

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCT MOBILE (US) INC; TCL CHINA STAR OPTOELECTRONICS
TECHNOLOGY CO., LTD; TCL TECHNOLOGY GROUP
CORPORATION; TTE TECHNOLOGY, INC.; TCL COMMUNICATION
TECHNOLOGY HOLDINGS LIMITED; AND TCT MOBILE, INC.
Petitioner,

v.

SEMICONDUCTOR ENERGY LABORATORY CO., LTD.,
Patent Owner.

IPR2022-00440
Patent 9,208,717 B2

Before KEVIN F. TURNER, JENNIFER MEYER CHAGNON,
and NATHAN A. ENGELS, *Administrative Patent Judges*.

TURNER, *Administrative Patent Judge*.

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

I. INTRODUCTION

TCL China Star OptoElectronics Technology Co., Ltd., TCL Technology Group Corporation, TTE Technology, Inc., TCL Communication Technology Holdings Limited, TCT Mobile, Inc., and TCT Mobile (US) Inc. (collectively, “Petitioner”) filed a Petition (“Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–48 of U.S. Patent No. 9,208,717 B2 (“the ’717 Patent”). Paper 1. Semiconductor Energy Laboratory Co., Ltd., (“Patent Owner”) filed a Preliminary Response (“Prelim. Resp.”). Paper 11.

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition and any 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 explained below, we deny the Petition and do not institute an *inter partes* review.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies the parties identified as Petitioner as the real parties in interest. Pet. 3. Patent Owner identifies itself as a real party in interest. Paper 9, 1.

B. Related Proceedings

The parties identify *Semiconductor Energy Laboratory Co. v. TCL China Star Optoelectronics Technology Co.*, Case No. 8:21-cv-00554 (C.D. Cal. March 24, 2021) as a related matter. Pet. 3; Paper 9, 1.

