

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BOE TECHNOLOGY GROUP CO., LTD.,
Petitioner,

v.

OPTRONIC SCIENCES LLC,
Patent Owner.

IPR2024-01131
Patent 7,226,801 B2

Before BENJAMIN D. M. WOOD, BRIAN J. McNAMARA, and
ROBERT J. WEINSCHENK, *Administrative Patent Judges*.

WOOD, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background*

BOE Technology Group Co., Ltd. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–6 and 8–14 of U.S. Patent No. 7,226,801 B2 (Ex. 1001, “the ’801 patent”). Optronix Sciences LLC (“Patent Owner”) filed a preliminary response. Paper 6 (“Prelim. Resp.”). With our authorization (Ex. 3001), Petitioner filed a preliminary reply (Paper 13, “Prelim. Reply”), and Patent Owner filed a preliminary sur-reply (Paper 14, “Prelim. Sur-reply”).

We have authority under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . 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 considering the Petition, we determine that Petitioner has satisfied this threshold requirement, and we institute *inter partes* review of claims 1–6 and 8–14 of the ’801 patent.

B. *Real Parties-in-Interest*

Petitioner identifies itself as real party-in-interest. Pet. 87.

Patent Owner identifies itself as real party-in-interest. Paper 3, 1.

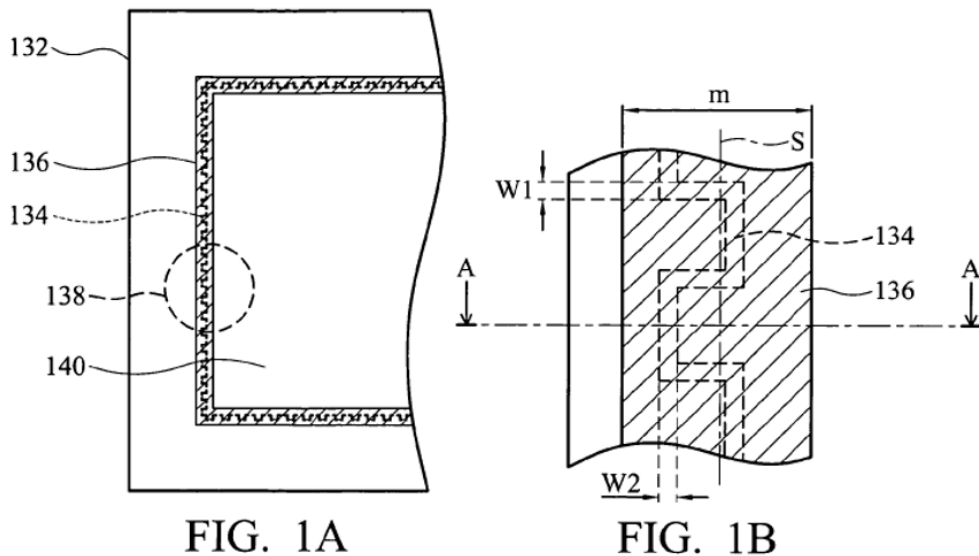
C. *Related Proceedings*

The parties identify *Optronix Sciences LLC v. BOE Technology Group Co., LTD*, 2:23-cv-00549 (E.D. Tex.) as a related matter. Pet. 87; Paper 3, 1.

D. The '801 patent

The '801 patent¹ relates to “a sealant region pattern of a liquid crystal display apparatus.” Ex. 1001, 1:31–32. The '801 patent teaches that TFT-LCD (thin film transistor liquid crystal display) devices “can suffer from degradation related to ambient environmental conditions such as moisture which may lead to performance loss, operational instability, poor color/emission accuracy, and shortened operational life.” *Id.* at 1:10–13. “Typical encapsulation methods utilize a color filter substrate covering organic polymer areas with an adhesive sealant,” but those “encapsulation methods suffer from problems such as sealant peeling, uneven cell gaps, and formation of voids in the sealant regions during assembly.” *Id.* at 1:19–25. The '801 patent purports to resolve these problems. *Id.* at 1:26–27, 1:47–50.

Figures 1A–1C of the '801 patent, reproduced below, illustrate a “comparative example” of a sealant region of a TFT-LCD display:



¹ The '801 patent issued on June 5, 2007, from an application filed December 28, 2005.

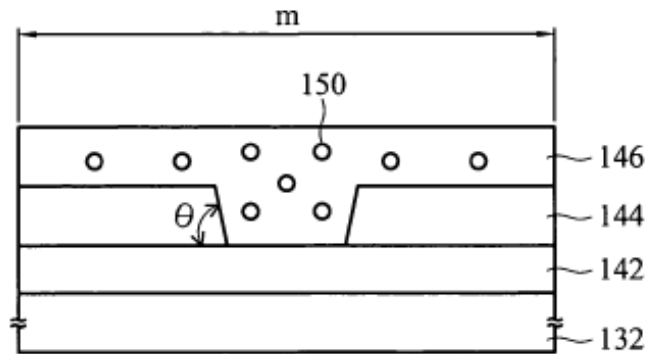


FIG. 1C

Figures 1A and 1B depict sealant region 136 of a “comparative example” TFT-LCD display. Ex. 1001, 2:9–40. Sealant region 136 comprises saw tooth openings 134, which receive sealant 146 to attach TFT array substrate 132 to color filter substrate 140. *Id.* at 2:11–16. As shown in Figure 1C, a “predetermined material layer,” such as silicon nitride layer 142, is formed on TFT array substrate 132, serving as a passivation layer. *Id.* at 2:27–30. Organic material layer 144, on which saw tooth openings 134 are formed, covers predetermined material layer 142; sealant 146 is applied on organic material layer 144 and fills openings 134. *Id.* at 2:31–36. In this example, “[v]oids or bubbles 150 [are] formed during application of sealant 146 . . . due to angle θ between sidewall of saw tooth openings 134 and the surface of silicon nitride layer 142 exceeding 60 degrees.” *Id.* at 2:37–40.

Figures 2B and 2C of the ’801 patent, reproduced below, are cross-sections of “a TFT-LCD according to an embodiment” of Kwak, illustrating different stages of fabrication. *Id.* at 2:1–3.

