplied from the bondpads 328 to each heater array has been reduced,” the ’864 patent discloses. *Id.* at 5:12–18. “Thus, the number of bondpads 328 required to fire the required number of heaters simultaneously has been reduced to the point that one bondpad 328 can supply the power needs of . . . a portion of one heater array and a portion of a second heater array,” which “save[s] space on the heater chip,” according to the ’864 patent. *Id.* at 5:30–35, 5:38–40. Moreover, “a single bondpad 328 [can] suppl[y] power not only to heaters in multiple heater arrays, but also to heaters on both sides of an ink via.” *Id.* at 5:46–49. “For example, as shown [above] in F[igure] 3, employing this configuration with two power traces 326 stemming from a

single bondpad 328 reduces the number of bondpads needed to power all the arrays from 16 to 10.” *Id.* at 5:49–52.

D. Illustrative Claim

Of the challenged claims, claims 1, 8, and 16 are independent. Claim 1 is illustrative of the challenged claims and is reproduced below.

1. A heater chip for use in a printing device, comprising:
 - an ink via;
 - a first heater array adjacent at least a portion of one side of the ink via;
 - a second heater array adjacent at least a portion of another side of the ink via; and
 - a bondpad, wherein the bondpad supplies power to at least a portion of the first heater array and to at least a portion of the second heater array.

Ex. 1001, 6:31–39.

E. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims of the ’864 patent are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)
1–3, 5, 6, 8–10, 13–15	103	Benjamin144, ² Benjamin703 ³
4, 11, 12, 16–20	103	Benjamin144, Benjamin703, Childers ⁴
1, 3, 5, 6, 8–10, 13, 15	102	Uenishi ⁵

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102 and 103 that became effective on March 16, 2013. Because the ’864 patent issued from an application filed before March 16, 2013, we apply the pre-AIA version of these bases for unpatentability.

² US 7,722,144 B2, issued May 25, 2010 (Ex. 1005, “Benjamin144”).

³ US 7,278,703 B2, issued Oct. 9, 2007 (Ex. 1006, “Benjamin703”).

⁴ US 6,582,062 B1, issued June 24, 2003 (Ex. 1007, “Childers”).

⁵ JP 11-245409, published Sept. 14, 1999 (Ex. 1008, “Uenishi”).

Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)
4, 11, 12	103	Uenishi, Hayasaki ⁶

Pet. 3, 7–101. Petitioner submits in support of its arguments the Declaration of Stephen F. Pond, Ph.D. (Ex. 1002).

II. LEVEL OF ORDINARY SKILL IN THE ART

To determine whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962–63 (Fed. Cir. 1986)). “[O]ne or more factors may predominate.” *Id.*

Petitioner argues that one of ordinary skill in the art at the time of the invention of the ’864 patent would have had “a Bachelor’s or Master’s level college degree in Mechanical Engineering, Materials Science, Physics, Electrical Engineering, or a related field, and two years of training or experience in the design of inkjet printheads or semiconductor circuit layout.” Pet. 6 (citing Ex. 1002 ¶ 56). Patent Owner states that it “does not dispute [Petitioner’s] characterization of the level of ordinary skill in the art for the purpose of [Patent Owner’s] Preliminary Response, except that it disagrees that a degree in Materials Science is sufficient.” Prelim. Resp. 16.

⁶ US 2001/0045967 A1, published Nov. 29, 2001 (Ex. 1009, “Hayasaki”).

Patent Owner does not explain its basis for this disagreement, nor how the disagreement relates to Petitioner’s proposal, which requires, *inter alia*, “two years of training or experience.” *Id.*; Pet. 6.

For purposes of this Decision on Institution, we adopt Petitioner’s definition of the level of skill for one of ordinary skill in the art. Pet. 6. This definition is consistent with the ’864 patent and the asserted prior art, and we apply it in our analysis below.

III. CLAIM CONSTRUCTION

Because the Petition was filed after November 13, 2018, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019); 83 Fed. Reg. 51,340, 51,340–41, 51,343 (Oct. 11, 2018). In applying such standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

Petitioner “propose[s] that claim terms in the [c]hallenged [c]laims be afforded their plain and ordinary meaning.” Pet. 6. Patent Owner states that it “contends that all claim terms should be given their plain and ordinary meaning as used in the ’864 patent.” Prelim. Resp. 17.

Patent Owner, however, also argues that under the plain and ordinary meaning, “power traces” “are narrow connections between a wider bond pad and a heater array.” *Id.* (citing Ex. 1001, citing Figs. 1–3). This term does not appear in independent claim 1, but rather in dependent claims 3 and 5. *See* Ex. 1001, 6:31–39, 6:43–46, 6:49–51. We note that the term “traces” appears in independent claim 8, but Patent Owner does not address whether “traces” has the same meaning as “power traces.” Prelim. Resp. 17.

In addition, Patent Owner argues that “[t]he term ‘physically separated proximal to the bondpad’ should be interpreted consistent with the ’864 patent to mean ‘separated at a location nearer to the bond pad than the heater arrays.’” Prelim. Resp. 17; *see id.* at 17–18 (arguing that the language of claims 1 and 3 supports its construction); *id.* at 18 (citing Ex. 2001; Ex. 2002) (arguing that dictionary definitions support its construction). This term appears in dependent claims 3 and 9, and similarly in dependent claim 15. Ex. 1001, 6:43–46, 7:4–5, 7:26–8:2.

As we discuss below, we find that Petitioner shows by a reasonable likelihood that claim 1—as well as other claims that also do not contain these terms—would have been obvious to one of ordinary skill in the art. *See supra* Section V.C (finding at this stage that challenged claims would have been obvious in view of the combination of Benjamin144 and Benjamin703). Thus, we determine that no express constructions are needed for us to render our Decision on Institution. *See, e.g., Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”).

Moreover, at this stage of the proceeding, we do not view these issues as being fully developed. The parties should fully develop the record for any claim construction issues relating to these terms, and any other terms in dispute,⁷ during trial in accordance with our Rules. If the parties assert a term has its plain and ordinary meaning, but dispute what that plain and ordinary meaning is, such a dispute needs to be resolved as a matter of claim construction. *See Eon Corp. IP Holdings v. Silver Spring Networks*, 815 F.3d 1314, 1318 (Fed. Cir. 2016).

IV. PRINCIPLES OF LAW

A claim is unpatentable under 35 U.S.C. § 102 “if each and every [claim] limitation is found either expressly or inherently in a single prior art reference.” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 851 F.3d 1270, 1273 (Fed. Cir. 2017). “A claim limitation is inherent in the prior art if it is necessarily present in the prior art, not merely probably or possibly present.” *Akamai Techs., Inc. v. Cable & Wireless Internet Servs., Inc.*, 344 F.3d 1186, 1192 (Fed. Cir. 2003) (citing *Rosco, Inc. v. Mirror Lite, Co.*, 304 F.3d 1373, 1380 (Fed. Cir. 2002)).