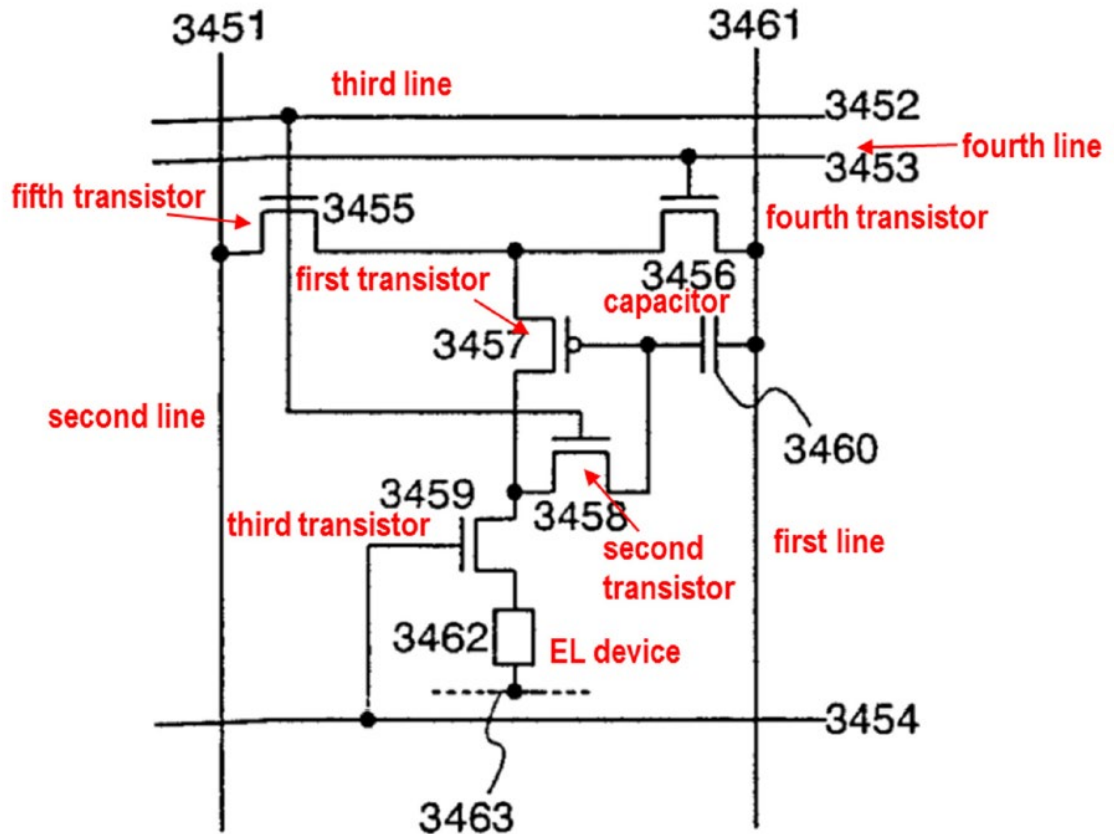
C. The '717 Patent

The '717 Patent is directed to light emitting devices. Ex. 1001, code (57). The disclosed structure relates to display devices/modules or semiconductor devices with a pixel comprising five thin-film transistors (“TFTs”), source/supply lines, and a capacitor, with the sources, drains, and gate electrodes of the transistors connected to each other, the capacitor and supply/signal lines in a certain configuration. *Id.* at 57:63–64:49.

The '717 Patent discloses that the TFTs are formed from polycrystalline silicon having a high field-effect mobility in comparison to amorphous silicon. Ex. 1001, 13:62–66. However, polycrystalline silicon has a problem with the variation of its electrical properties, including drain currents, due to defects in crystal grain boundaries that will introduce dispersion in the brightness of the EL devices. *Id.* at 14:1–9. The '717 Patent addresses this problem by modifying the pixel structure by adding two additional TFTs and one capacitor, to correct for TFT threshold voltage dispersion by using this particular pixel structure. *Id.* at 14:10–17, 16:34–41.

Patent Owner acknowledges that Figure 34B is illustrative of its proposed circuits (Prelim. Resp. 6–7), and provides an annotated version of Figure 34B, reproduced below:

Fig.34B



Annotated Figure 34 B of the '717 Patent illustrating a pixel having an electroluminescent device, TFTs, source/supply lines, and a capacitor connected to each other in a certain configuration

Prelim. Resp. 7.

D. Illustrative Claim

Independent claim 1 is reproduced below:

- [1.Preamble] 1. A display device comprising:
- [1.1] a pixel comprising:
- [1.2] an electroluminescent device;
- [1.3] a first transistor;

- [1.4] a second transistor;
- [1.5] a third transistor;
- [1.6] a fourth transistor;
- [1.7] a fifth transistor; and
- [1.8] a capacitor,

[1.9] wherein one of a source and a drain of the first transistor is directly connected to one of a source and a drain of the second transistor,

[1.10] wherein the one of the source and the drain of the first transistor is directly connected to one of a source and a drain of the third transistor,

[1.11] wherein a gate of the first transistor is directly connected to the other of the source and the drain of the second transistor,

[1.12] wherein one of a source and a drain of the fourth transistor is directly connected to the other of the source and the drain of the first transistor,

[1.13] wherein the other of the source and the drain of the fourth transistor is directly connected to a first line,

[1.14] wherein one of a source and a drain of the fifth transistor is directly connected to the other of the source and the drain of the first transistor,

[1.15] wherein the other of the source and the drain of the fifth transistor is directly connected to a second line,

[1.16] wherein the other of the source and the drain of the third transistor is directly connected to the electroluminescent device,

[1.17] wherein a first electrode of the capacitor is directly connected to the gate of the first transistor,

[1.18] wherein a second electrode of the capacitor is directly connected to the first line,

[1.19] wherein a gate of the second transistor is directly connected to a third line,

[1.20] wherein a gate of the fifth transistor is directly connected to the third line,

[1.21] wherein a gate of the fourth transistor is directly connected to a fourth line.

Ex. 1001, 57:63–58:38¹.

