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Paper 44
Entered: January 13, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

POWER2B INC.,
Patent Owner.

IPR2021-01257
Patent 9,317,170 B2

Before BARBARA A. PARVIS, SHEILA F. McSHANE, and JOHN D. HAMANN, *Administrative Patent Judges.*

PARVIS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
Dismissing Patent Owner's Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

We instituted an *inter partes* review of claims 1, 2, 6–8, 13, 14, 16, 18, 19, 21–23, 26, and 30 ("challenged claims") of U.S. Patent No. 9,317,170 B2 (Ex. 1001, "the '170 patent") owned by Power2B, Inc. ("Patent Owner"). Paper 12 ("Decision to Institute" or "Inst. Dec."). We have authority to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. We determine that Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively "Petitioner") has not shown by a preponderance of the evidence that claims 1, 2, 6–8, 13, 14, 16, 18, 19, 21–23, 26, and 30 of the '170 patent are unpatentable.

A. Procedural History

Petitioner filed a Petition (Paper 3 ("Pet.")) requesting *inter partes* review of the challenged claims of the '170 patent, along with the supporting Declaration of Benjamin B. Bederson, Ph.D. (Ex. 1002). Patent Owner filed a Preliminary Response. Paper 8 ("Prelim. Resp."). With our authorization, Petitioner filed a Reply to Patent Owner's Preliminary Response (Paper 10) and Patent Owner filed a Sur-Reply (Paper 11).

The Decision to Institute was entered on January 18, 2022. Inst. Dec. 1. Subsequently, Patent Owner filed a Patent Owner Response (Paper 19 ("Resp.")), along with the supporting Declaration of Darran R. Cairns, Ph.D. (Ex. 2056). Petitioner filed a Reply (Paper 23 ("Reply")), along with the Reply Declaration of Dr. Bederson (Ex. 1035). Patent Owner filed a Sur-reply (Paper 28 ("Sur-reply")). Patent Owner also filed a Motion to Exclude certain of Petitioner's evidence (Paper 30, "Mot." or "Motion") and Petitioner filed an Opposition (Paper (Paper 31, "Opp'n"). The oral hearing

was held on October 14, 2022. A copy of the hearing transcript has been entered into the record as Paper 43 ("Tr.").[1]

B. Real Parties in Interest

Petitioner identifies as the real parties in interest the following: Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. Pet. 2. Patent Owner names itself as the real party in interest. Paper 7, 2.

C. Related Matters

Each party identifies a judicial matter that would affect, or be affected by, a decision in this proceeding. In particular, the parties inform us that the '170 patent is asserted in the following district court proceeding: *Power2B, Inc. v. Samsung Electronics Co., Ltd. et al.*, Case No. 6:20-cv-01183-ADA (W.D. Tex.) (filed December 23, 2020) ("parallel district court proceeding"). Pet. 2; Paper 7, 2. That case has been stayed. Tr. 11:14–12:3.

Petitioner also has filed (1) a petition for *inter partes* review of U.S. Patent No. 10,156,931 B2 (IPR2021-01190); (2) a petition for *inter partes* review of U.S. Patent No. 8,610,675 B2 (IPR2021-01220); (3) a petition for *inter partes* review of U.S. Patent No. 8,624,850 B2 (IPR2021-01239); and (4) a petition for *inter partes* review of U.S. Patent No. 9,569,093 B2 (IPR2021-01266). *Inter partes* review has been instituted in each of the proceedings. A Final Written Decision has been entered in IPR2021-01190. The remaining proceedings are ongoing.

[1] Each party filed objections to the other party's demonstrative exhibits. Papers 41, 42. We took into consideration the parties' objections in our review and reference of the transcript.

D. The '170 Patent

The '170 patent is titled "INTERACTIVE DEVICES" and relates to an interactive assembly including at least one interactive surface element. Ex. 1001, codes (54), (57). Figure 4 of the '170 patent illustrates a portion of an input device and is reproduced below. *Id.* at 7:32–33.

FIG. 4

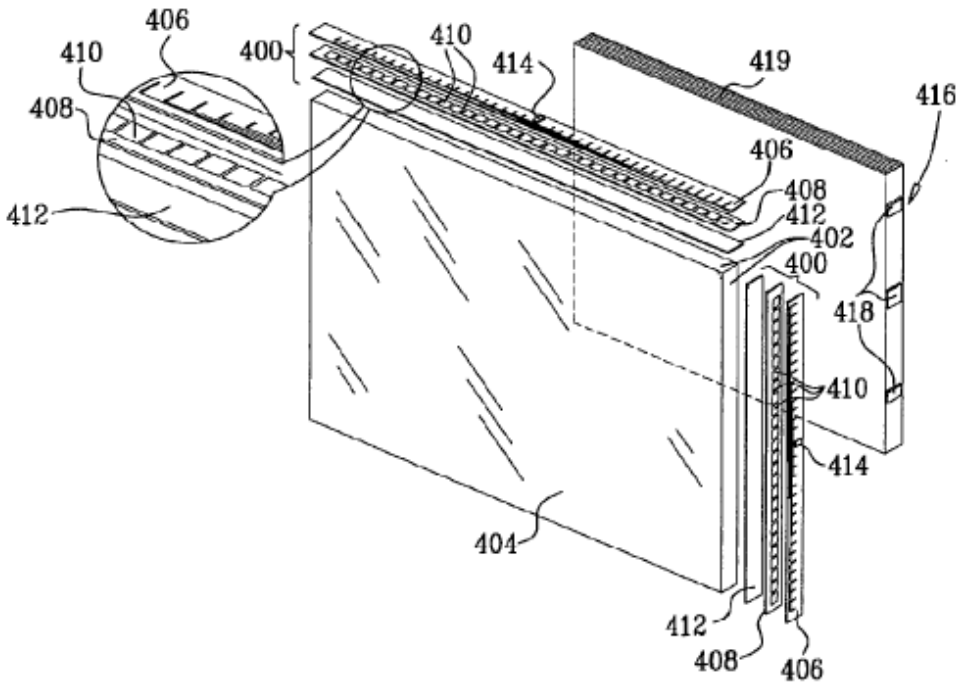

Figure 4, above, illustrates a portion of an input device employing detector elements arranged along edges of an interactive surface element. *Id.* at 18:59–63.

As shown in Figure 4, detector assembly 400 is arranged along edge 402 of interactive surface element 404 to sense light. *Id.* at 18:64–67. Interactive surface element 404 may be a single or multiple layer plate and may have one or more coating layers associated therewith. *Id.* at 18:67–19:2. Interactive surface element 404 may be associated with a display panel, such as a liquid crystal display (LCD). *Id.* at 19:2–4. The viewing plane of the

display panel may coincide with a portion of the interactive surface element 404. *Id.* at 19:4–5. Detector assemblies 400 are provided along two mutually perpendicular edges 402. *Id.* at 19:6–7.

Detector assembly 400 comprises a support substrate 406 onto which is mounted a linear arrangement 408 of detector elements 410. *Id.* at 19:12–15. Interposed between linear arrangement 408 and edge 402 is a cover layer 412. *Id.* at 19:15–16. Cover layer 412 may have multiple functions including physical protection, light intensity limitation, and field-of-view limitation and may have optical power. *Id.* at 19:16–19. Support substrate 406 may be mounted onto a display housing. *Id.* at 19:23–24. Support substrate 406 may also provide mounting for and electrical connections to the detector elements 410. *Id.* at 19:29–31. Processor 414 for processing the outputs of the detector elements 410 may also be mounted on support substrate 406. *Id.* at 19:31–33.

E. Illustrative Claim

Petitioner challenges claims 1, 2, 6–8, 13, 14, 16, 18, 19, 21–23, 26, and 30 of the '170 patent. Pet. 1. Claims 1 and 30 are independent claims. Claims 2, 6–8, 13, 14, 16, 18, 19, 21–23, and 26 depend, directly or indirectly, from claim 1. Independent claim 1, reproduced below, is illustrative of the claimed subject matter.

> 1. [pre[2]] An interactive assembly comprising:
>
> [a] at least one interactive surface element, at least a first region of the at least one interactive surface element having first user sensible functionality and at least a second region of the at least one interactive surface element having second

[2] Herein we use Petitioner's designations for the elements of claim 1. Pet. 21–36.

functionality, different from the first user sensible functionality;

[b] at least one input sensor located in propinquity to at least one of the at least one interactive surface element, each of the at least one input sensor being configured to provide an output indicative of an impingement of an electromagnetic radiation spot on at least one of the at least one first region and the at least one second region of the at least one interactive surface element;

[c] utilization circuitry coupled to the output of each of the at least one input sensor;

[d] wherein the at least one input sensor includes a detector assembly arranged at least one edge of the interactive surface element;

[e] wherein the detector assembly includes a support substrate and an arrangement of detector elements; and

[f] (1) wherein the arrangement of detector elements is configured to detect electromagnetic radiation at a baseline level and to sense a position of at least one object with respect to the interactive surface element and (2) wherein the utilization circuitry is further configured to provide an output according to a location of at least one detector element in the arrangement for which at least one of an amount of radiation detected and a change in the amount of radiation detected exceed a first predetermined threshold.

Ex. 1001, 73:10–40.

F. Evidence

Petitioner relies on the patent document references summarized in the table below.