A claim is unpatentable under 35 U.S.C. § 103 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 of the invention to a person having ordinary skill in the art. *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

⁷ We note that Patent Owner asserts that “bondpad” has a particular plain and ordinary meaning in the context of Patent Owner’s arguments concerning the asserted grounds that include Uenishi. Prelim. Resp. 38.

the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of non-obviousness, if present.⁸ *See Graham*, 383 U.S. at 17–18. When evaluating a claim for obviousness, we also must “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

V. ALLEGED OBVIOUSNESS OVER BENJAMIN144 AND BENJAMIN703

Petitioner argues that the combination of Benjamin144 and Benjamin703 renders claims 1–3, 5, 6, 8–10, and 13–15 obvious. Pet. 7–46. For the reasons that follow, we determine that Petitioner establishes a reasonable likelihood that it would prevail in showing that the combination of Benjamin144 and Benjamin703 renders at least one of these challenged claims obvious.

A. *Summary of Benjamin144*

Benjamin144 is titled “Fluid Ejection Device.” Ex. 1005, code (54). Benjamin144 teaches a fluid ejection device which “includes a first fire line adapted to conduct a first energy signal having energy pulses, a second fire line adapted to conduct a second energy signal having energy pulses, a first address generator configured to provide first address signals, a second address generator configured to provide second address signals, [and] first drop generators and second drop generators.” *Id.* at code (57). The drop generators are electrically coupled to their respective fire line and are

⁸ Patent Owner does not present arguments or evidence of such objective evidence of non-obviousness. *See generally* Prelim. Resp.

configured to respond to the energy signal to eject fluid based on the address signals. *Id.*

B. Summary of Benjamin703

Benjamin703 is titled “Fluid Ejection Device with Identification Cells.” Ex. 1006, code (54). Benjamin703 teaches “[a] fluid ejection device comprising an identification line adapted to receive a program signal and a read signal and identification cells electrically coupled to the identification line.” *Id.* at code (57). “Each of the identification cells comprises a memory circuit and a memory element,” which “is adapted to receive and respond to signals in order to selectively store a value in the memory circuit, which determines whether the identification cell is responsive to signals received on the identification line.” *Id.*

C. Challenged Claim 1

1. Heater Chip (Preamble)

Claim 1’s preamble recites “[a] heater chip for use in a printing device.” Ex. 1001, 6:31. At this stage of the proceeding, we agree with Petitioner and find that Benjamin144 teaches claim 1’s preamble. Pet. 7–10.

More specifically, we find that Benjamin144 teaches “an inkjet printing system 20,” that “includes a fluid ejection device, such as inkjet printhead assembly 22,” that “includes one printhead 40.” Ex. 1005, 3:23–27, 4:46–47. Benjamin144 teaches having “drop generators 60 located along ink feed slot 46 in one embodiment of printhead die 40.” *Id.* at 5:46–47. And at this stage of the proceeding, we agree with Petitioner and find that a “die” is a “chip.” *See* Ex. 1013 (Dict. of Elecs.), 125; Ex. 1002 ¶ 63.

In addition, Benjamin144 teaches that “[t]he firing resistors 52 of drop generators 60 are energized in a controlled sequence to eject fluid from

vaporization chambers 56 and through nozzles 34 to print an image on print medium 36.” Ex. 1005, 5:64–67.

At this stage, we find persuasive Dr. Pond’s testimony that one of ordinary skill in the art would have understood that Benjamin144’s printhead die 1700 teaches the claimed “heater chip for use in a printing device” (e.g., an inkjet printer). Ex. 1002 ¶¶ 60–68. We find that this testimony is consistent with Benjamin144’s teachings we discuss above.

After reviewing Petitioner’s arguments and evidence, which are not addressed by Patent Owner at this stage of the proceeding, we are persuaded that Petitioner shows, for purposes of institution, that Benjamin144 teaches “[a] heater chip for use in a printing device.” In light of our finding, we need not, and thus do not, reach whether claim 1’s preamble is limiting.

2. Ink Via

Claim 1 further recites “an ink via.” Ex. 1001, 6:32. At this stage of the proceeding, we agree with Petitioner and find that Benjamin144 teaches this limitation. Pet. 11–12.

Benjamin144 teaches that “[t]he printhead die 1700 includes . . . three ink fluid feed sources, . . . feed slots 1704, 1706 and 1708.” Ex. 1005, 63:21–24; *see also id.* at Fig. 21 (illustrating ink feed slots 1704, 1706, and 1708). At this stage, we also find persuasive Dr. Pond’s testimony that Benjamin144 teaches an ink via (e.g., ink feed slot 1704), as this testimony is consistent with Benjamin144’s teachings. *See* Ex. 1002 ¶¶ 69–72.

After reviewing Petitioner’s arguments and evidence, which are not addressed by Patent Owner at this stage, we are persuaded that Petitioner shows, for purposes of institution, that Benjamin144 teaches “an ink via.”

3. *First and Second Heater Arrays*

Claim 1 further recites “a first heater array adjacent at least a portion of one side of the ink via,” and “a second heater array adjacent at least a portion of another side of the ink via.” Ex. 1001, 6:33–36. At this stage of the proceeding, we agree with Petitioner and find that Benjamin144 teaches these limitations. Pet. 13–16.

Benjamin144 teaches that “printhead die 1700 includes six fire groups 1702a–1702f disposed along three ink fluid feed sources, . . . feed slots 1704, 1706 and 1708.” Ex. 1005, 63:21–24, Fig. 21. Benjamin144 explains that “[t]he fire groups 1702a–1702f are divided into eight data line groups, indicated at D1–D8” and that “[e]ach data line group D1–D8 includes pre-charged firing cells 120 from each of the fire groups 1702a–1702f.” *Id.* at 63:39–42. Benjamin144 teaches that “[p]recharged firing cell 120 is one embodiment of firing cell 70” and that “[f]iring cell 70 includes a firing resistor 52 . . . [that] is part of a drop generator 60.” *Id.* at 6:3–5, 8:7–8. In addition, Benjamin144 teaches that “[d]rop generators 60 in data line groups D1, D3, D5[,] and D7 [in fire groups 1702a and 1702d] are disposed along one side 1704a of ink feed slot 1704 and drop generators 60 in data line groups D2, D4, D6[,] and D8 [in fire groups 1702a and 1702d] are disposed along the opposing side 1704b of ink feed slot 1704.” *Id.* at 64:9–14.

In addition, as this stage of the proceeding we find persuasive Dr. Pond’s testimony that Benjamin144 teaches (i) a first heater array (i.e., a vertical array of firing resistors 52 within drop generators 60 in data line groups D1, D3, D5, and D7 for fire groups 1702a and 1702d) adjacent one side of an ink via (i.e., side 1704a of ink feed slot 1704); and (ii) a second heater array (i.e., a vertical array of firing resistors 52 within

drop generators 60 in data line groups D2, D4, D6, and D8 for fire groups 1702a and 1702d) adjacent another side of the ink via (i.e., side 1704b of ink feed slot 1704). *See* Ex. 1002 ¶¶ 73–81.

After reviewing Petitioner’s arguments and evidence, which are not addressed by Patent Owner at this stage, we are persuaded that Petitioner demonstrates, for purposes of institution, that Benjamin144 teaches “a first heater array adjacent at least a portion of one side of the ink via,” and “a second heater array adjacent at least a portion of another side of the ink via.”

4. Bondpad Supplies Power

Claim 1 further recites “a bondpad, wherein the bondpad supplies power to at least a portion of the first heater array and to at least a portion of the second heater array.” Ex. 1001, 6:37–39. At this stage of the proceeding, we agree with Petitioner and find that Benjamin144, as well as the combination of Benjamin144 and Benjamin703, teaches this limitation. Pet. 14–22. We address below the parties’ arguments as to each.

a. Benjamin144’s Teachings

Benjamin144’s Figure 21, as annotated by Petitioner, is shown below.