E. Asserted Grounds of Unpatentability

Petitioner asserts the following ground of unpatentability (Pet. 14), supported by the declaration of Jerzy Kanicki, Ph.D. (Ex. 1002):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–4, 7–10, 13–16, 19–22, 25–28, 31–34, 37–40, 43–46	103(a) ²	Dawson ³
1–48	103(a)	Dawson, Hayashi ⁴

¹ The listing of claim 1 utilizes the bracketed numbering of the claim elements employed by both Petitioner (Pet. 25–45) and Patent Owner (Prelim. Resp. 17–47).

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. § 103 effective March 16, 2013. Because the challenged patent claims priority to an application filed before March 16, 2013, we refer to the pre-AIA version of § 103.

³ U.S. Patent No. 6,229,506 B1, filed April 22, 1998, issued May 8, 2001 (Ex. 1003, “Dawson”). The parties refer to Dawson as “the ’506 patent.”

⁴ U.S. Patent No. 6,661,563 B2, filed January 30, 2001, issued December 9, 2003 (Ex. 1004, “Hayashi”). The parties refer to Hayashi as “the ’563 patent.”

III. ANALYSIS

A. *Obviousness: 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 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.” *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

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.

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. Rather, 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 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.”).

The motivation to combine must be “accompanied by a reasonable expectation of achieving what is claimed in the patent-at-issue.” *Intelligent Bio-Sys*, 821 F.3d at 1367. “The reasonable expectation of success requirement refers to the likelihood of success in combining references to meet the limitations of the claimed invention.” *Id.*

B. Level of Skill in the Art

Petitioner's expert, Dr. Kanicki, testifies:

[A] person of ordinary skill in the art ("POSITA") at the time of the alleged invention of the '717 patent (*i.e.*, around January 18, 2002), and for that matter, at all subsequent times through the present, would have held a graduate degree in electrical engineering or computer engineering or a similar discipline, with at least three years of relevant industry or research experience, including experience designing or implementing light emitting devices in combination with pixel, switching, and driving circuits.

Ex. 1002 ¶ 30. Patent Owner does not offer an alternative. Petitioner's proposal is consistent with the level of ordinary skill in the art reflected by the prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). On this record, the level of ordinary skill is neither in dispute nor dispositive of any challenge. For purposes of this Decision, we apply Petitioner's articulation.

C. Claim Construction

In an *inter partes* review, a claim "shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b) (2019). We apply the claim construction standard from *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (*en banc*). Claim terms need only be construed to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

Petitioner seeks to construe the claim terms "electrically connected" and "directly connected," which appear in numerous claims. Pet. 21–24.

Petitioner asserts that “electrically connected” should be construed as “an electrical connection of circuit components either directly connected or indirectly connected via intervening circuit components.” *Id.* at 21.

Petitioner asserts that this construction was adopted in the related District Court litigation. *Id.* Petitioner contrasts that construction with its proposed construction of “directly connected,” which it asserts to be “a connection of circuit components via conductive material, for example, wiring, and without other intervening circuit components,” also asserting that this is the agreed-to construction of the parties in the related District Court litigation. *Id.* at 22. Patent Owner does not appear to dispute these constructions and specifically cites to these constructions in its own analysis. Prelim. Resp. 1–2, 19–20.

For purposes of this Decision, we construe these claim limitations in accord with Petitioner’s proffered constructions.

D. Ground 1: Obviousness of Claims 1–4, 7–10, 13–16, 19–22, 25–28, 31–34, 37–40, 43–46 Over Dawson

Petitioner challenges claims 1–4, 7–10, 13–16, 19–22, 25–28, 31–34, 37–40, 43–46 as obvious over Dawson. Pet. 24–71. We begin with a discussion of Dawson, Petitioner’s proposed combination of embodiments of Dawson, and Petitioner’s application of the same to the claims, and Patent Owner’s responsive arguments thereto.