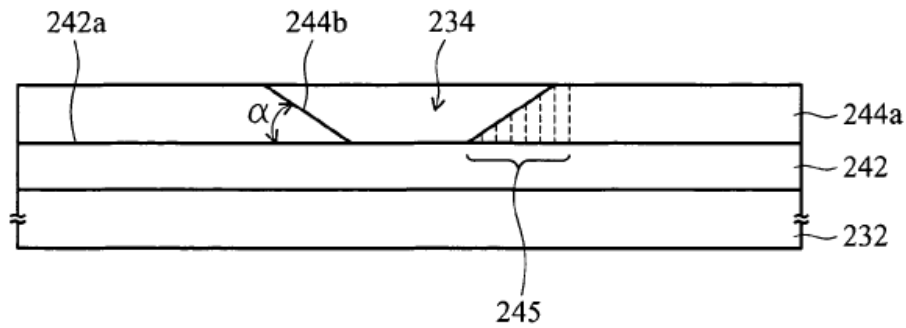


FIG. 2B

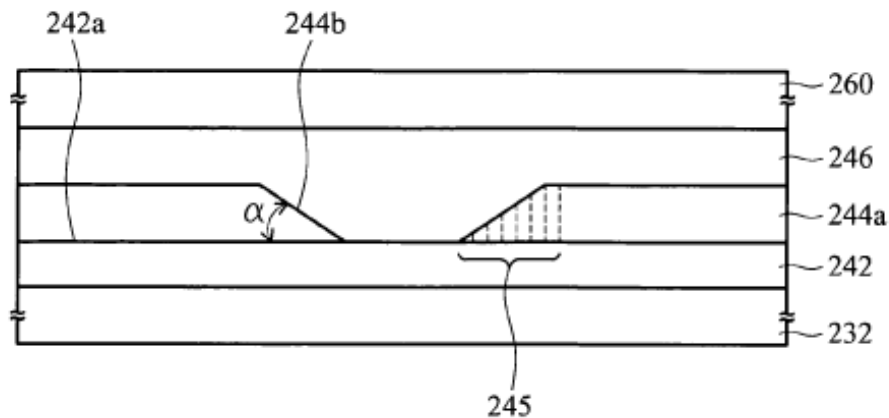


FIG. 2C

The device depicted in Figure 2C, similar to that shown in Figure 1C, comprises TFT array substrate 232 and “color filter substrate 260 opposite thereto”; predetermined material layer 242 (e.g., a passivation layer or metal electrode layer) formed on the TFT array substrate 232; and organic material layer 244a formed on predetermined material layer 242. *Id.* at 2:44–57.

Saw tooth openings 234 (labeled in Figure 2B) are formed in organic material layer 244a, with saw-tooth-opening sidewall 244b and surface 242a of layer 242 forming “a predetermined angle α ” that is “substantially less than 60 degree[s]” and is “preferably about 20 degree[s] to about 30 degree[s].” *Id.* at 2:66–3:21. Sealant 246 covers organic material layer 242 and fills saw tooth opening 234. *Id.* at 3:22–26. “With predetermined angle α [substantially less than 60 degrees], air exhausts easily via the tapered

profile of the saw tooth opening 234 during application of sealant, avoiding formation of voids or bubbles in the sealant.” *Id.* at 3:27–30.

E. The Challenged Claims

Petitioner challenges claims 1–6 and 8–14 of the ’801 patent. Pet. 1. Claims 1 and 9 are independent. Claims 1 and 9 are illustrative of the claimed subject matter and are reproduced below:²

1. [1pre] A method for forming a sealant region pattern of a liquid crystal display, comprising:

[1a] providing a first substrate and a second substrate opposite thereto;

[1b] forming a predetermined material layer on the first substrate; and

[1c] forming an organic material pattern layer having a saw tooth opening on the predetermined material layer to expose the surface of the predetermined material layer underneath, wherein the surface of the predetermined material layer and the sidewall of the organic material pattern layer form a predetermined angle.

Ex. 1001, 3:40–51.

9. [9pre] A sealant region pattern for a liquid crystal display, comprising:

[9a] a first substrate and a second substrate opposite thereto;

[9b] a predetermined material layer formed on the first substrate; and

[9c] an organic material pattern layer having a saw tooth opening formed on the predetermined material layer to expose the surface of the predetermined material layer underneath, wherein the surface of the predetermined material layer and the

² We use Petitioner’s bracketed identifiers for each limitation. *See* Pet. vii, 21–74.

sidewall of the organic material pattern layer form a predetermined angle.

Id. at 4:26–37.

F. Asserted Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable based on the following specific grounds (Pet. 1):

Ground	Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1	9	102(e) ³	Kwak ⁴
2	1–6, 8–14	103(a)	Kwak
3	2, 3, 6, 10, 11	103(a)	Kwak, Vaganov ⁵
4	2, 3, 6, 8, 10, 11, 14	103(a)	Kwak, Kim ⁶
5	2, 3, 6, 10, 11	103(a)	Kwak, Yamazaki ⁷
6	1–6, 9–13	103(a)	Zhang ⁸
7	2, 3, 6, 10, 11	103(a)	Zhang, Vaganov

³ Because the '801 patent's filing date precedes the effective date of the amendments to 35 U.S.C. §§ 102 and 103 enacted by the Leahy-Smith America Invents Act (AIA), we apply the pre-AIA version of these sections (although our decision would be the same under either version). *See* AIA, Pub. L. No. 112–29, § 3(n)(1), 125 Stat. 284, 293 (2011).

⁴ U.S. Patent No. 7,538,488 B2 (issued May 26, 2009) (Ex. 1005).

⁵ U.S. Patent No. 6,406,636 B1 (issued June 18, 2002) (Ex. 1007).

⁶ U.S. Patent Appl. Pub. No. 2003/0076452 A1 (published Apr. 24, 2003) (Ex. 1008).

⁷ U.S. Patent No. 7,446,336 B2 (issued Nov. 4, 2008) (Ex. 1009).

⁸ CN 1538212 A (published Oct. 20, 2004), including certified English language translation thereof (Ex. 1006).

Ground	Claims Challenged	35 U.S.C. §	Reference(s)/Basis
8	2, 3, 6, 10, 11	103(a)	Zhang, Yamazaki

Petitioner also relies on the Declaration of Dr. Dean Neikirk (Ex. 1003) to support its asserted grounds.

II. PATENT OWNER’S REQUEST FOR DISCRETIONARY DENIAL OF INSTITUTION UNDER 35 U.S.C. § 314(A)

Patent Owner requests that we deny institution under 35 U.S.C. § 314(a) because of the parallel district-court action identified above. Prelim. Resp. 37–40. For the reasons stated below, we do not exercise our discretion in view of the parallel proceeding.

Institution of an *inter partes* review is discretionary. *See* 35 U.S.C. § 314(a) (authorizing institution of an *inter partes* review under particular circumstances, but not requiring institution under any circumstances); *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 273 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *SAS Inst., Inc. v Iancu*, 584 U.S. 357, 366 (2018) (same); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

The Board may, in the interest of fairness and efficient use of Board resources, deny institution under § 314(a) in view of a parallel district-court proceeding. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5–6, 12–13 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). Under *Fintiv*, we

consider several factors to determine whether to deny institution under § 314(a) based on parallel district-court proceedings:

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

Fintiv, Paper 11 at 5–6. We apply these factors in light of mandatory guidance issued by the USPTO Director in a June 21, 2022 Memorandum titled “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation” (“Memorandum”).⁹

A. Fintiv Factor 1: Stay in the Parallel Proceeding

Under the first *Fintiv* factor, we consider “whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted.” *Fintiv*, Paper 11, 5–6. “If a court has denied a defendant’s motion for a stay pending resolution of a PTAB proceeding, and has not indicated to the parties that it will consider a renewed motion or reconsider a motion to stay

⁹ Available at: https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf

if a PTAB trial is instituted, this fact has sometimes weighed in favor of exercising authority to deny institution.” *Id.* at 7–8.