Name	Patent Document	Exhibit
Reime	US 2003/0034439 Al	1010
Hinckley	US 2002/0021278 Al	1011
Newton	US 2002/0118177 Al	1012

G. Asserted Grounds

Petitioner asserts that the challenged claims of the '170 patent are unpatentable based on the following grounds summarized in the table below (Pet. 3):

Claims Challenged	35 U.S.C. §[3]	References/Basis
1, 2, 13, 14, 18, 21, 26, 30	103(a)	Newton
1, 2, 13, 14, 18, 21, 26, 30	103(a)	Newton, Hinckley
1, 2, 6–8, 13, 16, 18, 19, 21–23, 26, 30	103(a)	Reime[4]
1, 2, 6–8, 13, 16, 18, 19, 21–23, 26, 30	103(a)	Reime, Hinckley

II. ANALYSIS

We starting by addressing Patent Owner's Motion to Exclude certain of Petitioner's evidence. We then turn to our analysis of the parties' arguments and evidence regarding the patentability of the challenged claims.

A. Patent Owner's Motion to Exclude

Patent Owner filed a Motion to Exclude certain of Dr. Bederson's testimony in his Reply Declaration (Ex. 1035) arguing that the testimony is irrelevant and has little probative value. Mot 1. In particular, Patent Owner

[3] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. § 103, and was effective on March 16, 2013. Because the challenged claims of the '170 patent have an apparent effective filing date before March 16, 2013, we refer to the pre-AIA version of 35 U.S.C. § 103.

[4] The Petition lists "Ground 3 and 4" as obviousness over Reime and Hinckley (Pet. 3, 46–60 (emphasis omitted)), and Ground 3 appears to be obviousness over Reime alone. *Id.* at 58. We treat the omission of the explicit obviousness identification of Reime "alone" as a typographical error.

argues that we should exclude the following: (1) paragraphs 7, 9, 13, 16, 20, and 21 of Exhibit 1035, which Patent Owner argues are introduced for the sole purpose of supporting attorney argument against Patent Owner's proposed claim constructions (Mot. 1–2); and (2) paragraphs 28, 31, 34, 36, 37, 43, 45, 47, 49, 50–52, 60, and 62 of Exhibit 1035, which Patent Owner argues are introduced for the sole purpose of supporting attorney argument for Petitioner's Grounds 1–4 (Mot. 2–3). Patent Owner relies on the Federal Rules of Evidence ("FRE" or "Fed. R. Evid.") 401 through 403 as legal support for its arguments that the identified paragraphs are inadmissible. *See generally* Mot.

In its Opposition, Petitioner provides a table including the testimony in each contested paragraph, along with citations to the record set forth in that testimony, and the corresponding argument in Patent Owner's Response that the testimony responds to. Opp'n 2–7. Petitioner argues, in contrast to Patent Owner's arguments, Dr. Bederson's testimony directly responds to arguments in Patent Owner's Response and, therefore, is highly relevant and probative of the issues raised by Patent Owner. *Id.* at 1, 8. Petitioner also argues that Dr. Bederson's testimony "is replete with citations to the record" and is "well-supported" proper expert testimony. *Id.* (citing Fed. R. Evid. 702–704; Consolidated Trial Practice Guide ("TPG")[5]).

Petitioner argues that the probative value of Dr. Bederson's testimony in his Reply Declaration (Ex. 1035) is not outweighed by any unfair prejudice or confusion. Opp'n 8. Petitioner argues that Patent Owner's arguments in that regard are conclusory and unsupported. *Id.* at 7–8.

[5] Available at https://www.uspto.gov/TrialPracticeGuideConsolidated; *see also* 84 Fed. Reg. 64,280 (Nov. 21, 2019).

Petitioner further argues any "alleged 'prejudice'" is Patent Owner's "own making" because Patent Owner did not take a deposition to cross-examine Dr. Bederson regarding his testimony in his Reply Declaration. *Id.* at 1.

Petitioner further argues that Patent Owner's Motion to Exclude is procedurally improper because it constitutes an unauthorized motion to strike. *Id.* at 9–10.

In this proceeding, we do not need to determine whether Patent Owner's Motion to Exclude should be granted because even with the consideration of Petitioner's evidence we determine that Petitioner has not shown that the challenged claims are unpatentable. Accordingly, we *dismiss* Patent Owner's Motion to Exclude.

B. Patentability: Principles of Law

To prevail in its challenges to the patentability of all claims of the '170 patent, Petitioners must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an [*inter partes* review], 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); *see also* 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim"). That burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015); *see also In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1375–78 (Fed. Cir. 2016) (discussing the burden of proof in *inter partes* review).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that

the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness, i.e., secondary considerations.[6] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

C. Level of Ordinary Skill in the Art

Petitioner asserts the following:

> One of ordinary skill in the art would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience in the research, design, development, and/or testing of touch and/or proximity sensors, human-machine interaction and interfaces, and related firmware and software, or the equivalent, with additional education substituting for experience and vice versa.

Pet. 8 (citing Ex. 1002 ¶ 41).

At the institution stage Petitioner's proposed qualifications were undisputed. *See generally* Prelim. Resp.; Inst. Dec. 19. For purposes of the Decision to Institute, we adopted Petitioner's proposed qualifications for an ordinary level of skill, except we declined to adopt "at least" as that language is vague and open-ended.

At this stage in the proceeding, Patent Owner disagrees in part with Petitioner's proposed qualifications and asserts the following:

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[6] Patent Owner does not present objective evidence of nonobviousness. *See generally* Resp.

> A person having ordinary skill in the art ("POSITA") would have had a bachelor's degree in electrical engineering, computer engineering, physics, or a related field, and at least three years of experience relating to research, design, and/or development of sensor systems, circuits and signal processing algorithms, or the equivalent, with education substituting for experience and vice versa.

Resp. 8 (Ex. 2056 ¶¶ 9–10). Patent Owner states, however, that it does not believe that the parties' differing definitions of a person of ordinary skill in the art affect the resolution of any dispute between the parties. *Id.* Petitioner does not respond to Patent Owner's proposed qualifications. *See generally* Reply.

We find that for the most part Petitioner's proposed definition is the better definition for purposes of this proceeding, except we again decline to adopt "at least" because that language is vague and open-ended. With respect to the educational qualifications, Petitioner's proposed qualifications are that one of ordinary skill in the art would have had a bachelor's degree in electrical engineering, *computer engineering, computer science, or a related field*. Pet. 8 (citing Ex. 1002 ¶ 41) (emphasis added). The claims are directed to an interactive assembly comprising at least one input sensor to provide an output indicative of an impingement of an electromagnetic radiation spot. Individuals with bachelor's degrees in physics would be knowledgeable in researching, designing, or developing such assemblies and would be able to comprehend and evaluate the teachings of the prior art. Accordingly, Petitioner's proposed qualifications are overly narrow in not including individuals with bachelor's degrees in physics. With respect to work experience, a person having two years of experience would be able to comprehend and evaluate the teachings of the prior art, consistent with Petitioner's proposal.

Considering the subject matter of the '170 patent, the background technical field, and the asserted prior art, we agree therefore with Patent Owner's addition of "physics" in its proposed qualifications of the educational level for a person having an ordinary level of skill and we otherwise agree with Petitioner's proposed qualifications, except without the "at least" language. Based on the complete record now before us, the level of skill that we adopt is set forth immediately below.

> One of ordinary skill in the art would have had a bachelor's degree in electrical engineering, computer engineering, computer science, physics, or a related field, and at least two years of experience in the research, design, development, and/or testing of touch and/or proximity sensors, human-machine interaction and interfaces, and related firmware and software, or the equivalent, with additional education substituting for experience and vice versa.

We find that the definition set forth above is consistent with the level of skill reflected in the specification of the '170 patent and the asserted prior art references. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Our analysis and conclusions herein, however, do not turn on whether we adopt Petitioner's proposed qualifications, Patent Owner's proposed qualifications, or the qualifications set forth immediately above.

D. Claim Construction

At the institution stage, we provided our analysis of constructions of certain terms provided by Patent Owner that were issued by the district court in the parallel district court proceeding. Inst. Dec. 20–25. At that preliminary juncture, the parties had not provided any claim construction analysis nor had the district court provided any analysis. Pet. 9; Prelim. Resp. 27–29; Exs. 2027–2029; Papers 10, 11. Based on the complete record now before us, below we provide our final claim construction analysis for recitations

that include the term "impingement." We determine that no further analysis is needed of any terms to resolve a dispute in the instant proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017)), *cert. denied*, 138 S. Ct. 1695 (April 30, 2018) (noting that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'") (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

1. Claim Construction: Principles of Law

We construe the challenged claims by applying the standard used in federal courts, in other words, "the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b)," which is articulated in *Phillips v. AWH Corp*., 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). Under this standard, the words of a claim generally are given their "ordinary and customary meaning," which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *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 *Philipps*, 415 F.3d at 1312–17).

2. Recitations including the term "impingement"

a) Procedural History

In the Petition, Petitioner stated that it "interprets the'170 Patent claims according to the *Phillips* claim construction standard" and it "does

not believe that any term requires explicit construction to resolve the issues presented in this Petition." Pet. 9 (citing 37 C.F.R. § 42.100(b); *Phillips*, 415 F.3d at 1303; Ex. 1002 ¶ 43). Petitioner also informed us that "[c]laim construction disclosures are still on-going in the district court" and it would "request leave to submit the district court's claim construction order as soon as it becomes available, so that it is timely made of record in the proceeding and can be considered by the Board." *Id.* at n.5. Indeed, Petitioner submitted the District Court's claim constructions prior to our entering the Decision to Institute. *See* Ex. 1034. Petitioner, however, did not provide substantive argument.