1. Dawson

Dawson describes an LED pixel structure that reduces current nonuniformities and threshold voltage variations in a drive transistor. Ex. 1003, code (57). Two types of pixel structures are disclosed in Dawson,

with one type providing a current source for loading data in the pixel via a data line, and the other where an auto zero voltage is determined for the drive transistor prior to loading the data. *Id.* Illustrative of the first type is a structure illustrated in Figure 6, wherein constant current source (230) provides a programmable current to set a voltage stored in the capacitor. *Id.* at 4:14–23. Figure 6 is reproduced below:

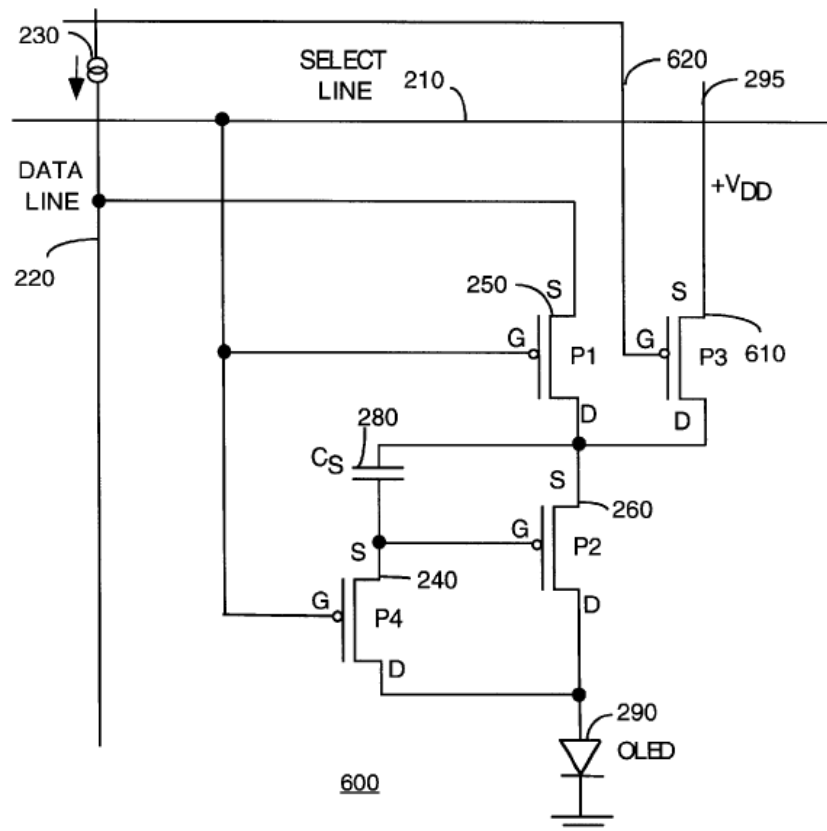


FIG. 6

A schematic diagram of an active matrix LED pixel structure

Exemplary of the second type is a structure illustrated in Figure 3, in which “the data line voltage is converted into a current within the pixel structure without the need of a voltage-to-current converter such as the

implementation of a current source as discussed above in [Fig. 6].”

Ex. 1003, 4:37–40. Figure 3 is reproduced below:

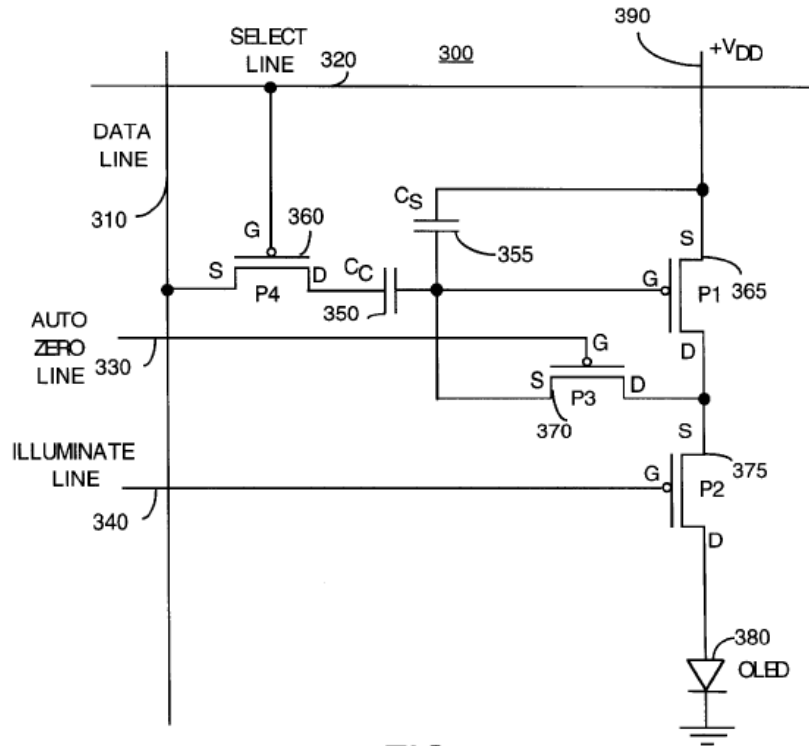


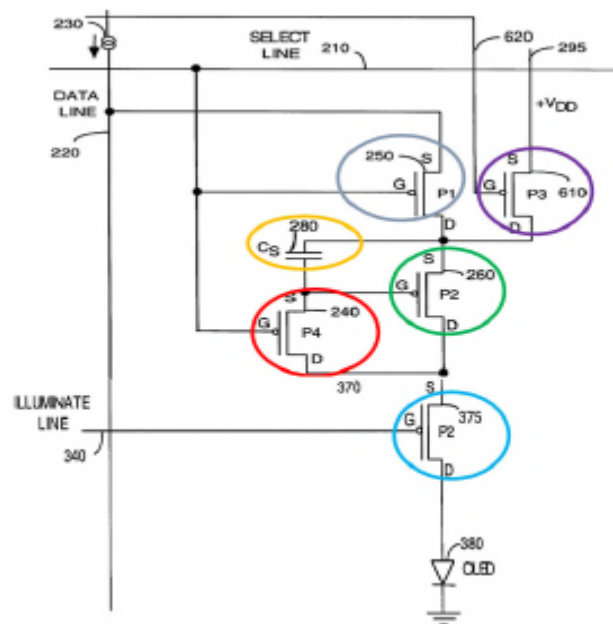
FIG. 3

A schematic diagram of an active matrix LED pixel structure

2. The Combination of Embodiments of Dawson

Petitioner argues that one of ordinary skill would have been motivated to combine two embodiments disclosed by Dawson. Pet. 7–13 (citing Ex. 1002 ¶¶ 78–86). In particular, Petitioner argues that embodiments illustrated in Figures 3 and 6 could be combined to overcome inherent limitations with the disclosed pixel circuit. Pet. 11. The combined embodiment, edited, with annotations added, is reproduced below:

electroluminescent device -290 OLED
first transistor - 260
second transistor - 240
third transistor - 375
fourth transistor - 610
fifth transistor - 250
capacitor - 280



Combined Figures 3 and 6 of Dawson, proposed by Petitioner
Pet. 12.

Petitioner argues that a person of ordinary skill in the art could evaluate if the pixel circuit of Figure 3 has any potential limitations that need to be addressed for practical application of the pixel circuit to Active Matrix Organic Light Emitting Diodes (“AM-OLEDs”). Pet. 11 (citing Ex. 1002 ¶ 84). Petitioner asserts that the Figure 3 embodiment “does account for any changes in drive TFT threshold voltage and mobility variations, but there are some capacitor – voltage errors in switching of the row and control line inputs.” *Id.* Petitioner also asserts that “[a]nother issue is for low illumination within a row time, especially more critical for higher resolution displays.” *Id.* Based on what Petitioner asserts to be the possible changes to address the errors, Petitioner asserts that a person of ordinary skill in the art “would have realized the easier solution to address the short comings of the pixel circuit shown in Fig. 6 is to adopt the illumination line with

corresponding TFT shown on Fig. 3 to the pixel circuit shown on Fig. 6.” *Id.* at 12. Based on this, Petitioner asserts that a person of ordinary skill in the art “would be motivated to add the third transistor 375 and illuminate line from FIG. 3 to the embodiment in FIG. 6,” with the addition of the third transistor being well within the capabilities of such a person. *Id.* at 13 (citing Ex. 1002 ¶ 86).