Patent Owner contends that Factor 1 “weighs against institution” because the judge presiding over the parallel district-court litigation “rarely stayed a case pending *inter partes* review, only granting 8 of 67 motions to stay pending an IPR (12%) since 2020 according a report from Docket Navigator.” Prelim. Resp. 38.¹⁰ Petitioner responds that Factor 1 is neutral because “the Board should not speculate on how the Court will rule on any motion to stay filed post-institution.” Prelim. Reply 3.

“A judge determines whether to grant a stay based on the facts of each specific case as presented in the briefs by the parties.” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020) (informative). Thus, “[w]e decline to infer, based on actions taken in different cases with different facts, how the [court] would rule should a stay be requested by the partes in the parallel case.” Accordingly, we determine that the first *Fintiv* factor is neutral.

B. Fintiv Factor 2: Proximity of Trial Date in the Parallel Proceeding

Under the second *Fintiv* factor, we consider the “proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision.” *Fintiv*, Paper 11, 6. Patent Owner contends that this factor “weighs against institution” because, “[t]rial is set for January 5,

¹⁰ Although Patent Owner reproduces in the Preliminary Response a graph presumably from an October 17, 2024 “Docket Navigator Motion Outcomes Report” (Prelim. Resp. 38), that report has not been entered into the record as evidence.

2026,” whereas “[t]he final written decision is not expected until February 16, more than a month after trial.” Prelim. Resp. 38–39 (citing Ex. 2001, 1). Petitioner responds that this factor weighs against denial of institution because although jury selection is set to begin on January 5, 2026, “[t]rial [will] occur well after that date, since ten patent cases are set to begin that day.” Prelim. Reply 3 (citing Ex. 1011, 1–2).

Because a number of cases are scheduled for jury selection on January 5, 2026, in addition to the parallel proceeding, there is some uncertainty whether the trial in that proceeding would actually begin on that date. Thus, we cannot say with any degree of assurance that a trial in the district-court proceeding would occur before the statutory deadline in this case. Accordingly, we consider this factor to be neutral or weigh slightly against exercising our discretion to deny institution under *Fintiv*.

*C. Fintiv Factor 3: Investment by the Court
and the Parties in the Parallel Proceeding*

Under the third *Fintiv* factor, we consider the “investment in the parallel proceeding by the court and the parties.” *Fintiv*, Paper 11, 6. Patent Owner contends that by the time an institution decision in this proceeding issues, “the parties will have spent *over a year* litigating in district court and be close to the start of the claim construction process set for March 11, 2025.” Prelim. Resp. 39. Thus, in Patent Owner’s view, Factor 3 is neutral. *Id.* Petitioner responds that Factor 3 “weighs heavily in favor of institution because the deadline for institution (Feb. 17, 2025) is at least 3 weeks before the first step of claim construction in the litigation (identification of terms, March 11, 2025).” Prelim. Reply, 3 (citing Ex. 2001, 5).

“If, at the time of the institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution” *Fintiv*, Paper 11, 10. That appears to be the case here. Although the litigation may have been pending for a year, the parties have not yet begun the court’s claim-construction process, are in the early stages of fact discovery, and the court has not issued any substantive orders regarding the ’801 patent. *See* Ex. 2001, 4–5. Because the parties’ and the court’s investment in the parallel proceeding is not extensive, this factor weighs against exercising our discretion to deny institution.

*D. Fintiv Factor 4: Overlap Between Issues
Raised in the Petition and Parallel Proceeding*

Under the fourth *Fintiv* factor, we consider the “overlap between issues raised in the petition and in the parallel proceeding.” *Fintiv*, Paper 11, 6. Overlap between prior art arguments and claims challenged in the petition and in the district-court proceeding raises concerns of “inefficiency and the possibility of conflicting decisions.” *Id.* at 12. Patent Owner contends that this factor weighs against institution because “Petitioner asserts the same prior art in district court, without a *Sotera*-type stipulation,^[11] such that the duplicative arguments in these two forums are inefficient.” Prelim. Resp. 39; Ex. 2003, 6–10. According to Patent Owner, Petitioner also asserts in the district-court proceeding “14 different patent publications” and “**85** systems as prior art.” Prelim. Resp. 39 (citing Ex. 2003, 15). Petitioner responds that Factor 4 “weighs heavily in favor of

¹¹ *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (Dec. 1, 2020) (precedential).

institution” because “[t]his IPR challenges claims 1-6 and 8-14 while the litigation will address claims 9 and 10.” Prelim. Reply 3 (citing Ex. 2002).

We find particularly relevant to this analysis the fact that the district-court litigation does not address the patentability of independent claim 1 and dependent claims 2–6, 8, and 11–13, which are challenged in the Petition. Because ten of twelve claims at issue in this proceeding are only addressed here at the Board, we are less concerned about inefficiency and conflicting decisions resulting from instituting review. Thus, we determine that this factor weighs against exercising our discretion to deny institution.

E. Fintiv Factor 5: Whether Petitioner is the Defendant in the Parallel Proceeding

Under the fifth *Fintiv* factor, we consider “whether the petitioner and the defendant in the parallel proceeding are the same party.” *Fintiv*, Paper 11, 6. It is undisputed that the parties here are the same parties in the parallel district-court litigation. The parties being the same “could weigh either in favor of, or against, exercising discretion to deny institution, depending on which tribunal is likely to address the challenged patent first.” *Carrier Fire & Security Americas Corp. v. Sentrilock, LLC*, IPR2021-00665, Paper 12 at 13–14 (PTAB Sept. 16, 2021). For example, if the Board reaches the merits before the district court, “estoppel will apply against Petitioner should we determine that Petitioner failed to demonstrate unpatentability of the challenged claims.” *Id.*

As discussed above, the district-court trial—and hence any ruling on the validity of the claims asserted in the district court—may not occur before the entry of a final written decision in this IPR. Accordingly, this factor is neutral or weighs slightly against exercising discretionary denial.