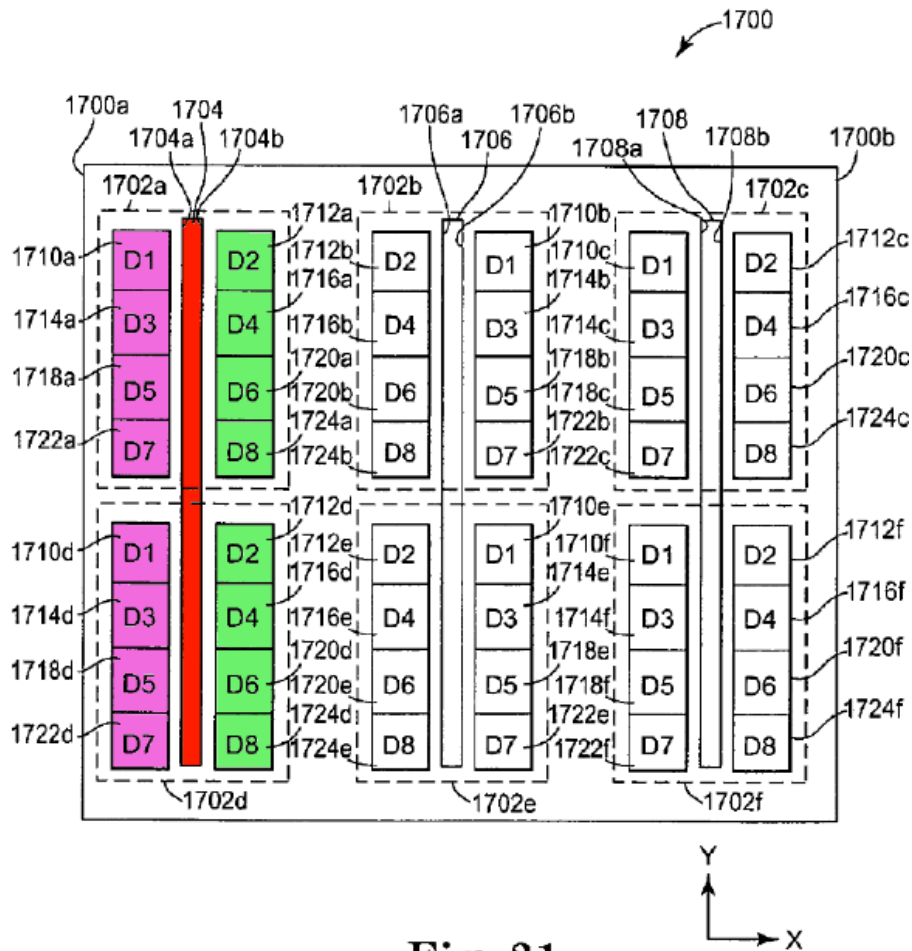


Fig. 21

Pet. 15 (annotating Ex. 1005, Fig. 21). Figure 21 “is a diagram illustrating an example layout of one embodiment of a printhead die 1700.” Ex. 1005, 63:20–21. As illustrated, “[t]he printhead die 1700 includes six fire groups 1702a–1702f disposed along . . . [ink] feed slots 1704, 1706 and 1708.” *Id.* at 63:21–24. More specifically, “[f]ire groups 1702a and 1702d are disposed along ink feed slot 1704, fire groups 1702b and 1702e are disposed along ink feed slot 1706 and fire groups 1702c and 1702f are disposed along ink feed slot 1708.” *Id.* at 63:24–27. Figure 21 also depicts that “[t]he fire groups 1702a–1702f are [each] divided into eight data line groups, indicated at D1–D8.” *Id.* at 63:39–40. Petitioner annotates Figure 21 by coloring (i) ink feed slot 1704 red; (ii) data line groups D1, D3, D5, and D7 in fire

groups 1702*a* and 1702*d* purple; and (iii) data line groups D2, D4, D6, and D8 in fire groups 1702*a* and 1702*d* green. Pet. 15 (annotating Ex. 1005, Fig. 21).

Benjamin144 teaches that “[e]ach data line group D1–D8 includes pre-charged firing cells 120 from each of the fire groups 1702a–1702f,” and that “[t]he pre-charged firing cells 120 . . . include firing resistors 52 that are part of drop generators 60.” Ex. 1005, 63:40–42, 64:2–4. As we discuss above, the heater arrays each are comprised of a vertical array of firing resistors 52. *See supra* Section V.C.3 (finding that Benjamin144 teaches the claimed first and second heater arrays). Figure 22, shown below as annotated by Petitioner, further illustrates Benjamin144’s teachings.