3. *Claim 1*

Petitioner challenges claim 1 as obvious over Dawson. Pet. 25–45. Patent Owner raises multiple arguments against this ground of unpatentability with respect to claim 1. Prelim. Resp. 17–47. We address a single argument by Patent Owner below because it demonstrates that the Petition has failed to persuade, to within a reasonable likelihood, that independent claim 1 would have been obvious over Dawson.

Patent Owner argues that the Petition relies on Dawson for claim element [1.18], namely “wherein a second electrode of the capacitor is directly connected to the first line,” and Dawson fails to teach such a connection. Prelim. Resp. 17–18 (citing Pet. 40–42, 48–49, 50–52). Patent Owner asserts that:

the Petition maps the ’717 Patent’s claimed “capacitor” to capacitor 280 in FIG. 6 of [Dawson], and maps the claimed “first line” or “current supply line” to line 295 in FIG. 6 of [Dawson], which carries a voltage VDD.

Id. at 18. Patent Owner further argues that such an arrangement “leaves transistor P3 (610) as an intermediate circuit component between capacitor 280 and VDD line 295,” which does not comport with Petitioner’s adopted claim construction of “directly connected.” *Id.* at 19–20.

We agree with Patent Owner's argument. As illustrated in Figure 6 of Dawson, there is no "direct connection" between the electrode of the capacitor, identified by Petitioner as the second electrode, and the first line, identified by the Petitioner as VDD. Looking to Petitioner's "combined Figures 3 and 6" of Dawson as well, relied upon to teach or suggest elements [1.5] and [1.10] and, thus, to supply the overall structure recited in claim 1, that combined embodiment also has "other intervening circuit components" between capacitor (280) and + V_{DD} line 295. As such, neither Figure 6 of Dawson, nor Petitioner's combined Figures 3 and 6 of Dawson, teach or suggest claim element [1.18], i.e., "wherein a second electrode of the capacitor is directly connected to the first line."

Additionally, while Petitioner is correct that Figure 3 of Dawson illustrates a "direct connection" between C_S (355) and +V_{DD} (390) (Pet. 40–41), that aspect of the Figure 3 embodiment was not included in Petitioner's combined embodiment. Petitioner does not rely on the Figure 3 embodiment to teach or suggest all of the elements of independent claim 1, and Petitioner cannot rely on such a connection, only found in the Figure 3 embodiment, unless Petitioner explains how it would be incorporated in the combined embodiment and why one of ordinary skill in the art would have provided for such a connection. Although the Petition provides a rationale for the creation of the combined embodiment, the Petition does not assert that one of ordinary skill in the art would have been motivated to incorporate the "direct connection" aspect of Figure 3 into the combined embodiment.

Similarly, Petitioner also argues that "Figure 6 also shows the second electrode of a capacitor is directly connected to the first line because a POSITA would design the VDD line to be extended to run parallel to data

line 220.” Pet. 41 (citing Ex. 1002 ¶ 206). This is unavailing because we have no proffered rationale why such line would be extended, with only a conclusory statement provided in the Petition and Dr. Kanicki’s testimony adding nothing additional. The annotated Figure 6 (Pet. 42), provided by Petitioner in the Petition, provides no support for Petitioner’s assertions as it appears that the red line on that figure would tie the source and drain of TFT P3 (610) together, shorting the TFT and rendering it inoperable. We find it difficult to discern Petitioner’s intent or position from the section of the Petition discussing claim element [1.18], but we nonetheless can determine that it does not appear to be supported by any recognizable evidence.