F. Fintiv Factor 6: Other Considerations

Under the sixth *Fintiv* factor, we consider “other circumstances that impact the Board’s exercise of discretion, including the merits.” *Fintiv*, Paper 11, 6. “[W]here the PTAB determines that the information presented at the institution stage presents a compelling unpatentability challenge, that determination alone demonstrates that the PTAB should not discretionarily deny institution under *Fintiv*.” Memorandum, 4–5. On the other hand, “in circumstances where the Board determines that the other *Fintiv* factors 1–5 do not favor discretionary denial, the Board shall decline to discretionarily deny under *Fintiv* without reaching the compelling merits analysis.”

CommScope Techs. LLC v. Dali Wireless, Inc., IPR2022-01242, Paper 23 at 4–5 (PTAB Feb. 27, 2023) (decision on Director review) (precedential).

Here, factors 1–5 are either neutral or weigh at least slightly against discretionary denial of institution. Thus, on balance, we determine that *Fintiv* factors 1–5 do not favor discretionary denial of institution, and we need not decide whether Petitioner presents a compelling unpatentability challenge.

G. Conclusion

Based on our review of the *Fintiv* factors, we decline to exercise our discretion under § 314(a) to deny institution.

III. ANALYSIS

A. Legal Standards Used in the Merits Analysis

“In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C.

§ 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)); *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

“Because the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

“A patent may not be obtained though the invention is not identically disclosed or described as set forth in [35 U.S.C. § 102], if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). Obviousness is a question of law based on underlying findings of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The underlying factual considerations include the scope and content of the prior art, the differences between the prior art and the claimed invention, the level of ordinary skill in the art, and any relevant secondary considerations of non-obviousness, including commercial success of the patented product or method, a long-felt but unmet need for the functionality of the patented invention, and the failure of others who have unsuccessfully attempted to accomplish what the patentee has achieved. *Id.*

at 17. The obviousness analysis should not be conducted “in a narrow, rigid manner,” but should instead focus on whether a claimed invention is merely “the result[] of ordinary innovation,” which is not entitled to patent protection. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406, 427–28 (2007).

B. Level of Ordinary Skill in the Art

Petitioner contends that, for the ’801 patent, one of ordinary skill in the art “would have had a Bachelors’ degree in electrical or mechanical engineering or a comparable field of study, plus approximately two to three years of professional experience with electronic and optoelectronic device design or other relevant industry experience” but “[a]dditional graduate education could substitute for professional experience, and significant experience in the field could substitute for formal education.” Pet. 2 (citing Ex. 1003 ¶¶ 34–37). Patent Owner does not offer an alternative definition. *See generally* Prelim. Resp.

The level of ordinary skill in the art is evidenced by the references themselves. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). As Petitioner’s unchallenged description of an ordinarily skilled artisan appears consistent with the subject matter discussed in the references and that of the challenged claims, for purposes of this Decision we apply Petitioner’s description of a person of ordinary skill in the art.

C. Claim Construction

We construe claim terms “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). Under this standard, claim terms are

generally given their plain and ordinary meaning as would have been 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 v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). Any special definitions for claim terms must be set forth in the Specification “with reasonable clarity, deliberateness, and precision.” *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Extrinsic evidence is “less significant than the intrinsic record in determining ‘the legally operative meaning of claim language.’” *Phillips*, 415 F.3d at 1317.

Neither party proposes an express construction of the terms “predetermined material layer” or “formed on,” but we will address the meaning of those terms in considering Patent Owner’s arguments opposing Ground 1. Otherwise, at this stage of the proceeding, we do not see the need to expressly construe any claim term, as the threshold question of institution can be decided without doing so. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (approving Board decision not to construe claim language where construction is not material to the dispute).

D. Ground 1: Anticipation of Claim 9 by Kwak

Petitioner contends that Kwak anticipates claim 9. Pet. 21–29. Patent Owner opposes. Prelim. Resp. 19–26.

1. Kwak (Ex. 1005)

Kwak is titled “Flat Panel Display,” and “relates to . . . a flat panel display having a wide display area at least partially impervious to degradation caused by moisture.” Ex. 1005, code (54), 1:15–17. Kwak describes “an organic electroluminescent [(EL)] flat panel display, in which

a panel (substrate) size is reduced and a sealing function is simultaneously improved.” *Id.* at 2:53–56.

Figures 2A, 2B, 2D, reproduced below, depict a flat panel display according to an embodiment of Kwak. Ex. 1005, 6:21–22, 27–28.