Patent Owner responded by urging us to adopt the claim constructions in the parallel district court proceeding for recitations that include the term "impingement." Prelim. Resp. 29 (citing Ex. 1034). Although the District Court adopted Patent Owner's proposed construction in that proceeding (Ex. 1034, 4), prior to institution, Patent Owner did not provide us with substantive analysis as to why we should adopt the district court's constructions. Prelim. Resp. 27–29.

We consider any prior claim construction determinations in related court proceedings, but we are not bound by those determinations. 37 C.F.R. § 42.100(b); Consolidated Trial Practice Guide (Nov. 2019), 46-47 ("The Board will give [] other claim construction determinations appropriate weight."). The District Court's claim construction for the claim term "impingement of an electromagnetic radiation spot" is "an area of reflected or projected radiation." Ex. 1034, 4.[7] The District Court's claim construction

[7] The District Court's Claim Construction Order includes a table that was sent to the parties prior to the Markman hearing. Ex. 1034; Ex. 2027. The table includes a column having the header "Court's Preliminary

for the claim term "each of the at least one input sensor being configured to provide an output indicative of an impingement of an electromagnetic radiation spot on at least one of the at least one first region and the at least one second region of the at least one interactive surface element" is "[i]mpingement of an electromagnetic radiation spot means 'an area of reflected or projected radiation,' and plain and ordinary meaning for the remaining language." Ex. 1034, 4.

At the institution stage, the parties had not provided substantive argument or pointed us to analysis by the District Court to assist in our determination of why we should adopt the District Court's claim construction. *See* Inst. Dec. 22 (citing Pet. 9; Prelim. Resp. 27–29; Ex. 1034). Although Petitioner did not provide an explicit construction for any term in the Petition, at the institution stage, we discerned from Petitioner's unpatentability arguments an implicit construction in the Petition for the recitations including the term "impingement." *Id.* at 22–25. For purposes of our Institution Decision, upon consideration of the argument and evidence of record at that juncture including the constructions adopted by the District Court, we preliminarily adopted Petitioner's implicit

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Construction." Ex. 1034. The District Court's Claim Construction Order states "[t]he Court held a Markman hearing on October 19, 2021" and "[d]uring that hearing, the Court provided *its final constructions*." Ex. 1034, 1 (emphasis added). The District Court's Claim Construction Order further states "[t]he Court now enters those claim constructions." *Id.* Notwithstanding the work "preliminary" in the column header, both parties treat the Court's Claim Construction Order as its final claim construction ruling. *See, e.g.*, Paper 10, 1; Resp. 10–11; Ex. 2028. Accordingly, we refer to the court's constructions in its November 10, 2021 Claim Construction Order as final. Nonetheless, our analysis and conclusions herein do not turn on whether the Court's claim constructions are preliminary or final.

construction for the recitations including the term "impingement," which was that "'an impingement' of an electromagnetic radiation spot encompasses a user touching the 'electromagnetic radiation spot,'" which differs from the construction provided by the District Court. *Id.* at 25; Ex. 1034, 4. The Decision to Institute specifically noted "the sparse record provided by the parties" at the institution stage and that we welcomed the parties further addressing this construction during trial in accordance with our Rules. Inst. Dec. 22.

Patent Owner now provides substantive argument in support of adopting the District Court's claim constructions (*see, e.g.*, Resp. 10–15), which are those that were proposed by the Patent Owner in the District Court proceeding and in the instant proceeding. Ex. 1034, 4. Patent Owner argues "the district court adopted Patent Owner's construction after extensive claim construction briefing in the pending litigation." Resp. 11 (citing Exs. 2004–2008, 2028, 2029, 2056 ¶¶ 19–20). The District Court did not provide analysis in support of its constructions, nor has it provided any further analysis because the District Court proceeding has been stayed. Ex. 1034; Tr. 11:22–12:3.

In its Reply, Petitioner disputes Patent Owner's argument. Reply 1–6. Regarding our adoption of Petitioner's implicit construction, Petitioner states that it "agrees that 'an impingement' of an electromagnetic radiation spot encompasses a user touching the 'electromagnetic radiation spot.'" *Id.* Petitioner does not provide its own explicit construction or explain further the implicit construction discussed above and in the Decision to Institute. *See generally* Reply; Inst. Dec. 22–25 .

Based on the chart including each party's proposed claim constructions in the District Court's Claim Construction Order, Petitioner

presented a construction for the longer recitation including the term "impingement." Ex. 1034, 4. Petitioner does not argue that we should adopt that construction in the instant proceeding. With respect to the "extensive claim construction briefing in the pending litigation" referred to by Patent Owner (Resp. 11 (citing Exs. 2004–2008, 2028, 2029, 2056 ¶¶ 19–20)), any arguments in the District Court briefs and papers entered as exhibits in this proceeding that have not been presented in the parties' briefs filed in the instant proceeding are not before us and will not be considered. *See* 37 C.F.R. § 42.22 (stating each petition "must be filed as a separate paper and must include" a "full statement of the reasons for the relief requested"); 37 C.F.R. § 42.23 (stating oppositions, replies, and sur-replies "must comply with the content requirements for motions"); *see also* 37 C.F.R. § 42.6(a)(3) ("Arguments must not be incorporated by reference from one document into another document.").

Based on the complete record now before us, we conclude that our preliminary determination in our Decision to Institute adopting Petitioner's implicit construction of "impingement of an electromagnetic radiation spot" was not correct. Based on the complete record now before us, for the reasons given below, as urged by Patent Owner in its Response (Resp. 8–15), we adopt the same constructions adopted by the District Court, including that "impingement of an electromagnetic radiation spot" should be construed as "an area of reflected or projected radiation." Because the constructions that we adopt do not differ from that adopted by the District Court and because Patent Owner urged adoption of those constructions in its Patent Owner Response with detailed substantive argument and explanations, Petitioner has had notice and a full opportunity to respond. Indeed, Petitioner has provided responsive argument disputing Patent Owner's claim constructions

and, further, has responded as to why in Petitioner's view one of the asserted prior art reference meets the limitations under Patent Owner's proposed constructions. Reply 1–5, 22–23. We have considered the arguments and evidence by both parties in the complete record now before us in making our final determinations herein.

b) Analysis: Construction of recitations including the term "impingement"

We start with the language of the claim. Claim 1 recites "[a]n interactive assembly" that comprises "at least one interactive surface element" and "at least one input sensor." Ex. 1001, 73:10–17. The input sensor provides the "output indicative of an impingement of an electromagnetic radiation spot," which is "on at least one of" two regions of the "interactive surface element." *Id.* at 73:20–23. The first region of the "interactive surface element" has "user sensible functionality." *Id.* at 73:11–16. The "at least a second region of the at least one interactive surface element" has a "second functionality, different from the first user sensible functionality." *Id.* at 73:14–16.

Regarding the language of the claim, although Petitioner did not provide an explicit construction for any term in the Petition (Pet. 9), at the institution stage, we discerned from Petitioner's unpatentability arguments an implicit construction in the Petition for the recitations including the term "impingement." Inst. Dec. 22–25. We looked to extrinsic evidence for clarification of the claim language and stated that we "find that the ordinary and customary meaning of 'impinge' is '[t]o collide or strike.'" *Id.* at 25

(citing Ex. 3001, 1).[8] We then preliminarily adopted Petitioner's implicit construction "that 'an impingement' of an electromagnetic radiation spot encompasses a user touching the 'electromagnetic radiation spot.'" *Id.*

Patent Owner states that it "does not dispute the Board's definition of 'impingement,' which can include colliding or striking." Resp. 11. Patent Owner, however, argues that our preliminary construction was "incorrect" because "'electromagnetic radiation' performs the 'impingement,' *not* an object or finger." *Id.* at 10–11 (citing Ex. 2056 ¶ 24). Patent Owner argues that our preliminary construction renders superfluous the recitation "electromagnetic radiation spot on." *Id.* at 12. Patent Owner also argues that the language of dependent claims 12, 15, and 28 supports Patent Owner's position. *Id.*

In its Reply, Petitioner disputes Patent Owner's argument. Reply 1–6. Petitioner argues that Patent Owner's proposed construction "is not required by the claim language." *Id.* at 2. Petitioner also argues that the recitations of touching or contacting in dependent claims 12, 15, and 28 support Petitioner's position because independent claim 1 must include touching within its scope. *Id.* at 2–3 (citing Ex. 1035 ¶ 9).

Regarding our adoption of Petitioner's implicit construction, Petitioner states that it "agrees that 'an impingement' of an electromagnetic radiation spot encompasses a user touching the 'electromagnetic radiation spot.'" *Id.* at 1 (citing Inst. Dec. 25). Petitioner also states "[a]s the Board found, the '170 Patent demonstrates that 'an impingement' of an electromagnetic radiation spot encompasses a user touching the

[8] Exhibit 3001 is The Free Dictionary.com entry for "impinge" web.archive.org/web/20061126072217/http://www.thefreedictionary.com:80/impinge showing a date of 2006.

'electromagnetic radiation spot.'" *Id.* Petitioner does not propose an explicit construction or explain further its implicit construction. *See generally* Reply.