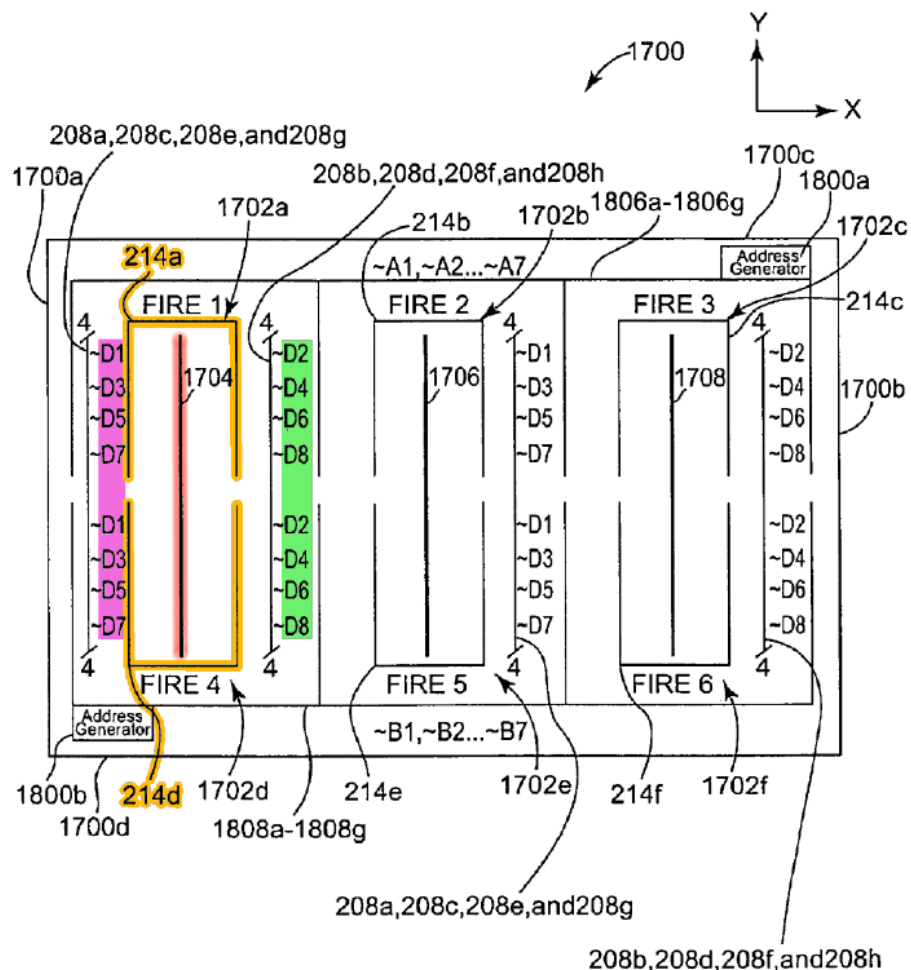


Figure 22 “is a diagram illustrating another aspect of the example layout of one embodiment of printhead die 1700.” Ex. 1005, 67:36–38. As illustrated, “the printhead die 1700 includes data lines 208*a*–208*h*, fire lines 214*a*–214*f*, . . . ink feed slots 1704, 1706 and 1708 and the six fire groups 1702*a*–1702*f*.” *Id.* at 67:38–41. Like annotated Figure 21 above, Petitioner annotates Figure 22 by coloring (i) ink feed slot 1704 red; (ii) data line groups D1, D3, D5, and D7 in fire groups 1702*a* and 1702*d* purple; and (iii) data line groups D2, D4, D6, and D8 in fire groups 1702*a* and 1702*d* green. Pet. 16 (annotating Ex. 1005, Fig. 22).

In addition, Figure 22 illustrates that “[e]ach of the fire lines 214*a*–214*f* are disposed on both sides of an ink feed slot 1704, 1706 or 1708 and electrically coupled at one end of the ink feed slot 1704, 1706 or 1708 to form a substantially U-shaped fire line 214*a*–214*f*.” *Id.* at 70:17–21. For example, “[t]he fire line 214*d* is disposed along each of the opposing sides of ink feed slot 1704 and extends from one end of ink feed slot 1704 to half the length of ink feed slot 1704 in the y-direction.” *Id.* at 71:9–12.

Petitioner further annotates Figure 22 by coloring U-shaped fire lines 214*a* and 214*d* orange. Pet. 16.

Benjamin144 teaches that “fire lines 214*a*–214*f* are located along ink feed slots 1704, 1706 and 1708 to supply energy signals FIRE1, FIRE2 . . . FIRE6 to the fire groups 1702*a*–1702*f*, respectively.” Ex. 1005, 69:42–45. In particular, Benjamin144 teaches that “[t]he substantially U-shaped fire lines 214*a*–214*f* are electrically coupled to pre-charged firing cells 120 located along each of the opposing sides of ink feed slots 1704, 1706 and 1708.” *Id.* at 70:51–54. “The fire lines 214*a*–214*f* supply energy to firing

resistors 52 in conducting pre-charged firing cells 120 to heat and eject ink from drop generators 60.” *Id.* at 69:45–47.

In addition, Benjamin144 teaches that “[t]he fire lines 214*a*–214*f* are electrically coupled to external supply circuitry by appropriate *interface pads*. (See, FIGS. 25A and 25B).” *Id.* at 11:9–12 (emphasis added). At this stage of the proceeding, we agree with Petitioner and find that Benjamin144 “refers to its interface pads as bondpads stating that ‘the firing resistor 52 nearest the bond pad receiving the energy signal FIRE1, FIRE2 . . . FIRE6,’ and uses the terms interface pads and bondpads interchangeably.” Pet. 17 (quoting Ex. 1005, 75:63–67) (emphases omitted); *see also* Ex. 1002 ¶ 90 (testifying that Benjamin144 “uses the terms interface pads and bond pads interchangeably”).

Benjamin144’s Figure 25B—which is cited by this “external supply circuitry” teaching—is shown below.

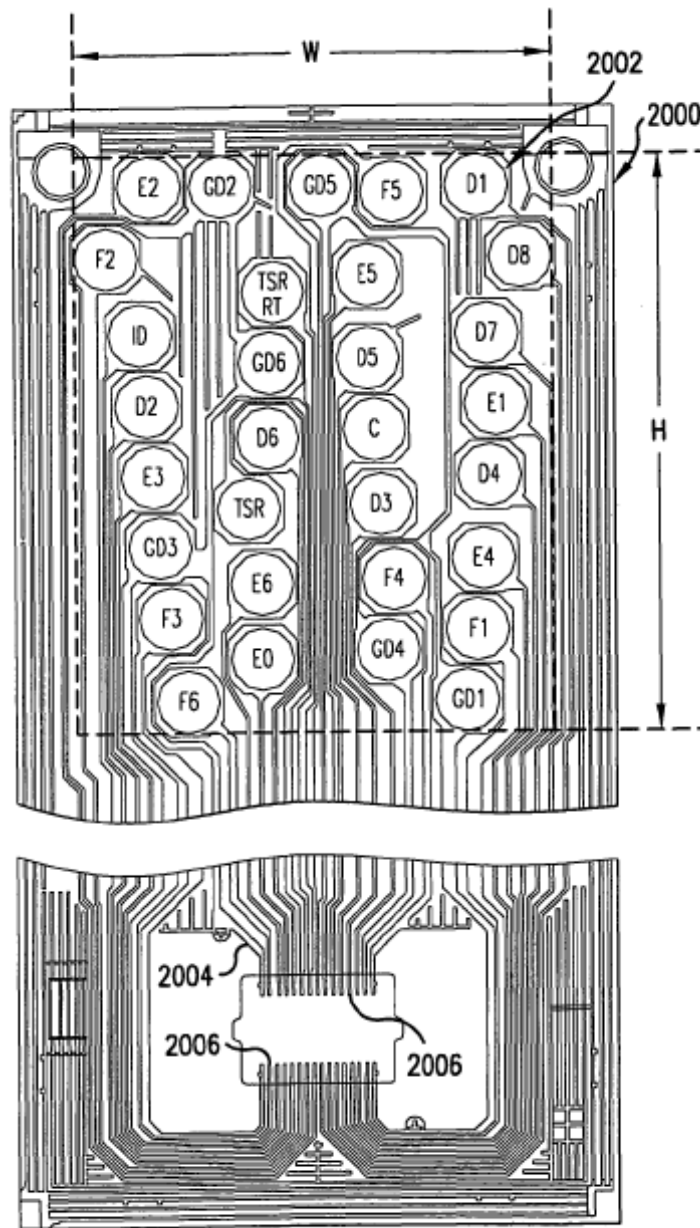


FIG. 25B

Figure 25B “illustrat[es] contact areas 2000 of a flex circuit 2002 that may be utilized to couple external circuitry to a printhead die.” Ex. 1005, 77:41–44. As illustrated, “[t]he contact areas 2000 are electrically coupled via conductive paths 2004 to contacts 2006 which provide coupling to the printhead die.” *Id.* at 77:44–46; *see also id.* at Fig. 25B (illustrating an

outline of printhead die showing the location for the die, which covers contacts 2006); Ex. 1002 ¶ 92 (testifying to the location for the die).

Benjamin144 teaches that “[f]ire line contact areas F1–F6 [are] configured to receive energy pulses and to provide the energy signals along fire lines Fire1–Fire6 to the appropriate fire groups, e.g. fire groups 202a–202f and 1702a–1702f.” *Id.* at 77:61–63. And Benjamin144 teaches that “an electrical path between contact areas 2000 [(i.e., F1–F6)] and the pre-charged firing cells 120 comprises conductive paths 2004, contacts 2006, and the appropriate signal lines, e.g., data lines 208a–208h, pre-charge lines 210a–210f, select lines 212a–212f, or ground lines.” *Id.* at 78:16–20.