FIG. 2A

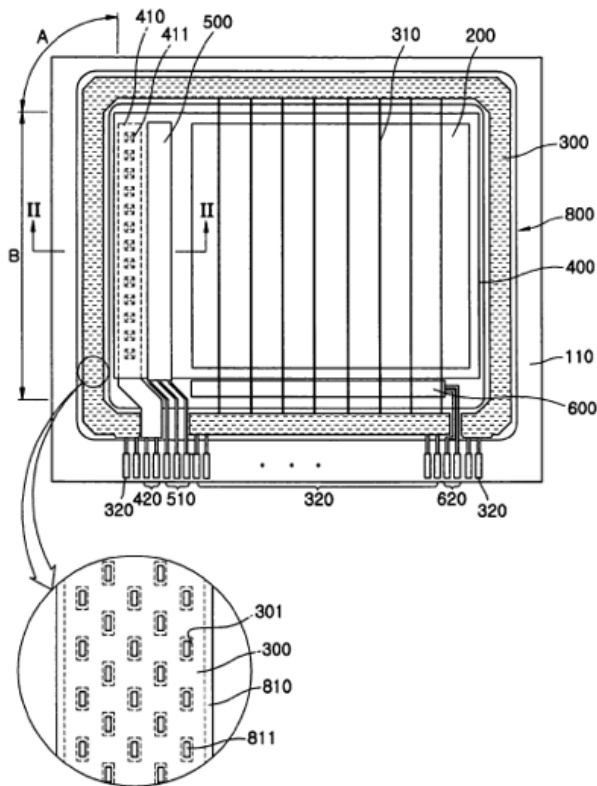


FIG. 2D

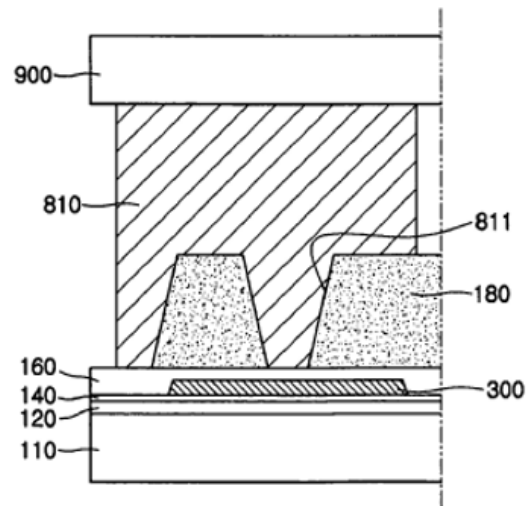
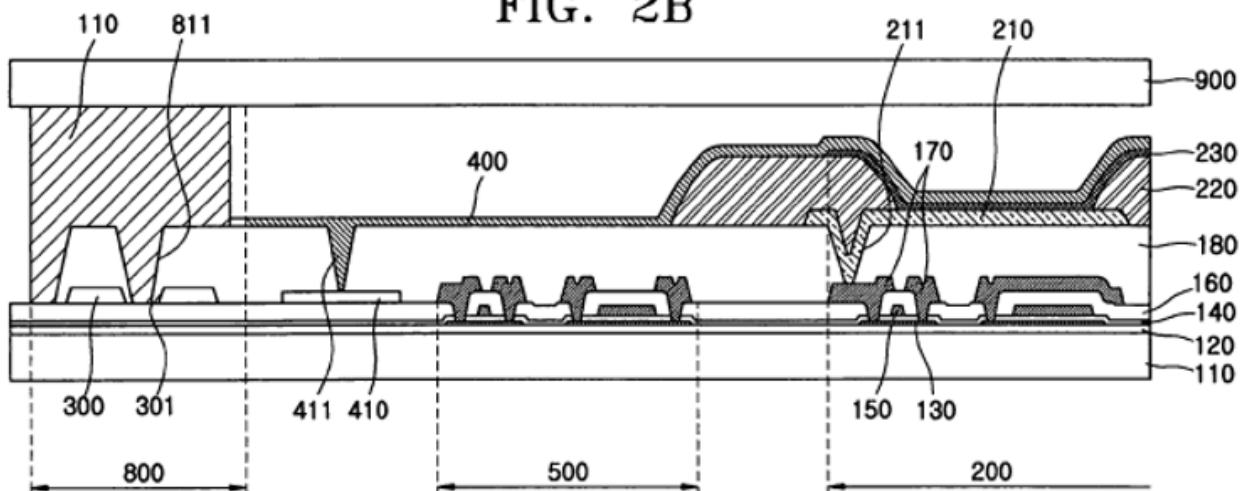


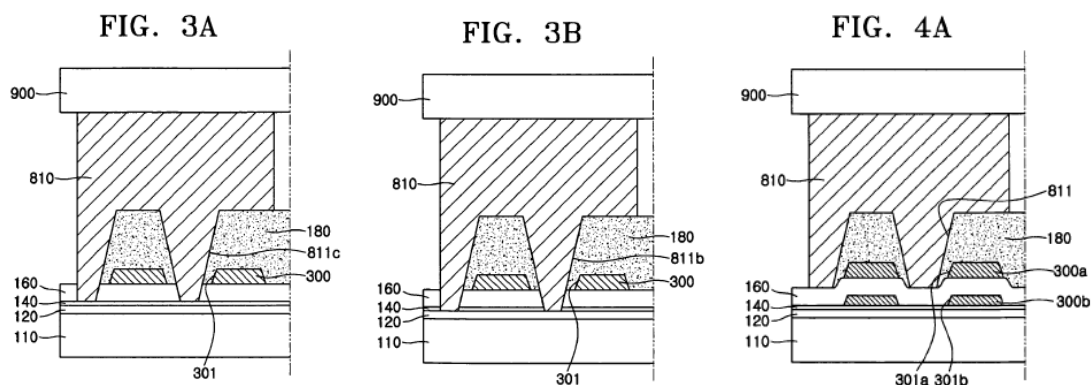
FIG. 2B



Figures 2A and 2B depict an organic EL display including display area 200, sealing portion 800 applied to an outer edge of display area 200 to seal substrate 110, and an organic EL device arranged on substrate 110. *Id.* at 6:52–56. Figure 2D depicts a portion of sealing portion 800. *Id.* at 9:58–61. As shown in Figures 2B and 2D, Kwak’s EL display comprises, e.g. (in vertical order from lowest (just above substrate 110) to highest): buffer layer 120, “for example a glass substrate using SiO₂”; gate insulating layer 140, e.g., SiO; and interlayer 160, “which can be a single layer or a double layered structure.” *Id.* at 6:58–7:18, Fig. 2B. Protection layer 180, which can be formed of an organic material, is arranged on an upper portion of source/drain electrode 170 (located in display area 200 as shown in Figure 2B) and extends to sealing portion 800 to cover interlayer 160. *Id.* at 7:24–29.

Sealing portion 800 includes via holes 811 that “are arranged on a portion of protection layer 180 that overlaps the sealing portion 800 to increase the contact area of the sealant 810 with layers stacked on the substrate, thereby tightly sealing the substrate 110 and the encapsulation substrate 900.” *Id.* at 9:58–63. Penetration holes 301 may also be formed in a portion of driving power supply 300 that overlaps sealing portion 800. *Id.* at 8:53–67.

Figures 3A, 3B, and 4A of Kwak are reproduced below.



Figures 3A, 3B, and 4A show other embodiments having different arrangements of sealing substrate 900, sealant 810, protection layer 180 with holes 811 having different penetrating depths as compared to the arrangement shown in Figure 2D. *Id.* at 6:32–37, 10:37–62.

2. Discussion

Petitioner contends that Kwak discloses all of the limitations of claim 9. Pet. 21–29. Petitioner specifically contends that: (a) substrate 110 and sealing substrate 900 correspond, respectively, to the claimed first substrate and second substrates (Pet. 23 (citing Ex. 1005, 6:52–60, Figs. 2B–D, 3A–C, 4A–C)); (b) “interlayer 160, gate insulating layer 140, buffer layer 120, or a combination of the same” corresponds to the claimed predetermined material layer (Pet. 23–24 (citing Ex. 1005, 6:52–60, Figs. 2B–D, 3A–C, 4A–C)); and (c) protection layer 180 corresponds to the claimed organic material pattern layer formed on the predetermined material layer and having a saw tooth opening to expose the surface of the predetermined material layer underneath, wherein the surface of the predetermined material layer and the sidewall of the organic material pattern layer form a predetermined angle (Pet. 24–29 (citing Ex. 1005, 7:24–33, 9:58–10:4, Figs. 2A–D, 3A–C, 4A–

C; Ex. 1003 ¶ 97)). Petitioner supports these contentions with citations to the record and to the testimony of its Declarant, Dr. Neikirk. *Id.*

Having reviewed the current record and the parties' contentions, we determine that Petitioner has shown a reasonable likelihood of prevailing in showing that Kwak anticipates claim 9. We have reviewed Patent Owner's arguments in opposition to this ground and, on this preliminary record, find them unpersuasive.