Upon consideration of the parties' arguments and evidence in the complete record now before us, we determine that the claim language following the disputed phrase supports Patent Owner's position. In particular claim 1 recites that at least one input sensor is configured "to provide an output indicative of an impingement of an electromagnetic radiation spot *on at least one of the at least one first region and the at least one second region of the at least one interactive surface element*" (emphasis added). Claim 30 includes a similar recitation requiring impingement of the electromagnetic radiation spot "on at least one of the first region and the second region of the at least one interactive surface element." In other words, independent claims 1 and 30 require that either the first or second region on the interactive surface element be impinged on.

Incorporating Patent Owner's proposed construction, i.e., "an area of reflected or projected radiation" results in "each of the at least one input sensor being configured to provide an output indicative of [an area of reflected or project radiation] *on* at least one of the at least one first region and the at least one second region of the at least one interactive surface element" (emphasis added). That is consistent with our preliminary finding at the institution stage that the ordinary and customary meaning of "impinge" is "[t]o collide or strike" (Inst. Dec. 25 (citing Ex. 3001, 1)), which is not disputed by either party. In particular, that the area of radiation is *on* one of the regions indicates a collision or striking of the region of the

surface.[9] Patent Owner's proposed construction results in electromagnetic radiation impinging a region. When Patent Owner's proposed construction is substituted into the claim, the result is clear and straightforward. Furthermore, as will be discussed further below, Patent Owner's proposed construction is more consistent with the written description of the '170 patent.

Petitioner's implicit construction, which we adopted at the institution stage, is "that 'an impingement' of an electromagnetic radiation spot encompasses a user touching the 'electromagnetic radiation spot.'" Inst. Dec. 25. Substituting that implicit construction for the claim phrase in independent claim 1 results in a requirement that something impinges "an electromagnetic radiation spot on at least one of the at least one first region and the at least one second region of the at least one interactive surface element." In other words, under this construction, the electromagnetic radiation spot must be touched (impinged on) by something (that includes a user) and that same spot must be "on" one of the regions. The result is the substantially the same for independent claim 30. Based on the complete record now before us, the claim recitation is not clearer when Petitioner's proposed construction is substituted into the claim.

We turn to the claim language recited in claims 12, 15, and 28, which depend, directly or indirectly, from independent claim 1. Dependent claim 12 recites circuitry configured to distinguishing "at least between positions of at least one *object when touching or not touching* the interactive

[9] Neither party proposes modifying the District Court's constructions in view of our finding regarding the ordinary and customary meaning of "impinge" and we discern no reason to make such a modification based on the complete record now before us.

assembly" and dependent claim 15 recites detecting "when at least one *object touches or does not touch* the interactive assembly" (emphases added). For the reasons given below, we determine Patent Owner has shown that under its proposed construction the claims are sufficiently broad so as to encompass embodiments in which a user touches the assembly and also where the object's position is calculated based on characteristics of a light spot on the surface. *See* Ex. 1001, 69:40–48, 70:44–71:4, 71:60–72:59. Thus, that dependent claims 12 and 15 encompass embodiments in which a user touches an assembly does not undermine Patent Owner's position.

Claim 28 recites "a location of an impingement point of the object on the interactive surface element." Each of independent claims 1 and 30 recites "an impingement of an electromagnetic radiation spot on" the first or second region of the interactive surface element. In claim 28, "the object" follows "of" and neither party disputes that "the object" performs the impinging in claim 28. In contrast, in the independent claims, the claim language recites impingement by the "electromagnetic radiation spot." The applicant knew how to claim an "object" and used the term in the claim 28 to require impingement by an object. That supports Patent Owner's position that "an electromagnetic radiation spot" following "of" performs the impinging in claims 1 and 30.

We turn to the written description of the '170 patent. At the institution stage, we stated the following:

> The '170 patent describes "an interactive assembly having touch responsive input functionality and/or propinquity responsive input functionality" that "is useful for application selection and operation, such as email communication and Internet surfing." *Id.* at 14:46–49. The '170 patent further describes that "a position of a user's finger is detected by means of a touch responsive and/or propinquity responsive input functionality." *Id.* at 14:59–

> 61. The '170 patent, more specifically, describes an embodiment in which "[l]ight, preferably including light in the Infrared (IR) band emitted by illumination subassembly 1212, is reflected from a user's finger, a stylus (not shown) or any other suitable reflective object, touching or located in propinquity to interactive surface element 1208." *Id.* at 49:34–39. An "IR emitting LED [light-emitting diode]" is described as an exemplary "electromagnetic radiation emitting source." *Id.* at 4:34–38. Detector analyzing processing circuitry determines whether the amount of light or change in the amount of light detected by detector elements exceeds a predetermined threshold. *Id.* at 49:53–59. Further processing provides information indicating "the location of the user's finger." *Id.* at 49:60–50:9. The '170 patent Specification describes that location as "the location of an impingement point of the user's finger." *Id.* at 50:2–3.

Inst. Dec. 23–24.

We note in the portions of the '170 patent Specification discussed in the Decision to Institute and reproduced above, the '170 patent Specification describes that light "*is reflected from* a user's finger, a stylus (not shown) or any other suitable reflective object." Ex. 1001, 49:34–39 (emphasis added). The '170 patent Specification describes using a detected amount of light or change in the amount of light to provide the location of the user's finger. *Id.* at 49:60–50:9.

Even in the embodiment relied on in the Decision to Institute, the '170 patent Specification describes that light "*is reflected from* a user's finger, a stylus (not shown) or any other suitable reflective object" (Ex. 1001, 49:34–39 (emphasis added)) and that a detected amount of light or change in the amount of light is used to provide the location of the user's finger (i*d.* at 49:60–50:9). Accordingly, the embodiment discussed in the Decision to Institute provides support for impingement by light reflected from user's finger, a stylus, or other suitable reflective object.

We turn to the parties' argument regarding the '170 patent's written description. Patent Owner argues the '170 patent Specification "describes *radiation impingement* in the context of (1) a stylus *projecting* electromagnetic radiation that *impinges on a surface* to form 'an electromagnetic radiation spot' on that surface, and (2) an object/finger *reflecting* light onto a surface to form 'an electromagnetic radiations spot.'" Resp. 13 (citing Ex. 1001, 14:21–26, 15:48–49, 17:58–59, 10:40–45, 18:64–67, 20:27–28, 21:65–66; Ex. 2056 ¶ 28). Patent Owner also relies on the '170 patent's description of sensing a finger "in propinquity to" a keyboard and defining "an impingement area 1609 that is generally centered on a first button 1611, even though it may also partially impinge on other buttons." *Id.* at 14 (quoting Ex. 1001, 64:49–59; citing *id*. at Fig. 23B). Patent Owner further argues the '170 patent Specification "also describes how to determine the object's position, orientation, and movement based on the projected or reflected area of radiation." *Id.* at 15 (citing Ex. 1001, 69:40–48, 70:44–71:4, 71:60–72:59; Ex. 2056 ¶ 31). Patent Owner concludes that a person having ordinary skill in the art "would have understood the specification describes distinct operations governed by different types of 'impingements' on a surface—e.g., 'touch' and 'radiation,'" and, therefore, "the proper construction of the claimed 'impingement of an electromagnetic radiation spot' means 'an area of reflected or projected radiation.'" *Id.* (citing Ex. 2056 ¶ 32).

Petitioner responds that in accordance with the '170 patent's description, "a position of a user's finger is detected by means of a touch responsive ***and/or*** propinquity responsive input functionality." Reply 3 (quoting Ex. 1001, 14:59–61). Petitioner argues that Patent Owner "relies on Figure 23B and excludes other embodiments in the specification." *Id.* at 4

(citing Ex. 1035 ¶ 12). Petitioner, more specifically argues, Patent Owner "excludes at least two embodiments." *Id.*

First, Petitioner identifies as excluded an embodiment described in connection with Figure 18A as follows:

> In Figure 18A, the user's finger touches, or is near, a specific spot on the interactive surface (red), and impinges upon the electromagnetic light beams propagating through the surface element. Ex-1001, 49:35-60. Specifically, "[w]hen the user's finger touches or is located in propinquity to interactive surface element 1208, the light reflected from the finger is detected by one or more of detector elements 1204[.]" *Id.* at 49:48-51. Thus, the finger impinges upon a spot on the surface, but reflected light is sensed by the elements on the side of the surface. Ex-1035 ¶13.

Reply 4.

Second, Petitioner identifies as excluded an embodiment described in connection with Figure 22. *Id.* at 5. In particular, Petitioner argues "[i]n Figure 22, 'two-dimensional location determining circuitry [] preferably calculates the two-dimensional position of the impingement points of the user's fingers on or above interactive surface element.'" *Id.* (citing Ex. 1001, 63:47–50).

Patent Owner's argument that "[i]n the recital, 'electromagnetic radiation' performs the 'impingement,' *not* an object or finger" (Resp. 11) is consistent with and supported by the '170 patent Specification. In particular, the '170 patent describes "an impingement of an electromagnetic radiation spot" as electromagnetic radiation performing the impingement, not an object or finger. *See, e.g.*, Ex. 1001, 14:21–26 (describing a "user, holding a light beam emitting remote control device 292" that interacts, for example, with mobile device 272 "by directing a beam of light in a direction which causes *impingement of a spot of light*" on mobile device 272 (emphasis

added)), 17:58–59 (describing "*light beam impingement* responsive input functionality" operating with light-emitting stylus 388), 18:64–67 (describing that detector assembly 400 is arranged along an edge 402 "of an interactive surface element 404, to sense *light impinging thereon*" (emphasis added)), 20:27–28 (describing sensing "*light impinging on* interactive surface element 424"), 21:65–66 (describing sensing "*light impinging on* interactive surface element 444"), 70:44–71:4 (describing calculating axes of an "elliptical light spot formed by *impingement of the light* from an input object *upon the interactive surface*" (emphases added)).