In addition, at this stage of the proceeding, in view of Benjamin144’s teachings we discuss above, we agree with Petitioner and find that one of ordinary skill in the art would have understood that “the approximate locations of the bondpads . . . for fire lines 214a and 214d match the locations of contacts 2006 (when chip flipped and soldered into position).” Pet. 19 (citing Ex. 1002 ¶ 95). At this stage of the proceeding, we are persuaded by Dr. Pond’s testimony on this issue as it is consistent with Benjamin144’s teachings that we discuss above. Ex. 1002 ¶¶ 92–95.

Accordingly, we find, at this stage of the proceeding, that Benjamin144 teaches “a bondpad, wherein the bondpad supplies power to at least a portion of the first heater array and to at least a portion of the second heater array.”

At this stage of the proceeding, we find unavailing Patent Owner’s arguments that Benjamin144’s “interface pads” are not synonymous with bondpads, as Petitioner argues, but “are the contact areas 2000 . . . , which are located on a flexible circuit 2002 that extends away from the heater chip

in order to interface with external supply circuitry of the printer.” Prelim. Resp. 23 (citing Ex. 1005, 77:41–46); *see also id.* at 24–25 (making same argument). Simply put, Patent Owner has no support for its reading of Benjamin144, and its arguments equating interface pads and contact areas 2000. *See In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997) (explaining that attorney arguments and conclusory statements that are unsupported by factual evidence are entitled to little probative value). Rather, as we discuss above, at this stage of the proceeding, we find that Benjamin144 uses the term interface pads interchangeably with bondpads. *E.g.*, Ex. 1002 ¶ 90.

In addition, at this stage of the proceeding, we find unavailing Patent Owner’s argument that Benjamin144 does not teach “a connection between U-shaped fire lines and bond pads located on the heater chip itself.” Prelim. Resp. 23–24. First, Benjamin144 explicitly teaches that “[t]he highest amount of power is found in the first firing resistor 52 of a fire group 1702a–1702f as only a single firing resistor 52 is energized, where the first firing resistor 52 is the firing resistor 52 nearest the *bond pad* receiving the energy signal FIRE1, FIRE2 . . . FIRE6.” Ex. 1005, 75:60–64 (emphasis added). In other words, Benjamin144 teaches that a bond pad is in the conductive path for powering heater arrays. *Id.* And as we discuss above, Benjamin144 teaches that “fire lines 214a–214f . . . supply energy signals FIRE1, FIRE2 . . . FIRE6 to the fire groups 1702a–1702f, respectively.” *Id.* at 69:42–45. Hence, Benjamin144 teaches a connection between U-shaped fire lines and bond pads to conduct energy signals FIRE1, FIRE2 . . . FIRE6. *Id.* at 69:42–45, 75:60–64; *see supra* (finding U-shaped fire lines).

Second, Benjamin144 teaches that bond pads are located on the heater chip itself. For example, Benjamin144 teaches that data lines are routed

“from a bond pad located along the side of printhead die 1700 nearest [its] data line group in the fire groups 1702a-1702f,” and “are electrically coupled to a bond pad along” a side of printhead die 1700. *Id.* at 69:3–10, Fig 22. And, at this stage of the proceeding, we find unavailing Patent Owner’s arguments limiting these teachings that bond pads are on the printhead die to only bond pads for the data lines. Prelim. Resp. 24–25. Rather, at this stage, we find no principled basis to make such a distinction. *See In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) (“A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.”).

Accordingly, at this stage of the proceeding, we disagree with Patent Owner that Benjamin144 does not teach “a connection between U-shaped fire lines and bond pads located on the heater chip itself.”

In addition, at this stage of the proceeding, we find unavailing Patent Owner’s argument that Benjamin144 “does not contemplate the challenges addressed by the ’864 patent of supplying the current needs of the firing arrays while minimizing the substrate area and cost of the power distribution circuitry when heater arrays are connected to bond pads.” Prelim. Resp. 25. That Benjamin144 may address other problems is not a correct focus. *See EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985) (“A reference must be considered for everything it *teaches* by way of technology and is not limited to the particular *invention* it is describing and attempting to protect.”); *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) (“The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are

concerned. They are part of the literature of the art, relevant for all they contain.”).

In addition, at this stage of the proceeding, we find unavailing Patent Owner’s argument that “given that the U-shaped fire lines have a significant width due to the horizontal portion . . . between the sections parallel to the ink via, contact 2006 could connect directly to U-shaped fire line.” Prelim. Resp. 25. We find that this is attorney argument without expert testimony or other factual support. *See In re Geisler*, 116 F.3d at 1471.

In addition, at this stage of the proceeding, we find Patent Owner’s arguments concerning inherency are inapposite. *See* Prelim. Resp. 26–27. As Patent Owner acknowledges, Petitioner does not make such arguments. *Id.* at 26. And as we discuss above, Benjamin144 teaches this limitation.

In addition, at this stage of the proceeding, we find unavailing Patent Owner’s argument that Petitioner improperly relies on Dr. Pond’s testimony that one of ordinary skill in the art would have understood that the approximate locations of the bondpads on Benjamin144’s heater chip (when installed) match the locations of contacts 2006. Prelim. Resp. 27 (citing Pet. 19–20). As we discuss above, at this stage of the proceeding, we find Dr. Pond’s testimony on this issue (Ex. 1002 ¶¶ 92–95) persuasive as we find it is consistent with Benjamin144’s teachings. Regardless, a finding of obviousness can rely on supported expert testimony to supply a missing element of a claim, contrary to Patent Owner’s arguments. *See Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1338 (Fed. Cir. 2020); Prelim. Resp. 27. To be clear, at this stage, we view no element to be missing here.

b. Benjamin144 and Benjamin703's Combined Teachings

Petitioner alternatively argues that the limitation would have been obvious in view of the combination of Benjamin144 and Benjamin703.

Pet. 20–22. At this stage of the proceeding, we agree with Petitioner.

Benjamin703 explicitly teaches having a bondpad (i.e., fire line input pad 706) in a printhead die. Ex. 1006, 19:34–36. Specifically, Benjamin703 teaches that for an embodiment in accordance with its teachings that “[t]he printhead die 40 includes an identification signal input pad 702, a data line input pad 704 and *a fire line input pad 706*,” that “are formed as part of the second metal layer of printhead die 40.” *Id.* at 19:33–39 (emphasis added). Moreover, Benjamin703 teaches that “[t]he fire line input pad 706 is electrically coupled to fire line 712 that is electrically coupled to firing cells 120 in print head die 40.” *Id.* at 19:45–47. And Benjamin703 teaches that “[f]ire line 712 receives fire signal FIRE and provides fire signal FIRE to firing cells 120 in printhead die 40.” *Id.* at 20:4–5.

At this stage of the proceeding, we find that the combined teachings of Benjamin144 (*supra* Section V.C.4.a) and Benjamin703 teach this limitation.