Patent Owner argues that none of Kwak's embodiments meets limitations [9b] and [9c]. Prelim. Resp. 19. For limitation [9b], Patent Owner submits that "Petitioner offers no reason to collectively treat the interlayer 160, gate insulating layer 140, [and] buffer layer 120 as a single layer." *Id.* at 22. According to Patent Owner, "[t]hese layers are formed at different stages, in different places, at different heights, can have different compositions, and are marked with different numbers." *Id.* Patent Owner asserts that only buffer layer 120 can be considered a predetermined material layer because it is the only layer that is "formed on" substrate 110. Prelim. Resp. 20 (citing Ex. 1005, 6:62–63). Patent Owner contends that gate insulating layer 140 is not "formed on" substrate 110, but rather on buffer layer 120 (i.e., in the sealing portion). *Id.* at 21 (citing Ex. 1005, 7:12–14, Figs. 2B, 2D). Likewise, argues Patent Owner, interlayer 160 is not "formed on" substrate 110, but rather is formed on gate insulating layer 140 (i.e., in the sealing portion). *Id.* at 22 (citing Ex. 1005, 7:16–23, Fig. 2B). Patent Owner further submits that because only buffer layer 120 can correspond to the claimed predetermined material layer, protection layer 180 "does not

meet the requirements of claim [9c]” because it “is formed on interlayer 160, . . . not . . . on buffer layer 120.” *Id.* at 19;¹² *see id.* at 23 (same).

Petitioner responds that Patent Owner’s “‘single layer’ interpretation should be rejected as inconsistent with the claims, specification, and ordinary meaning.” Prelim. Reply 1. Petitioner contends that such an interpretation would contradict the “open-ended” independent claims, which use the transition word “comprising” and “do not limit the layer to a single layer/material,” as well as the dependent claims, which recite that the predetermined material layer may comprise a passivation layer or a metal layer. *Id.* (citing Ex. 1001, claims 1, 4, 5). Petitioner asserts that Patent Owner’s interpretation “would also contradict the specification, which describes that a predetermined material layer can comprise a combination of multiple layers/materials.” *Id.* (citing Ex. 1001, 2:46–55).

Petitioner also takes issue with Patent Owner’s interpretation of “formed on” as “***directly*** formed on ‘without intervening layers.’” Prelim. Reply 2 (quoting Prelim. Resp. 6). According to Petitioner, “[t]he ordinary meaning of this term encompasses indirectly formed on.” *Id.* (citing *AFG Indus., Inc. v. Cardinal IG Co.*, 239 F.3d 1239, 1251 (Fed. Cir. 2001)).

Patent Owner counters in its Preliminary Sur-reply that although “it is presumptively permissible to have multiple predetermined material layers as claimed . . . the Petition include[s] no theory or explanation why the three to six separate layers in its theory form a predetermined material layer.” Prelim. Sur-reply 2. Patent Owner also disagrees that “formed on”

¹² Here and throughout this Opinion the parties’ occasional use of text coloring is omitted.

encompasses “formed indirectly on,” contending that the *AFG* case on which Petitioner relies is “inapposite.” *Id.* at 2–3.

As an initial matter, we disagree with Patent Owner that Petitioner exclusively relies on the combination of interlayer 160, gate insulating layer 140, and buffer layer 120 as corresponding to the claimed predetermined material layer. Petitioner instead relies on “interlayer 160, gate insulating layer 140, buffer layer 120, *or* a combination of the same” for this limitation. Pet. 23 (emphasis added). We understand the “or” in this phrase to mean that the list is disjunctive; that is, for example, any one of the listed layers, or a combination of all three, may meet the predetermined-material-layer limitation.

In any event, we understand Patent Owner to be arguing not so much that the combination of interlayer 160, gate insulating layer 140, and buffer layer 120 (plus additional layers in display area 200 of Kwak’s flat-panel display) *cannot* be considered the claimed predetermined material layer, but rather that Petitioner has not explained why they *should* be so considered. *See* Prelim. Sur-reply 2 (“[I]t is presumptively permissible to have multiple predetermined material layers as claimed . . . [b]ut the Petition included no theory or explanation why the three to six separate layers in its theory form a predetermined material layer.”). We agree that Petitioner does not offer an express construction of “predetermined material layer.” At this point, however, we find little in either the claims, the Specification, or elsewhere in the record that limits the meaning of “predetermined material layer” in a way that would exclude the combination of interlayer 160, gate insulating layer 140, and buffer layer 120.

The Specification does not expressly define “predetermined material layer” or “predetermined material,” and we have found no evidence in the record that “predetermined material layer” or “predetermined material” has a known meaning in the art, or that otherwise supports Patent Owner’s reading of those terms. Further, we find nothing in the claims or Specification that limits “material” to any specific materials. The Specification provides several nonlimiting examples of materials that can be used if the predetermined material layer is to serve as a passivation layer, and several other (or additional) materials that can be used if the predetermined material layer is to serve as a metal electrode layer. Ex. 1001, 2:47–55. Thus, in view of the Specification, a “predetermined material layer” would simply be a layer made of one or more predetermined materials. In light of Patent Owner’s acknowledgement that “a layer” can mean “one or more layers,” the term “predetermined material layer” would encompass the combination of interlayer 160, gate insulating layer 140, and buffer layer 120.

Even if we determine that only one of interlayer 160, gate insulating layer 140, or buffer layer 120 can correspond to the claimed predetermined material layer, we are not persuaded, on the current record, that Kwak’s protection layer 180 could not correspond to the claimed “organic material pattern layer . . . formed on the predetermined material layer.” That is, we are not persuaded, on the current record, that “formed on” is limited to formed *directly* on. Primarily, the claim does not state that the organic material protection layer 180 is “formed directly on” the predetermined material layer. Further, we agree with Petitioner that the Federal Circuit’s *AFG* decision supports interpreting “formed on” to encompass a layer formed indirectly on a lower layer, i.e., with a layer interposed between the

layers. Patent Owner argues that *AFG* is inapposite because the only reason the court concluded that “formed on” did not mean “formed directly on” was because the layers separating one layer “formed on” another layer were “very thin, optically insignificant ‘interlayers.’” Prelim. Sur-reply 2–3. We disagree. The *AFG* court’s stated reason for holding that “formed on” was not limited to “formed directly on” was because the claim did not say so:

The parties dispute whether the claim language requires that each successive layer be “formed on” the prior layer in such a way that nothing is interposed between each layer. As described above, however, the court had determined that the claim language and the specification permit the presence of interlayers between layers. *Notably, the claim does not state that each layer is “formed directly on” the preceding layer.* Accordingly, we determine that “formed on” does not mean “directly in contact with.”

AFG, 239 F.3d at 1251 (emphasis added). The *AFG* court distinguished “optically insignificant” interlayers from the metallic layers forming the claimed low-emissivity window coating to determine whether the claim’s “composed of” transition phrase permitted the inclusion of unclaimed interlayers.