Patent Owner's argument that the '170 patent Specification "describes *radiation impingement* in the context of (1) a stylus *projecting* electromagnetic radiation that *impinges on a surface* to form 'an electromagnetic radiation spot' on that surface, and (2) an object/finger *reflecting* light onto a surface to form 'an electromagnetic radiations spot'" (Resp. 13–14) also is consistent with and supported by the written description of the '170 patent. For instance, the '170 patent describes "the ability to use the same physical assembly and/or same processing circuitry to process information about the location of various input objects whether they emit or reflect light." Ex. 1001, 72:3–7; *see also id.* at 72:9–17 (describing that "it may be desirable to provide both finger touch input and light-emitting stylus input for different functions, for example, finger touch input for application selection functionality, and light-emitting stylus input for gaming functionality").

Petitioner's dispute regarding the '170 patent's written description centers on its argument that Patent Owner's proposed construction should not be adopted because it does not encompass every embodiment disclosed in the '170 patent Specification. Reply 1–5. We agree with Patent Owner

that patentees may claim specific embodiments. *See SIMO Holdings Inc. v. Hong Kong uCloudlink Network Tech. Ltd.*, 983 F.3d 1367, 1378 (Fed. Cir. 2021). Indeed, the '170 patent issued from a divisional application. Ex. 1001, code (62). We note here that the length of the patent, i.e., over 70 columns, and the many embodiments that include descriptions of reflected light, not just on the surface, by through and within a panel, for example, in Figure 18.

In its Sur-reply, Patent Owner agrees that "sensing internally reflected light 'through' or 'within' the panel" does not satisfy the disputed recitation. Sur-reply 4–6. That acknowledgement by Patent Owner is limited and does not extend to all embodiments in which an object touches the surface. *Id.* In the independent claims, the claim language recites impingement by the "electromagnetic radiation spot." The applicant knew how to claim an "object" and used the term in the claims, as discussed with respect to claim 28 that requires impingement by an object. Patent Owner's arguments that "electromagnetic radiation" performs the "impingement" are consistent with and supported by the intrinsic record and outweigh that "sensing internally reflected light 'through' or 'within' the panel" does not satisfy the disputed recitation, as set forth in Patent Owner's acknowledgment.

Nevertheless, we also agree with Patent Owner that Petitioner's arguments that Figures 18A and 22 of the '170 patent would be excluded from Patent Owner's proposed construction are not well explained and are not consistent with the '170 patent's written description. Sur-reply 5–6. With respect to Figure 18A, Patent Owner argues "[d]epending on the configuration LED 1216, reflected light travels (1) 'within' the panel by scattering; (2) 'above' the surface; or (3) directly 'through' the surface to detectors." Sur-reply 5 (citing Ex. 1001, 49:2–7, 49:39–47). Patent Owner

acknowledges that "sensing internally reflected light 'through' or 'within' the panel does not satisfy the recital." *Id.* at 6. Consistent with Patent Owner's position (*id.* at 5–6), the '170 patent describes reflected light traveling above the surface in connection with Figure 18A. Ex. 1001, 49:2–7 ("It is appreciated that the light emitted by LED 1261 may be directed entirely or partially *above* or through the surface" (emphasis added)), 49:39–47 ("Alternatively or additionally, the reflected light is propagated above the surface of interactive surface element 1208 and is detected by one or more of detector elements 1204, which may extend slightly above edges 1206").

With respect to Figure 22, Petitioner relies on the '170 patent's disclosure that "two-dimensional location determining circuitry [ ] preferably calculates the two-dimensional position of the impingement points of the user's fingers on or above interactive surface element 1508." Reply 5 (quoting Ex. 1001, 63:47–50). The disclosure in the '170 patent of calculating an impingement point of the user's fingers, however, does not exclude the embodiment from falling under Patent Owner's proposed construction.

Based on the complete record now before us, Petitioner has not provided argument or evidence supporting that its implicit construction encompasses every embodiment of the '170 patent. *See* 37 C.F.R. § 42.22 (stating each petition "must be filed as a separate paper and must include" a "full statement of the reasons for the relief requested"); 37 C.F.R. § 42.23 (stating oppositions, replies, and sur-replies "must comply with the content requirements for motions"). Regarding Petitioner's argument that Patent Owner "provides no . . . evidentiary support let alone 'highly persuasive support" for excluding embodiments (Reply 4), Petitioner has not shown that its implicit construction encompasses all or even more embodiments as

compared to Patent Owner's proposed construction. Furthermore, we disagree with Petitioner because Patent Owner has provided highly persuasive support showing its proposed construction is consistent with and supported by the intrinsic record, including the claim language reciting impingement by the "electromagnetic radiation spot," rather than impingement by an object, as is recited in claim 28 and the '170 patent's description of "an impingement of an electromagnetic radiation spot" as electromagnetic radiation performing the impingement, not an object or finger, as discussed above. *See, e.g.*, Ex. 1001, 14:21–26, 17:58–59, 18:64–67, 20:27–28, 21:65–66, 70:44–71:4).

Finally, we turn to the prosecution history. At the institution stage, we stated the following:

> The Examiner rejected the claims over U.S. Publication No. 2007/0052684 A1 ("Gruhlke," Ex. 3002) and U.S. Publication No. 2007/0063980 A1 ("Eich"). Ex. 1004, 832. The Examiner characterized Gruhlke as describing a "position detection system." *Id.* at 833. The Examiner stated that Eich teaches "a user interface for receiving inputs from a user includes a touch sensitive surface." *Id.*
>
> With respect to "an output indicative of an impingement of an electromagnetic radiation spot," the Examiner pointed to Gruhlke's laser speckle. *Id.* at 832. As background, Gruhlke describes that a "pointing device is a common component by which an operator can control the computer using its graphical user interface." Ex. 3002 ¶ 1. Exemplary pointing devices are "a stylus," employed with a digitizing tablet (*id.*), and "a user's finger," which allows a user to navigate a touchpad (*id.* ¶ 7). Gruhlke describes tracking the position and movement of an operator's hand. *See*, *e.g.*, *id*. ¶¶ 2–7. Gruhlke describes computing position change from speckle patterns. *See*, *e.g.*, *id.* at Fig. 5.

Inst. Dec. 24.

At the institution stage, regarding the prosecution history of the '170 patent, we concluded the following:

> Further, based on the current record, we preliminarily find that the prosecution history does not reveal an intentional disclaimer or disavowal of claim scope by the inventors.

Id. at 24–25.

Based on the complete record now before us, nevertheless, we determine that Patent Owner's proposed construction is at least consistent with and supported by the prosecution history. In particular, with respect to "an output indicative of an impingement of an electromagnetic radiation spot," the Examiner pointed to Gruhlke's laser speckle. Ex. 1004, 832.

c) Conclusion: Construction of recitations including the term "impingement"

Based on the complete record now before us, we are of the view that our preliminary determination in our Decision to Institute adopting Petitioner's implicit construction for "impingement of an electromagnetic radiation spot" was not correct. Based on the complete record now before us, we conclude that "impingement of an electromagnetic radiation spot" means "an area of reflected or projected radiation," which is the same as the claim construction provided by the District Court. *See* Ex. 1034, 4. For the longer claim recital that includes additional language, as well as the same phrase, we conclude that "plain and ordinary meaning" should apply to the remaining language, which is the same as the construction provided by the District Court. *See* Ex. 1034, 4.

E. Unpatentability of Claims 1, 2, 13, 14, 18, 21, 26, and 30 under 35 U.S.C. § 103(a) as Obvious over Newton Alone or with Hinckley

Petitioner asserts that claims 1, 2, 13, 14, 18, 21, 26, and 30 are unpatentable as obvious over Newton alone or with Hinckley. Pet. 3. Patent

Owner counters that Petitioner's reasoning to combine the prior art references is deficient and the asserted art does not teach elements 1[b] and 1[f]. Resp. 21–39. Patent Owner also counters Petitioner's showing for dependent claims 13 and 26. *Id.* at 39–42. For the reasons given below, we conclude that Petitioner has not shown that the asserted prior art teaches element 1[b].

We begin with an overview of Newton and Hinckley. We then turn to the parties' contentions regarding element 1[b].

1. Newton

Newton relates to a touch panel display system that displays information and allows a user to interact with the system by touching on or near the displayed information. Ex. 1012 ¶ 2. Figure 1 of Newton, reproduced below, depict a block diagram of a computing device and a touch panel screen. *Id*. ¶¶ 17, 26.