Lastly, we concur with Patent Owner’s observation that Petitioner’s argument with respect to claim element [1.18] “is at odds with their own statements in related district court litigation involving the ’717 Patent.” Prelim. Resp. 22. Petitioner’s invalidity contentions in related District Court litigation address claim element [1.18] and acknowledge that “[Dawson] does not disclose this element,” and that “[Dawson] teaches the second electrode of the capacitor is connected to the first line through the fifth transistor.” Ex. 2117, 57.

As such, we are persuaded that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to its challenge of independent claim 1 as obvious over Dawson.

4. Independent claims 7, 13, 19, 25, 31, 37, and 43

With respect to independent claim 7, Petitioner also asserts Dawson with respect to an equivalent element, namely claim element [7.18]: “wherein a second electrode of the capacitor is directly connected to the current supply line.” Pet. 50–52. Petitioner makes similar arguments with

respect to this element that it made with respect to claim element [1.18], specifically that Fig. 3 of Dawson discloses a direct connection and a person of ordinary skill in the art “would design the VDD line to be extended to run parallel to data line 220.” *Id.* at 51 (citing Ex. 1002 ¶ 261). Similar to the discussion of claim element [1.18] above, we find Petitioner’s arguments to be equally unavailing with respect to element [7.18] and independent claim 7 as a whole. As such, we are persuaded that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to its challenge of independent claim 7 as obvious over Dawson.

Similarly, with respect to independent claims 13, 19, 25, 31, 37, and 43, which all recite limitations the same or similar to claims elements [1.18] and [7.18], and where Petitioner relies on the same analysis (Pet. 61–62, 66–67, 69) for those elements, we find Petitioner’s arguments to be insufficient to teach or suggest the equivalent claim elements recited in those claims. As such, we are persuaded that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to its challenge of independent claims 13, 19, 25, 31, 37, and 43 as obvious over Dawson.

5. Dependent claims 2–4, 8–10, 14–16, 20–22, 26–28, 32–34, 38–40, and 44–46

By virtue of their dependence on independent claims 1, 7, 13, 19, 25, 31, 37, and 43, we likewise determine that Petitioner has failed to show the obviousness of dependent claims 2–4, 8–10, 14–16, 20–22, 26–28, 32–34, 38–40, and 44–46.

E. Ground 2: Obviousness of Claims 1–48 Over Dawson and Hayashi

Petitioner challenges claim 1–48 as obvious over the combination of Dawson and Hayashi. Pet. 71–86. Petitioner acknowledges that elements of the claims not covered in the first ground are not disclosed by Dawson alone. *Id.* at 71. Petitioner asserts that Hayashi teaches those missing elements and provides reasons that one of ordinary skill in the art would have combined their teachings. *Id.* at 71–75. Petitioner’s analysis relies on its analysis of the first ground (Pet. 75), where, as discussed above, we do not find Petitioner’s analysis to be persuasive.

Petitioner does not argue that Hayashi supports its argument that the combination of Dawson teaches the above-discussed claim elements [1.18] or [7.18]. Therefore, because, as discussed above, we find that Dawson would not have taught or suggested those elements, we are persuaded that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to its challenge of claims 1–48 as obvious over the combination of Dawson and Hayashi.

F. Discretionary Denial Under 35 U.S.C. § 314(a)

The above analysis is dispositive. We decline to address Patent Owner’s arguments for discretionary denial under 35 U.S.C. §§ 314(a), 325(d). Prelim. Resp. 47–65. *See Microchip Technology, Inc. v. HD Silicon Solutions LLC*, IPR2021-01421, Paper 13 at 9 (PTAB May 12, 2022) (“Because we deny institution on the merits, we do not reach the parties’ arguments regarding discretionary denial under 35 U.S.C. § 314(a)”); *Cf. Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984)

(explaining that an administrative agency “is at perfect liberty” to resolve a proceeding based on a single dispositive issue).

IV. ORDER

In consideration of the foregoing, it is hereby:

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

IPR2022-00440
Patent 9,208,717 B2

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