Moreover, at this stage of the proceeding, we agree with Petitioner and find that Benjamin144 incorporates Benjamin703 by reference. Pet. 44–45. Benjamin144 recites the following:

This application is related to patent application Ser. No. 10/827,030, entitled “Fluid Ejection Device,” patent application Ser. No. 10/827,163, entitled “Fluid Ejection Device With Address Generator,” patent application Ser. No. 10/827,045, entitled “Device With Gates Configured In Loop Structures,” patent application Ser. No. 10/827,142, entitled “Fluid Ejection Device,” and *patent application Ser. No. 11/849,078, entitled “Fluid Ejection Device With Identification Cells,”* each of which

are assigned to the Assignee of this application and are filed on even date herewith, and each of which is fully incorporated by reference as if fully set forth herein.

Ex. 1005, 1:6–16 (emphasis added). At this stage of the proceeding, we find persuasive Petitioner’s argument that reference to Ser. No. 11/849,078 is a typographical error, and reference to Benjamin703, which was filed on the same day as Benjamin144 and has the same specification as its referenced child application, was intended. Pet. 45.

Thus, at this stage of the proceeding, we view the combination of Benjamin144 and Benjamin703 as comprising a single disclosure in view of the incorporation by reference. *See, e.g., Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000). Or at a minimum, the incorporation by reference provides an explicit motivation for one of ordinary skill in the art to combine the references’ teachings. *See In re Kahn*, 441 F.3d at 988. The parties should consider addressing at trial what affect, if any, such a typographical error has on the incorporation by reference.

In sum, at this stage of the proceeding, we find that Petitioner shows that the combination of Benjamin144 and Benjamin703 teaches the bondpad limitation and provides sufficiently articulated reasoning with rational underpinning to support combining Benjamin144 and Benjamin703’s teachings.

At this stage of the proceeding, we find unavailing Patent Owner’s argument that “because Benjamin[]703 provides no teaching or other reason to connect multiple separate heater arrays to a single bond pad,” “[c]ombining Benjamin[]703 with Benjamin[]144 would not result in the claimed invention and would have given [one of ordinary skill in the art] no

reason to implement a single bond pad supplying power to separate heater arrays of Benjamin[]144.” Prelim. Resp. 28. At this stage of the proceeding, we view this argument as incorrectly focusing on Benjamin144 and Benjamin703’s teachings individually, rather than their combined teachings. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references”). The relevant inquiry is whether the claimed subject matter would have been obvious to those of ordinary skill in the art in light of the combined teachings of Benjamin144 and Benjamin703. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981). As we discuss above, at this stage of the proceeding, we find that this limitation would have been obvious in view of the combined teachings.

In addition, at this stage of the proceeding, we find unavailing Patent Owner’s argument that Benjamin144 incorporating Benjamin703 by reference “does not help [Petitioner’s] argument . . . because the disclosure of fire line bond pads in Benjamin[]703 relates to an entirely different printhead embodiment and not to the embodiment of Figs. 21 and 22 of Benjamin[]144,” and that Petitioner cannot “cobble together these unrelated disclosures as they attempt to do here.” Prelim. Resp. 28–29 (citing *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008)). First, we find Patent Owner’s reliance on *Net MoneyIN* misplaced as it involved anticipation, rather than obviousness. 545 F.3d at 1369–71. Second, Petitioner provides articulated reasoning to combine the relevant teachings from Benjamin144 and Benjamin703, which Patent Owner does not address at this stage of the proceeding, other than to argue incorrectly

that Benjamin144's bond pads are on a flexible circuit. *Compare* Pet. 45–46, *with* Prelim. Resp. 29; *see supra* Section V.C.4.a (finding that Benjamin144 teaches bondpads on the printhead die).

c. Summary for Bondpad Limitation

We are persuaded that Petitioner demonstrates, for purposes of institution, that Benjamin144, as well as the combination of Benjamin144 and Benjamin703, teach “a bondpad, wherein the bondpad supplies power to at least a portion of the first heater array and to at least a portion of the second heater array.” We also find, for purposes of institution, that Petitioner has provided sufficiently articulated reasoning with rational underpinning to support Petitioner's combining of Benjamin144 and Benjamin703's teachings. *See In re Kahn*, 441 F.3d at 988.

5. Summary for Claim 1

In summary, based on the current record, and for purposes of institution, we determine that Petitioner shows a reasonable likelihood that claim 1 would have been obvious to one of ordinary skill in the art in view of Benjamin144 and Benjamin703.

D. Challenged Claim 2

Claim 2 recites “[t]he heater chip of claim 1, further comprising a second bondpad, wherein the second bondpad supplies power to another portion of the first heater array and to another portion of the second heater array.” Ex. 1001, 6:39–42.

At this stage of the proceeding, the parties make the same substantive arguments regarding whether the combination of Benjamin144 and Benjamin703 teaches claim 2 as they do for the bondpad limitation of claim 1. *Compare* Pet. 22–24, *with id.* at 14–22; Prelim. Resp. 29–31, *with*

id. at 22–29. Accordingly, our findings above also apply to the parties’ arguments for claim 2. *See supra* Section V.C.4.

E. Challenged Claims 3 and Claim 9

Claim 3 recites “[t]he heater chip of claim 1, wherein the bondpad supplies power to the first heater array and the second heater array portions by power traces physically separated proximal to the bondpad.” Ex. 1001, 6:43–46. Claim 9 recites “[t]he heater chip of claim 8, wherein the at least two traces are physically separated proximal to the bondpad.” *Id.* at 7:4–5. Each of these claims recite that the traces are “physically separated proximal to the bondpad.” *Id.* at 6:43–46, 7:4–5. The parties dispute whether the combination of Benjamin144 and Benjamin703 teaches this recital. *See* Pet. 25–29, 34–35; Prelim. Resp. 31–35.

Petitioner argues that Benjamin144’s Figure 22, shown below as annotated by Petitioner, shows that fire lines 214*a*–214*f* “are physically separated to form ‘a substantially U-shaped fire line.’” Pet. 25.