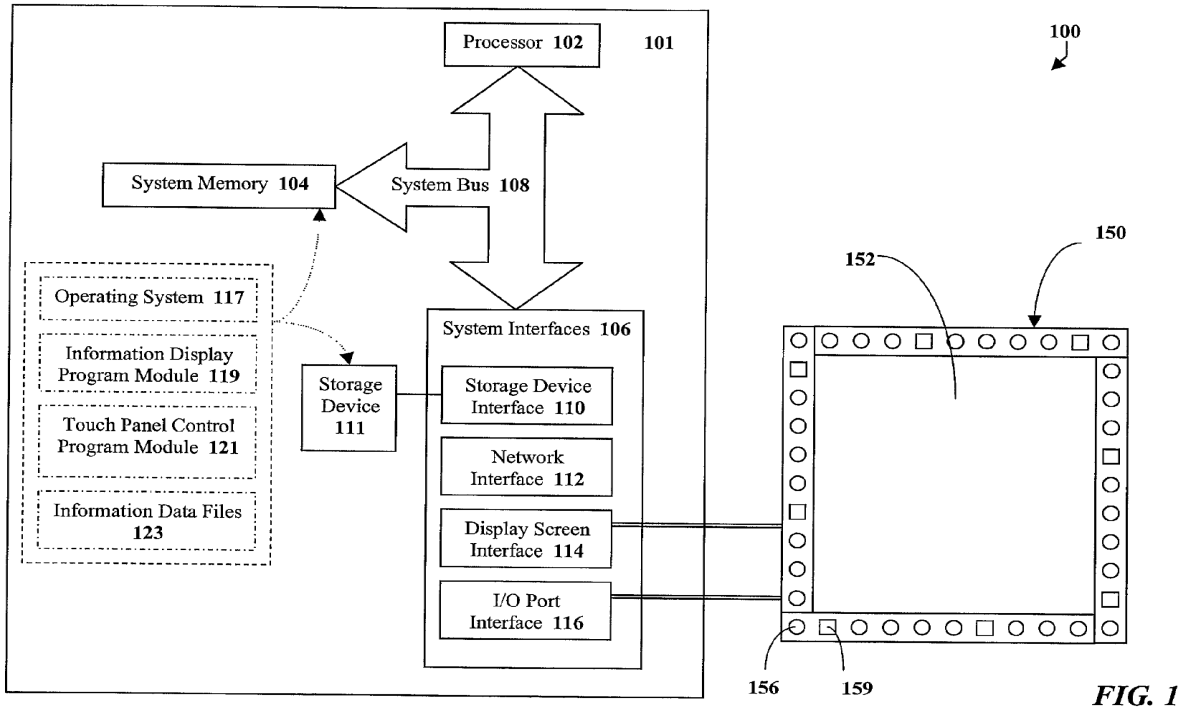

FIG. 1

Figure 1, above, depicts a block diagram, with touch panel display 150, and computing device 101 which may be a processor-driven device such as a handheld computer or a cellular phone. Ex. 1012 ¶ 26.

Touch panel display 150 includes emitters 156 and detectors 159, which are positioned around display screen 152. *Id.* ¶ 48. Emitters 156, detectors 159, and associated emission guides 208, 308 are adapted to provide energy beams that are used for detection. *Id.*

Figure 5, reproduced below, provides a view of exemplary storefront 402. *Id.* ¶ 44.

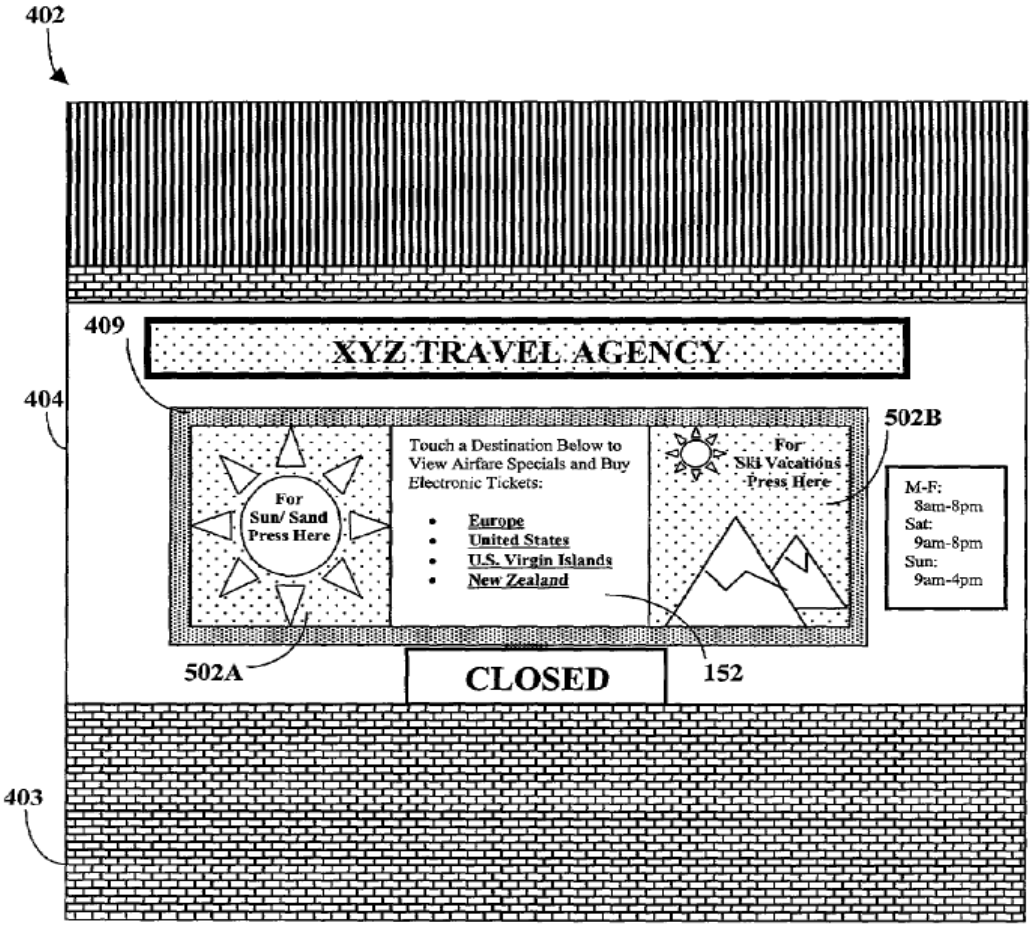

FIG. 5

Figure 5, above, provides a frontal view of exemplary storefront 402, which is displayed on touch panel display 150 of touch panel display system 100. *Id.* ¶¶ 25, 44.

Images, icons, or other indicia may be displayed on the display screen 152, including images that are intended to be touch-interactive. *Id.* ¶ 51. As shown in Figure 5, storefront 402 for "XYZ TRAVEL AGENCY" includes "Sun/Sand" option 502A and "Ski Vacation" option 502B, which are displayed in the touch-interactive area. *Id*. ¶ 51, Fig. 5. A touch on "Sun/Sand" option 502A or "Ski Vacation" option 502B generates an instruction for computer system 101. *Id.*

2. Hinckley

Hinckley relates to computing and mobile devices with displays. Ex. 1011 ¶ 2. Hinckley describes mobile device 200 including, among other things, two touch sensors 254 and 256, forward/back tilt sensor 258, left/right tilt sensor 260, and proximity sensor 262 consisting of infrared transmitter 264 and infrared receiver 266. *Id.* ¶ 29. Figure 7, reproduced below, shows a response curve for proximity sensor 262.

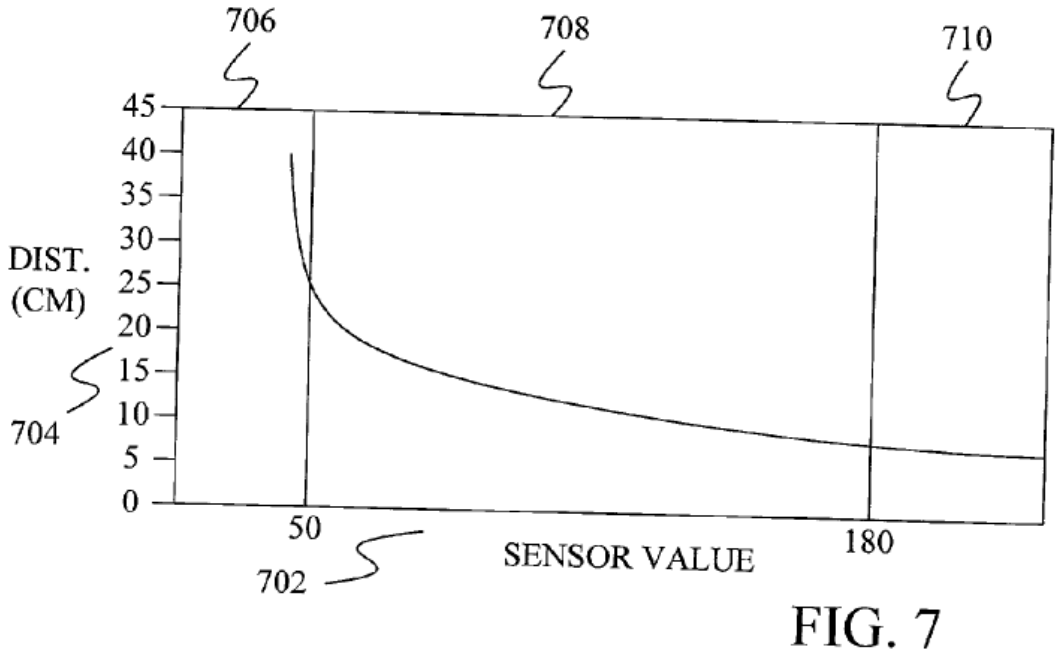

FIG. 7

Figure 7, reproduced below, shows a response curve for proximity sensor 262.