Because we are not persuaded that “formed on” excludes layers “formed indirectly on” lower layers, we agree with Petitioner that each of interlayer 160, gate insulating layer 140, and buffer layer 120, individually, is “formed on” substrate 110. Thus, for example, interlayer 160, by itself, could be considered the claimed “predetermined material layer formed on the first substrate,” in which case protection layer 180 would correspond to the claimed “organic material pattern layer . . . formed on the predetermined material layer.”

3. *Summary as to Ground 1*

In summary, having reviewed the record and the parties' arguments, we determine that Petitioner has a reasonable likelihood of prevailing with respect to Ground 1 and claim 9, and therefore has satisfied the threshold requirement for institution of *inter partes* review on the basis of Ground 1.

E. *Grounds 2–5*

For Grounds 2–5, Petitioner contends that some or all of claims 1–6 and 8–14 would have been obvious over Kwak alone or in view of one of Vaganov, Kim, or Yamazaki. Pet. 29–52. Patent Owner does not make any arguments specifically directed to these grounds, but instead relies on arguments made in connection with Ground 1, which we found unpersuasive.

“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” 37 C.F.R. § 42.108(a). We must “either (1) institute as to all claims challenged in the petition and on all grounds in the petition, or (2) institute on no claims and deny institution.” Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019),¹³ 5–6, 64; *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1359–60 (Fed. Cir. 2018) (stating a decision to institute is “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”). Because we have decided to grant institution on Ground 1

¹³ Available at <https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf?MURL=TrialPracticeGuideConsolidated>

with respect to claim 9, we do the same for Grounds 2–5 and claims 1–6, 8, and 10–14.

F. Ground 6: Obviousness of Claims 1–6 and 9–13 over Zhang

Petitioner contends that claims 1–6 and 9–13 would have been obvious over Zhang. Pet. 52–78.

As noted above, because we have decided to institute *inter partes* review based on Ground 1, we do the same for Ground 6. Nonetheless, we discuss Ground 6 to address Patent Owner’s challenge thereto.

1. Zhang (Ex. 1006)

Zhang “relates to . . . a display panel frame adhesive structure with superior bonding strength.” Ex. 1006, 5.¹⁴ Zhang seeks to improve on conventional TFT-LCD display panels by “increasing the contact area of the frame adhesive” so that “more frame adhesive can penetrate into grooves or openings, thereby increasing the bonding strength between the TFT substrate and the CF [color filter] substrate.” *Id.* at 8. Figures 3A and 3B, reproduced below, depict an embodiment of Zhang’s invention:

¹⁴ Throughout our discussion of Zhang we cite to the exhibit page numbers at the bottom right.

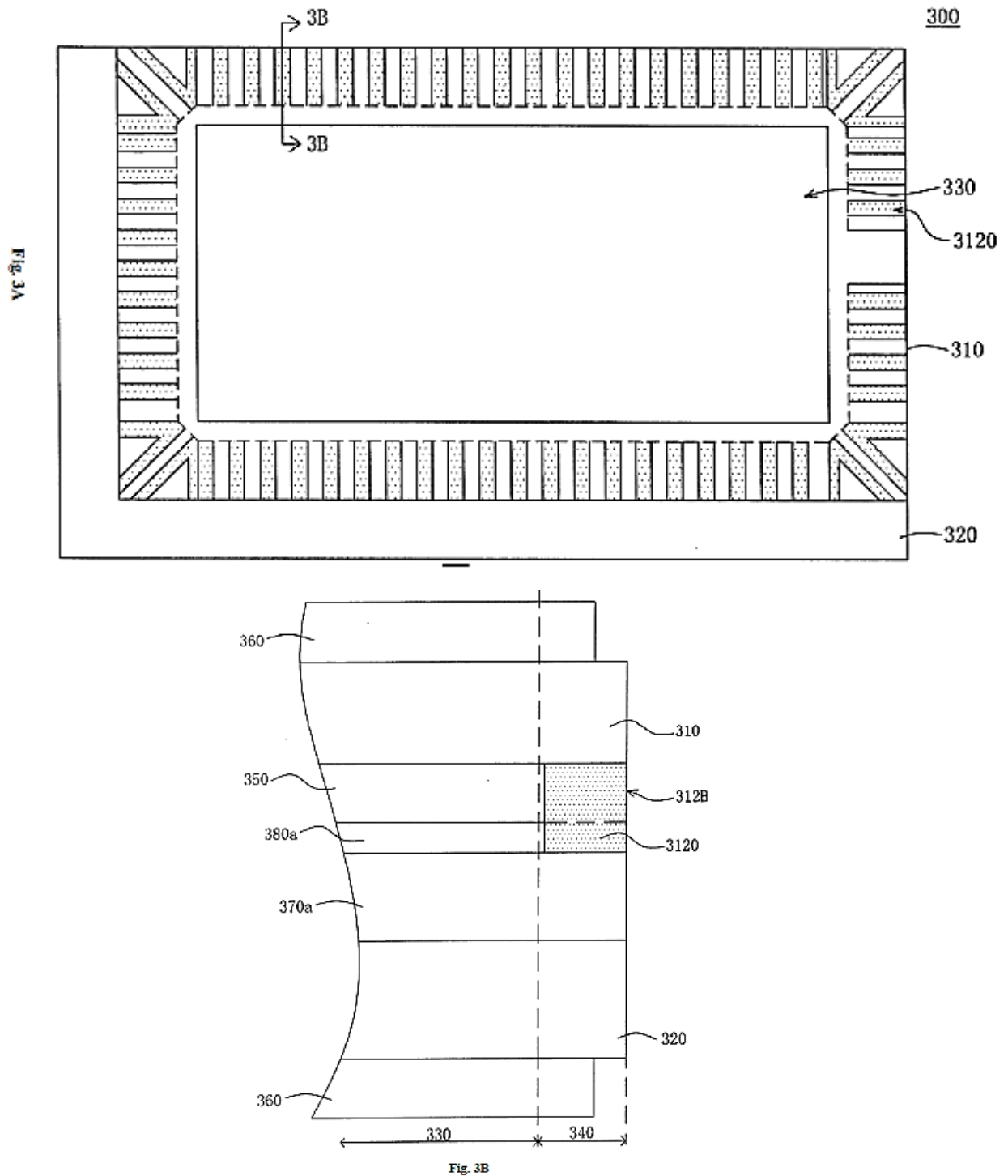


Figure 3A is a schematic diagram of an LCD display embodying Zhang's invention, and Figure 3B is a cross-sectional view of the LCD display in Figure 3A taken along line 3B-3B. Ex. 1006, 8. LCD display panel 300 is

divided into inner display area 330 surrounded by outer frame adhesive area 340, and comprises upper (CF) substrate 310, lower (TFT) substrate 320; polarizing plates 360, one above upper substrate 310 and another below lower substrate 320; and several layers between the upper substrate and the lower TFT substrate, i.e., (in order from lower to upper) first covering layer 370a, second covering layer 380a, and liquid crystal injection area 350. *Id.* Openings 3120 in second covering layer 380a expose portions of first covering layer 370a. *Id.* Frame adhesive 312B is applied between CF substrate 310 and TFT substrate 320 in frame adhesive area 340, and contacts liquid crystal injection area 350 and first covering layer 370a through openings 3120. *Id.*

2. Discussion

Petitioner contends that “Zhang in view of the knowledge of a POSITA renders obvious Claim 9.” Pet. 52 (citing Ex. 1003 ¶¶ 183–207). Petitioner specifically contends that: (1) lower substrate 320 and upper substrate 310 correspond, respectively, to the claimed first and second substrates; (2) first cover layer 370a corresponds to the claimed predetermined material layer; and (3) second covering layer 380a—which, according to Petitioner, “Zhang discloses or renders obvious would have comprised photoresist layer 225B,” and “would optionally include additional underlying layers such as protective layer 224”—corresponds to the claimed organic material pattern layer. Pet. 53–66 (citing Ex. 1006, 8–10,¹⁵ Figs.