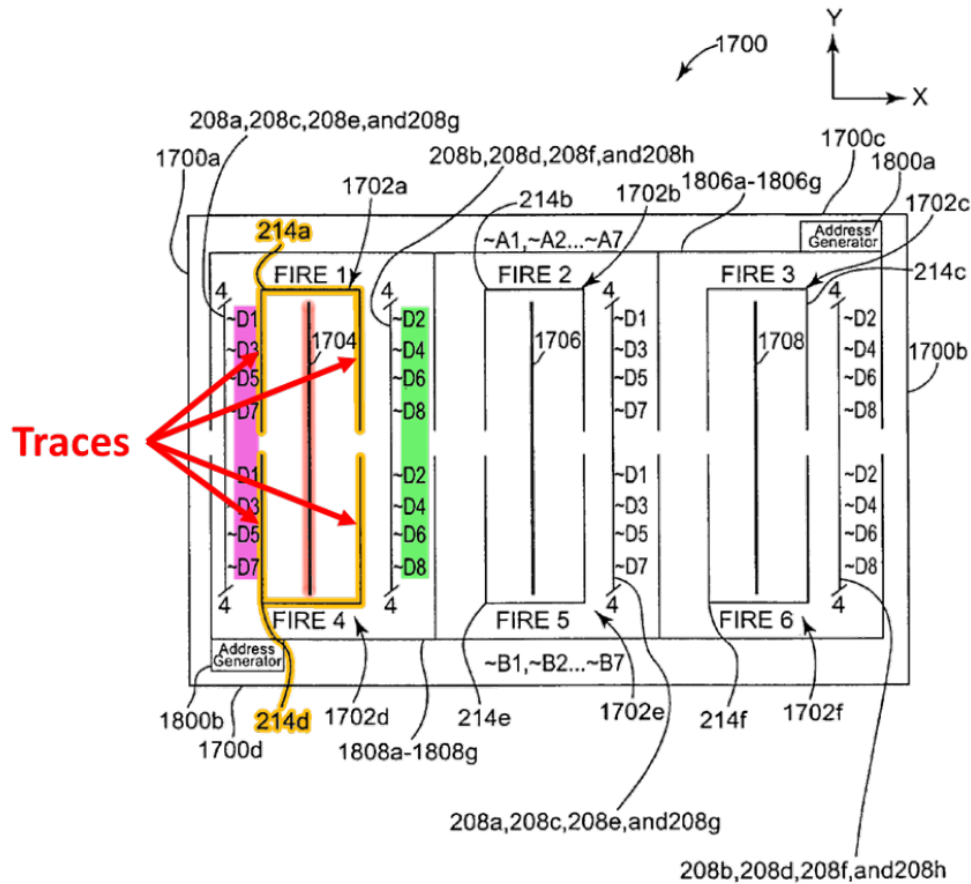


Figure 22 “is a diagram illustrating another aspect of the example layout of one embodiment of printhead die 1700.” Ex. 1005, 67:36–38. Petitioner annotates Figure 22 by coloring (i) ink feed slot 1704 red; (ii) data line groups D1, D3, D5, and D7 in fire groups 1702a and 1702d purple; (iii) data line groups D2, D4, D6, and D8 in fire groups 1702a and 1702d green; and (iv) U-shaped fire lines 214a and 214d orange. Pet. 26 (annotating Ex. 1005, Fig. 22). In addition, Petitioner (i) draws a red arrow to each of the two legs of each of the U-shaped fire groups 214a and 214d, and labels the four arrows “Traces.” *Id.*

Petitioner argues that Benjamin144’s “substantially U-shaped fire line,” “branch into two . . . traces that extend to respective heater arrays” proximal to the bondpad. *Id.* Petitioner argues that “[t]he top of

Benjamin[]144's U-shaped fire line 214a is proximal to side 1700c of printhead die 1700, the location where energy signal FIRE1 is sent from interface or bondpad 706." *Id.* at 27 (citing Ex. 1005, Fig. 22).

In addition, Petitioner argues that Benjamin703 teaches that "[t]he fire line input pad 706 . . . is electrically coupled to fire line 712 . . . that is electrically coupled to firing cells 120 in printhead die 40." *Id.* (quoting Ex. 1006, 19:45–47). Benjamin703 states that "[f]ire line 712 receives fire signal FIRE and provides fire signal FIRE to firing cells 120 in printhead die 40," according to Petitioner. *Id.* (quoting Ex. 1006, 20:4–5). "In other words in Benjamin[703], the fi[r]e line input pad, 706 is connected to the fire line 712, that splits on either side of the via," Petitioner argues. *Id.*; *see also id.* (annotating Ex. 1006, Fig. 10) (showing that fire line input pad 706 is immediately above fire line 712).

In addition, Petitioner argues that in view of Benjamin144 and Benjamin703's combined teachings, "[i]t would have been obvious that the bondpad would have been placed along a side of printhead die nearest the fire line similar to Benjamin[]144's data lines." *Id.* at 28. More specifically, Petitioner argues that Benjamin144 teaches "each of the data lines 208[a], 208[c], 208[e] and 208[g] is routed to its respective data line group from a bond pad located along the side of printhead die 1700 **nearest the data line group** in the fire groups 1702[a]–1702[f]." *Id.* (quoting Ex. 1005, 69:3–7) (emphasis in original). Petitioner adds that Benjamin144 also teaches that "[d]ata lines 208[a] and 208[c] are electrically coupled to a **bond pad alongside 1700[c]** of printhead die 1700." *Id.* (quoting Ex. 1005, 69:7–8) (emphasis in original). According to Petitioner, one of ordinary skill in the art "would have appreciated that Benjamin[]144's fire line input pad for fire

line 214a would be placed alongside 1700c at the side nearest the fire line.” *Id.* (citing Ex. 1002 ¶ 124).

Moreover, Dr. Pond testifies that Benjamin144’s U-shaped fire line branches into two traces that extend to respective heater arrays proximal to the bondpad, and that the top of Benjamin144’s U-shaped fire line 214a is proximate the edge of the die where the firing signal is received at a bond pad. Ex. 1002 ¶ 120 (citing Ex. 1005, Fig. 22). Dr. Pond also testifies that “it would have been obvious to use a bondpad to interface with Benjamin[]144’s fire lines (e.g., fire line 214a) at contacts 2006.” *Id.* ¶ 124.

Patent Owner argues that Benjamin144’s Figure 22 shows that the U-shaped fire line 1702a “is very close to ink via 1704, and branching of the structure occurs proximal to the heater arrays positioned next to their associated ink via . . . rather than proximal to any alleged placement of a bondpad.” Prelim. Resp. 34.

At this stage of the proceeding, we find that Petitioner’s showing is sufficient to establish a reasonable likelihood of prevailing for claims 3 and 9. In particular, at this stage, we find that the combination of Benjamin144 and Benjamin703 teaches that a U-shaped fire line branches into two traces that extend to respective heater arrays proximal to a bondpad. *See* Ex. 1005, 69:3–8, Fig. 22; Ex. 1006, 19:45–47, 20:4–5, Fig. 10; Ex. 1002 ¶¶ 117–124. We note, however, that this showing relies on the combined teachings for the placement of the bond pad, and Dr. Pond’s testimony regarding the bond pad placement relative to fire lines, and what Benjamin144’s Figure 22 and Benjamin703’s Figure 10 teach to one of ordinary skill in the art. *See* Ex. 1002 ¶¶ 117–124. The parties should consider addressing these issues further during trial, in accordance with our Rules.

At this stage of the proceeding, we find inapposite Patent Owner’s argument that “neither reference contains any teachings like the ’864 patent’s teachings regarding the advantages of separating traces proximal to the bondpad rather than proximal to associated heater arrays.” This is the incorrect focus. *See EWP Corp.*, 755 F.2d at 907; *In re Heck*, 699 F.2d at 1333.

F. Challenged Claims 5, 6, 8, 10, and 13–15

At this stage of the proceeding, Patent Owner does not address separately Petitioner’s arguments and evidence as to how the combination of Benjamin144 and Benjamin703 teaches the limitations of claims 5, 6, 8, 10, and 13–15. *See* Prelim. Resp. 35–36. We have reviewed Petitioner’s arguments and evidence regarding these claims, and, on the current record, we find them persuasive for purposes of institution.

VI. ALLEGED OBVIOUSNESS OVER BENJAMIN144,
BENJAMIN703, AND CHILDERS

Petitioner argues that the combination of Benjamin144, Benjamin703, and Childers renders claims 4, 11, 12, and 16–20 obvious. Pet. 46–71. At this stage of the proceeding, Patent Owner does not address separately Petitioner’s arguments and evidence as to how the combination of Benjamin144, Benjamin703, and Childers teaches these claims. *See* Prelim. Resp. 36. We have reviewed Petitioner’s arguments and evidence regarding claims 4, 11, 12, and 16–20, and, on the current record, we find them persuasive for purposes of institution.