As shown in Figure 1, the sensor value is shown along horizontal axis 702 and the actual distance to the object is shown along vertical axis 704. *Id.* ¶ 44. The graph shown in Figure 7 is divided into three ranges. *Id.* Range 706 extends from a distance of approximately 27 centimeters to infinity and indicates that no objects are within range of mobile device 200. *Id.* Range 708 extends from approximately 7 centimeters to 27 centimeters and

indicates that at least one object is within range of mobile device 200. *Id.* Readings in third range 710, which extends from 7 centimeters to 0 centimeters, are considered to be close to mobile device 200. *Id.*

3. Independent Claim 1

Element 1[b] is reproduced below.

> [b] at least one input sensor located in propinquity to at least one of the at least one interactive surface element, each of the at least one input sensor being configured to provide an output indicative of an impingement of an electromagnetic radiation spot on at least one of the at least one first region and the at least one second region of the at least one interactive surface element;

Ex. 1001, 73:17–23.

Petitioner relies on only Newton, and not Hinckley, for the teaching of the disputed recitation. Petitioner argues that Newton teaches element 1[b] based on its disclosure that touch panel display 150 includes "a number of emitters 156 and detectors 159 positioned around the display screen 152." Pet. 25 (quoting Ex. 1012 ¶ 48, Figs. 2, 6). Petitioner also argues the following:

> Newton teaches that the emitters 156 and detectors 159 are configured to "provide a number of energy beams," and "[a] touch on the exterior side of the protective barrier will interrupt at least two of the energy beams and will cause the at least one detector to not detect the at least two interrupted energy beams." Ex-1012, [0048], [0013]. That is to say that an object will impinge upon the beams (207 in Figures 2 and 3, and 107 in Figure 6) at a spot on the interactive surface, which impingement is then sensed by the detectors around the periphery of the surface. Ex-1002, ¶72. Newton thus measures objects impinging on beams over a certain location on the interactive surface. *Id.* Newton further teaches that "[i]n response to detecting the interruption of the energy beams, the detectors may generate signals from which the touch panel display system is able to

> calculate the location of the touch on the touch panel display screen." *Id.*, [0025].

Pet. 26–27 (citing Ex. 1012 ¶¶ 13, 25, 48, Figs. 2, 3, 6; Ex. 1002 ¶ 72).

Patent Owner argues that Petitioner does not demonstrate that Newton teaches "impingement of an electromagnetic radiation spot" on an interactive surface under its proposed claim construction. Resp. 31–32. Patent Owner argues that "the referenced portions of Newton only demonstrate[ ] (1) an object *interrupting* an energy beam above an exterior surface of a protective barrier and (2) a finger touching or contacting the surface." Resp. 32 (citing Ex. 1012, Figs. 2, 3, 6, ¶¶ 13, 48). Patent Owner argues that a person having ordinary skill in the art "would have understood that Newton's disclosure regarding detecting signal absence or signal interruption is the opposite of the claimed input sensor providing an output indicative of an 'electromagnetic radiation spot' on the surface." *Id.* (citing Ex. 2056 ¶ 77).

Petitioner responds that Patent Owner's "argument rests on its incorrect, narrow proposed construction." Reply 13; *see also id.* at 14 (arguing Patent Owner's "argument relies on its construction requiring radiation reflected onto the surface"). Petitioner argues "Newton's showing of 'an impingement,' for example, a user touching the 'electromagnetic radiation spot' of the energy beams on the display is sufficient." *Id.* at 13 n.6.

During oral argument, Petitioner's counsel acknowledged that Newton does not teach detecting reflected light. Tr. 12:4–17. Petitioner's counsel acknowledged that Newton does not teach element 1[b] under Patent Owner's construction. *Id.* The questioning of Petitioner's counsel is reproduced below.

> JUDGE PARVIS: Does Newton teach an impingement of an electromagnetic radiation spot under the court's construction?
>
> MR. HABER: *I think the answer to that is likely not*. The reason that I'm hedging a bit is because the way that Newton operates is that a user certainly impinges upon an energy field. That happens in Newton. Newton doesn't talk about what happens to the reflected light once that impingement occurs. So it is a physical reality that that light will be reflected by that impinging object, *but Newton doesn't say anything about detecting that reflection in particular*. So there will be reflected radiation in Newton. It's just whether or not Newton actually does anything with that reflected light. I don't think Newton is very clear.

Tr. 12:4–17 (emphases added); *see also id.* at 12:18–13:2 (in response to a question regarding whether Newton is silent with respect to reflected light, providing attorney argument regarding Newton's cover without identifying evidentiary support and not contradicting or clarifying prior acknowledgment of Newton's deficiency).

For the reasons given with respect to claim construction (*see supra* § II.D.2), we conclude that "impingement of an electromagnetic radiation spot" means "an area of reflected or projected radiation," which is the same as the claim construction provided by the District Court. *See* Ex. 1034, 4. For the longer claim recital that includes additional language, as well as the same cited phrase, we conclude that the "plain and ordinary meaning" should apply to the remaining language, which is the same as the construction provided by the District Court. *See* Ex. 1034, 4.

We agree with Patent Owner (Resp. 32) that Newton's teachings relied on by Petitioner describe an object interrupting an energy beam above an exterior surface of a protective barrier as well as a finger touching or contacting the surface)), but Newton does not teach "an output indicative of an impingement of an electromagnetic radiation spot on at least one of the at

least one first region and the at least one second region of the at least one interactive surface element" recited in claim 1. *See, e.g.*, Ex. 1012, Figs. 2, 3, 6, ¶¶ 13, 25, 48.

After consideration of the contentions and the evidence of record, we determine that Petitioner has not shown that either Newton alone or the combination of Newton and Hinckley teaches element 1[b] of claim 1. Accordingly, based on the complete record now before us, we conclude that Petitioner has not established by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over Newton alone or with Hinckley.

4. Independent Claim 30

Independent claim 30 is similar to independent claim 1, except claim 30 does not recite that the detector assembly includes a support substrate. Petitioner's analysis of claim 30 is the same as the analysis of claim 1. Pet. 19–36. Petitioner does not provide contentions for claim 30 that resolve the deficiency discussed with respect to claim 1. *Id.*

Accordingly, based on the complete record now before us, we conclude that Petitioner has not established by a preponderance of the evidence that claim 30 is unpatentable under 35 U.S.C. § 103(a) as obvious over Newton alone or with Hinckley.

5. Dependent Claims 2, 13, 14, 18, 21, and 26

We have considered Petitioner's arguments and evidence for dependent claims 2, 13, 14, 18, 21, and 26. Claims 2, 13, 14, 18, 21, and 26 depend, directly or indirectly, from claim 1. Petitioner does not present persuasive argument or evidence that remedies the deficiencies discussed with respect to claim 1 above. Accordingly, based on the complete record

now before us, we conclude that Petitioner has not established by a preponderance of the evidence that claims 2, 13, 14, 18, 21, and 26 are unpatentable under 35 U.S.C. § 103(a) as obvious over Newton alone or with Hinckley.

F. Unpatentability of Claims 1, 2, 6–8, 13, 16, 18, 19, 21–23, 26, and 30 under 35 U.S.C. § 103(a) over Reime Alone or with Hinckley

Petitioner asserts that claims 1, 2, 6–8, 13, 16, 18, 19, 21–23, 26, and 30 are unpatentable as obvious over Reime alone or with Hinckley. Pet. 3, 58. Patent Owner counters that Petitioner's reasoning to combine is deficient and the asserted art does not teach elements 1[b] through 1[f]. Resp. 50–65. For the reasons given below, we conclude that Petitioner has not shown that the asserted prior art teaches element 1[b].

We begin with an overview of Reime. We then turn to the parties' contentions regarding element 1[b].

1. Reime

Reime relates to a touch sensitive device in an electronic device or a wireless telecommunication terminal. Ex. 1010 ¶ 2. Figure 2A, reproduced below, shows touch pad device 1.

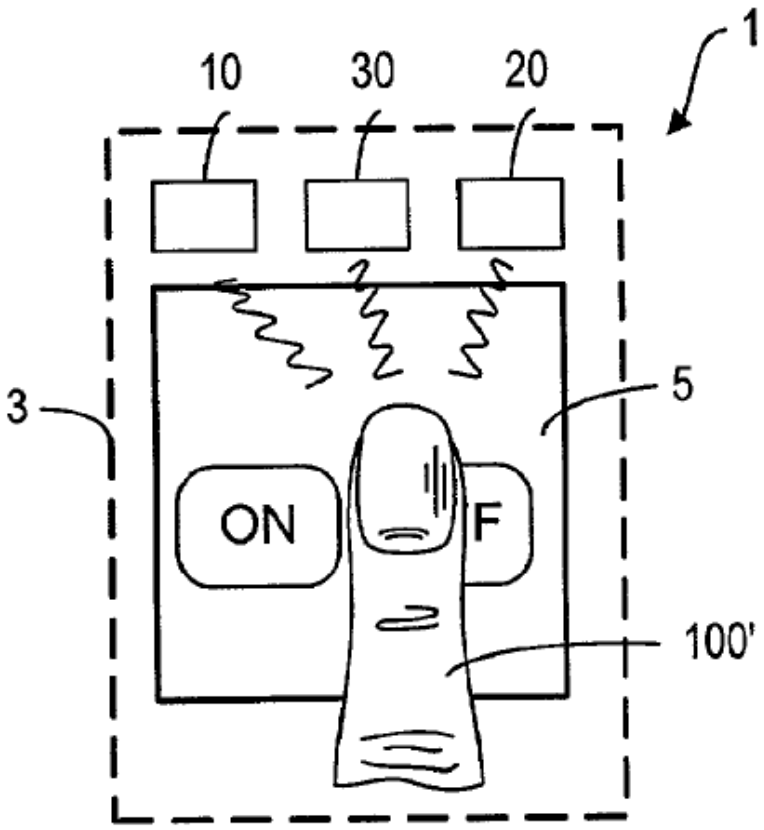

FIG. 2A

Figure 2A is a diagrammatic representation showing touch pad device 1 having optical sensor components 10, 20, and 30 placed near the top side of touch pad area 5. *Id.* ¶ 29, 76.