¹⁵ Petitioner cites to Zhang’s original page numbers at the bottom middle rather than to the Exhibit page numbers at the bottom right. Note that the second digit of original page numbers 10–12 has been omitted in the reproduction of Zhang in the record (i.e., each of those pages is labeled “1.”)

3A–E). Petitioner further contends that Zhang in view of the knowledge of a POSITA renders obvious claims 1–6 and 10–13. *Id.* at 67–78. Petitioner supports these contentions with citations to Zhang and to the testimony of its Declarant, Dr. Neikirk. *Id.*

At this stage of the proceeding, Patent Owner only disputes that Zhang teaches limitation [9c] and [1c]. Prelim. Resp. 28–36. According to Patent Owner, “second covering layer 380 is not organic,” as these limitations require. *Id.* at 28.

As noted above, Petitioner contends that “Zhang discloses or renders obvious” that second covering layer 380a “would have comprised photoresist 225B” (and optionally protective layer 224). Pet. 55, 57. Zhang describes photoresist 225B as part of the conventional display depicted in Figure 2B, and states that it “can be composed of an organic material.” Ex. 1006, 6. Petitioner asserts that “Zhang does not limit the second covering layer to any specific layer or combination of layers,” and “[a] POSITA would have understood Zhang to teach that the second covering layer 380a would, when implemented in conventional reflective LCDs, consist of or comprise organic photoresist layer 225B.” Pet. 56–57 (citing Ex. 1006, 8–9, claim 1; Ex. 1003 ¶ 190); *see id.* at 57 (stating that Zhang teaches that “modifications to the described embodiments that fall within the spirit of the invention are within the scope of the claims”). According to Petitioner:

[A] POSITA would have understood that the teachings of Zhang, as depicted in Figures 3A–3E, would be applied to conventional reflective LCDs with an organic photoresist layer to obtain similar improvements in adhesion and would have had a reasonable expectation of success doing so. . . . A POSITA would have been motivated to implement Zhang’s teachings within a conventional reflective LCD[] to increase the contact

area and allow more sealant to penetrate the groove or opening to create a stronger bond.

Id. at 59–60 (citing Ex. 1003 ¶ 192).

Patent Owner first argues that Zhang explicitly describes second covering layer 380a shown in Figures 3B to be made from an *inorganic* material rather than an organic material. Prelim. Resp. 29–32 (citing Ex. 1006, 10).¹⁶ We agree that in Zhang’s Figure 3B embodiment, second covering layer 380a is composed on an inorganic material. Ex. 1006, 9. On the other hand, Petitioner is arguing that one of ordinary skill in the art would have applied “the teachings of Zhang, as depicted in Figures 3A-3E,” to the conventional embodiment shown in Figure 2B of Zhang, and that photoresist layer 225B used in the conventional LCD display depicted in these figures may be made from an organic material. *See* Pet. 57. Thus, this argument is not responsive to the obviousness rationale underlying Ground 6.

Patent Owner further argues, in response to Petitioner’s obviousness rationale, that Petitioner “fails to identify which parts of Zhang Figures 2A and 2B allegedly meet the claim elements of [9a] or [9b],” but only “identifies allegedly obvious elements in the 300-range . . . that can only be found in Zhang Figure 3.” Prelim. Resp. 33. This is correct, but we understand that to mean that Petitioner is relying on the 300-range elements in Figure 3 as part of the proposed combination.

¹⁶ Patent Owner’s citations to Zhang are to the exhibit page numbers added by Petitioner at the bottom right of each page. Prelim. Resp. 29 n.3. We ask the parties to use this pagination in any further briefing.

Finally, Patent Owner argues that Petitioner’s proposed combination of Zhang’s Figure 2A/2B embodiment with Zhang’s Figure 3B embodiment “would still fail to meet claim elements [9b] and [9c] because, like Kwak’s design, Zhang Figures 2A and 2B have too many layers.” Prelim. Resp. 34. Patent Owner asserts, for example, that while Zhang’s photoresist layer 225B is formed on protective layer 224, protective layer 224 is not formed on TFT substrate 220 as required by limitation [9b], so “protective layer 224 cannot be the ‘predetermined material layer.’” *Id.* at 35–36. Likewise, according to Patent Owner, “only the first metal layer 221 is formed on the TFT substrate per claim [9b],” but “photoresist layer 225B is not formed on the first metal layer 22a in accordance with claim [9c],” so “first metal layer 221 cannot be the ‘predetermined material layer.’” *Id.* at 36.

These arguments are based on Patent Owner’s interpretations of “predetermined material layer” and “formed on” that, as discussed above in connection with Ground 1, we found unpersuasive on the current record. For that reason, these arguments are also unpersuasive.

3. *Claims 1–6, 8, and 10–13*

Patent Owner does not raise any arguments specifically directed to these claims. Prelim. Resp. 36–37.

G. *Grounds 7 and 8*

For Ground 7, Petitioner contends that claims 2, 3, 6, 10, and 11 would have been obvious over Zhang and Vaganov. Pet. 78–81. For Ground 8, Petitioner contends that claims 2, 3, 6, 10, and 11 would have been obvious over Zhang and Yamazaki. *Id.* at 82–85. Patent Owner does not make any arguments specifically directed to these grounds. Prelim.

Resp. 37. As noted above, because we have determined to institute *inter partes* review on the basis of Ground 1, we do the same for Grounds 7 and 8.

IV. CONCLUSION

For the foregoing reasons, we determine that Petitioner has shown that there is a reasonable likelihood that it would prevail with regard to at least one of the claims challenged in the Petition. Accordingly, we institute *inter partes* review of claims 1–6 and 8–14 of the '801 patent on all asserted grounds.

V. ORDER

For the reasons given, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–6 and 8–14 of the '801 patent on all asserted grounds is *instituted*; and

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

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