VII. ALLEGED ANTICIPATION BY UENISHI

Petitioner argues that Uenishi anticipates claims 1, 3, 5, 6, 8–10, 13, and 15. Pet. 71–94. Patent Owner argues that Uenishi does not disclose all of the limitations of these challenged claims. Prelim. Resp. 36–43.

Petitioner already has demonstrated a reasonable likelihood of success in proving that at least claim 1 of the '864 patent is unpatentable. *See supra* Section V.C. We address the issues that are in dispute for this asserted ground to provide guidance to the parties. *See Consolidated Trial Practice Guide* (November 2019)⁹ 6 (“If a trial is instituted, the Board generally will provide analysis of the strengths and weaknesses of all challenges in the petition in order to provide guidance to the parties for the upcoming trial.”).

A. Summary of Uenishi

Uenishi is titled “Thermal Inkjet Head.” Ex. 1008, code (54). Uenishi relates to “provid[ing] a high-resolution, small-volume thermal inkjet head that can laminate stable layers of material.” *Id.* at code (57). In particular, Uenishi teaches the following embodiment in accordance with its teachings:

Four drive circuits 22a, 22b, 22c and 22d are formed in a thermal inkjet head 20 on a silicon substrate 21. A first orifice array resistor 25-1 is connected to a common electrode 23a via an individual wiring electrode 24-1 between it and the common electrode 23a and a second orifice column resistor 25-2 is connected via an individual wiring electrode 24-2 between it and a common electrode 23b. Ink ejection from the first and second orifice columns is controlled by timesharing. The drive circuits 22b, 22c and 22d similarly drive the resistors of two orifice columns, right and left, in a time-sharing manner. Black ink is supplied from ink channels 28a and 28e to the first and eighth orifice columns, while Y ink, M ink, and C ink are supplied to the second and third, fourth and fifth, and sixth and seventh orifice columns, respectively. The two orifice columns of the same color are disposed offset by half a pitch.

Id.

⁹ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

B. Parties' Arguments Concerning Uenishi's Teachings

The parties dispute whether Uenishi discloses a “bondpad,” as recited in independent claims 1 and 8, as well as “traces,” as recited in claim 8. *See* Pet. 78–80, 85–87; Prelim. Resp. 36–40, 42.

Petitioner argues that Uenishi discloses a bondpad (e.g., electricity-feed terminal 26b) which supplies power via a common electrode (e.g., electrode 23b) to heater arrays. Pet. 78–80. Petitioner adds that the common electrode has its center section cut out so that the electrode comprises two traces (e.g., a left branch and a right branch of electrode 23b). *Id.* at 85–87.

Patent Owner argues that “Uenishi does not disclose a bond pad structure that supplies power to heater arrays,” in accordance with the challenged claims. Prelim. Resp. 38. In addition, Patent Owner argues that Uenishi does not disclose “a bondpad having at least two traces.” *Id.* at 42. In particular, Patent Owner argues that the plain and ordinary meaning of “bondpad” means “a metalized area of the substrate to which external and internal power traces can be connected to provide power to internal components.” *Id.* at 38 (citing Ex. 1001, 3:42–51, 5:64–6:17). Patent Owner adds that “‘power traces’ are relatively narrow structures.” *Id.* (citing Ex. 1001, Fig. 3).

In view of these meanings, Patent Owner argues that “Uenishi does not disclose what terminal 26[] connects to, and certainly does not describe the terminal as a pad to which external power traces and onboard power traces can be connected.” *Id.* at 39. In addition, Patent Owner argues that “[t]o the extent that the large common electrode 23[] can even be considered

a power trace, the electricity-feed terminal 26[] is an integral portion of that large electrode) not a distinct component functioning as a bond pad.” *Id.*

The parties’ dispute turns on what is the plain and ordinary meaning of “bondpad” and “trace” in the context of the challenged claims. At this stage of the proceeding, we do not view the record on claim construction to be sufficiently developed for us to conclude that the plain and ordinary meaning of these terms is limited in the manner Patent Owner proposes. Thus, we find unavailing Patent Owner’s arguments concerning Uenishi’s teachings, at this stage of the proceeding.

In addition, the parties dispute whether Uenishi discloses traces that are physically separated proximal to the bondpad, in accordance with claims 3 and 9. *See* Pet. 80–82, 87; Prelim. Resp. 40–42. Petitioner argues that Uenishi teaches that “the center parts in the direction of length are cut out from their respective common electrodes 23a–23e and ink supply channels 28a–28d are formed in their lower areas.” Pet. 80 (quoting Ex. 1008 ¶ 34; citing *id.* at Fig. 1) (emphasis omitted). Thus, “Uenishi teaches that its common electrode includes traces that are physically separated from one another to accommodate the ink supply channels 28,” according to Petitioner. *Id.* (citing Ex. 1002 ¶ 339). Petitioner argues that “[t]hese portions or traces of the common electrode 23b . . . are physically separated proximal to the electricity-feed terminal 26.” *Id.* at 81 (citing Ex. 1008, Fig. 1; Ex. 1002 ¶¶ 339–340).

Patent Owner argues that “Uenishi shows an electrode that separates into two wide branches only in the portion that is in the vicinity of an ink via.” Prelim. Resp. 40.

At this stage of the proceeding, we agree with Patent Owner that Uenishi discloses that its common electrodes separate into two branches in the vicinity of an ink via, rather than proximal to terminal 26 (i.e., the bondpad). *See* Ex. 1008, Fig. 1.

VIII. ALLEGED OBVIOUSNESS OVER UENISHI AND HAYASAKI

Petitioner argues that the combination of Uenishi and Hayasaki renders claims 4, 11, and 12 obvious. Pet. 95–101. Patent Owner relies on its arguments for the ground asserting anticipation by Uenishi. Prelim. Resp. 43. Accordingly, the guidance we provide with respect to those arguments also applies here. *See supra* Section VII.B.

IX. CONCLUSION

For the foregoing reasons, we determine that Petitioner shows a reasonable likelihood that it would prevail in proving the unpatentability of at least one of the challenged claims of the '864 patent. We thus institute an *inter partes* review of all of the challenged claims of the '864 patent on all grounds asserted in the Petition. *See* 37 C.F.R. § 42.108(a).

Any findings or conclusions in this Decision are made only for the purposes of institution and are not dispositive of any issue. We have not made a final determination with respect to the patentability of any challenged claim. Our final determination will be based on the record as fully developed during trial, including any evidence or argument timely presented by the parties under our Rules.

X. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of the '864 patent is instituted on all of the challenged claims and all grounds asserted in the Petition; and

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FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial commences on the entry date of this Decision.

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FOR PETITIONER:

Dion M. Bregman
Amanda S. Williamson
Jason E. Gettleman
James J. Kritsas
MORGAN, LEWIS & BOCKIUS LLP
dion.bregman@morganlewis.com
amanda.williamson@morganlewis.com
jason.gettleman@morganlewis.com
james.kritsas@morganlewis.com

PATENT OWNER:

Timothy P. Maloney
Paul B. Henkelmann
Mark A. Borsos
David A. Gosse
FITCH, EVEN, TABIN & FLANNERY LLP
tim@fitcheven.com
phenkelmann@fitcheven.com
mborsos@fitcheven.com
dgosse@fitcheven.com