As shown in Figure 2A, touch pad device 1 can be used to select the "ON" function or "OFF" function depending on the location of the "touching" point on touch pad area 5. *Id.* ¶ 75. When user's finger 100' touches or approaches the pad area 5, the changes in the output signal of the receiver 30 show which function is selected. *Id.*

2. Independent Claim 1

Element 1[b] is reproduced below.

> [b] at least one input sensor located in propinquity to at least one of the at least one interactive surface element, each of the at least one input sensor being configured to provide an output indicative of an impingement of an electromagnetic radiation spot on at least one of the at least one first region and the at least one second region of the at least one interactive surface element;

Ex. 1001, 73:17–23.

Petitioner relies on only Reime, not Hinckley, for the disputed teaching of limitation 1[b]. Petitioner argues that Reime teaches element 1[b] based on Reime's disclosure of "a touch pad device 'having four emitters separately placed near the four corners, and four receivers separately placed near the four edges of the touch pad area.'" Pet. 51 (citing Ex. 1010 ¶ 46, Fig. 6B; Ex. 1002 ¶ 127). Petitioner also points to "emitters and detectors," which are placed "at the edge of LCD 92 and coverplate 70." *Id.* (citing, *e.g.*, Ex. 1010, Fig. 8B; Ex. 1002 ¶ 127).

Petitioner also points to Reime's disclosure of a user using pencil 100 to make contact with touch pad 5. *Id.* at 13–14, 51 (citing Ex. 1010 ¶¶ 73, 75, Fig. 1). Petitioner states "Reime shows, *e.g.*, in Fig. 1, that light will hit a nearby impinging object (100) and then be reflected back to and impinge upon one of the detector elements (RX 30)." *Id.* at 51 (emphasis added). Petitioner argues "Reime's output includes information corresponding to the spot on the interactive surface where the impinging object is: 'the two dimensional coordinates of the touching point with respect to the touch pad area 5,' which includes both the first and the second regions." *Id.* at 52 (citing Ex. 1010 ¶ 80; Ex. 1002 ¶¶ 126–129).

Patent Owner argues that Petitioner does not demonstrate that Reime teaches element 1[b] under its proposed claim construction of "impingement of an electromagnetic radiation spot." Resp. 50–52. Patent Owner also argues the "construction aside," Reime does not teach the plain claim language recited in element 1[b]. *Id.* at 51–52 (citing, e.g., Ex. 1010 ¶¶ 80, 86).

Petitioner responds that Patent Owner's "argument rests on its narrow construction." Reply 22. Petitioner also responds "even under Power2B's narrow construction," Reime teaches the limitation "because Reime teaches detecting the light reflected by object (100) onto the interactive surface, shown, e.g., in Figures 2A and 11." Reply 22 (citing Ex. 1010 ¶ 73; Ex. 1035 ¶ 43). Petitioner argues "Reime uses the reflected signal to 'determine the-two dimensional coordinates of the touching point with respect to the touch pad area 5.'" *Id.* at 23 (citing Ex. 1010 ¶ 80).

In its Sur-reply, Patent Owner argues that Petitioner's theories in its Reply are new and, therefore, should not be considered. Sur-reply 17–19. Patent Owner also argues that even if considered Petitioner's theories in its Reply do not teach element 1[b]. *Id.* at 19–21.

For the reasons given with respect to claim construction (*see supra* § II.D.2), we conclude that "impingement of an electromagnetic radiation spot" means "an area of reflected or projected radiation," which is the same as the claim construction provided by the District Court. *See* Ex. 1034, 4. For the longer claim recital that includes additional language, as well as the same cited phrase, we conclude that the "plain and ordinary meaning" should apply to the remaining language, which is the same as the construction provided by the District Court. *See* Ex. 1034, 4.

Substituting the construction for the recitation in the claim results in the following" "at least one input sensor being configured to provide an output indicative of [an area of reflected or projected radiation] *on at least one of the at least one first region and the at least one second region of the at least one interactive surface element*" (emphasis added). The emphasized language derives antecedent basis from the recitation "at least a first region of the at least one interactive surface element having first user sensible functionality and at least a second region of the at least one interactive surface element having second functionality, different from the first user sensible functionality" recited in element 1[a].

With respect to element 1[a], Petitioner argues "as shown in FIG. 2A [of Reime], a first region of the interactive touch pad area allows the user to select the 'ON' function, and a second region of the interactive touch pad area 5 allows the user to select the 'OFF' function." Pet. 50 (citing Ex. 1010, Fig. 2A, ¶ 75). Petitioner also argues "[a]s another example, FIG. 4A [of Reime] shows that 'the user can select the "UP," "DOWN," "RIGHT" or "LEFT" function by touching at or near the respective arrow.'" *Id.* (citing Ex. 1010 ¶ 78, Fig. 4A).

Petitioner does not show that Reime teaches "to provide an output indicative of [an area of reflected or projected radiation] on at least one of the at least one first region and the at least one second region of the at least one interactive surface element" (emphasis added) recited in element 1[b]. Reime describes when "a user uses an object such as a pencil 100," as illustrated in Figure 2A "some of light 110 emitted from emitter 10 encounters the surface of the object 100" and "[p]art of the light 110 reflects off the object 100 and is received by receiver 30." Ex. 1010 ¶ 73. Reime also describes likewise "some light 120 emitted from the emitter 20 encounters

the surface of the object 100 and then reflects off the object 100 to receiver 30." *Id.*

Figure 2A of Reime, relied on by Petitioner is reproduced below.

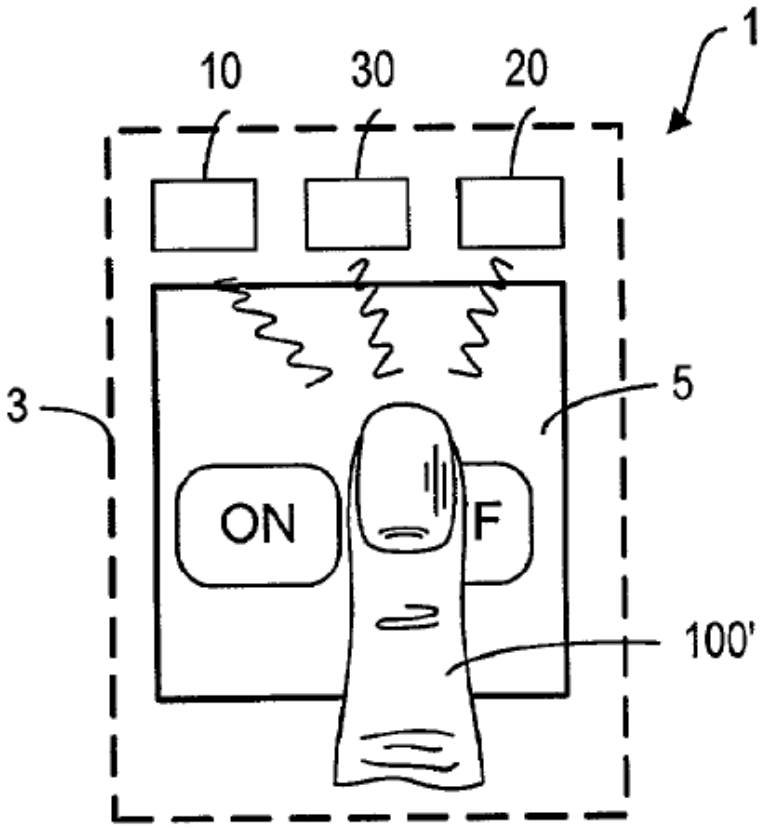

FIG. 2A

Figure 2A is a diagrammatic representation showing touch pad device 1 having optical sensor components 10, 20, and 30 placed near the top side of touch pad area 5. *Id.* ¶ 29, 76.

The illustration of reflected light in Figure 2A of Reime is consistent with Reime's description that light reflects off finger 100' to receiver 30. *See, e.g., id.* ¶ 73, Fig. 2A. Petitioner does not show that Reime teaches an

area of reflected or projected radiation on the first or second regions, i.e., the "ON" and "OFF" functions shown in Figure 2A, which are a sub-set of the area of touch pad 5. Petitioner also does not show any sensor providing an output of such reflected or projected radiation on one of "ON" and "OFF" functions shown in Figure 2A. Figures 2B through 2D, Figure 4A, and Figure 4B do not illustrate reflected light. *Id.* at Figs. 2B–2D, 4A, 4B. Figure 11 of Reime does not illustrate a surface or a first or second region. *Id.* at Fig. 11. Upon consideration of Petitioner's argument and evidence, Reime's disclosures relating to reflected light, including the aforementioned disclosures, do not teach "at least one input sensor being configured to provide an output indicative of [an area of reflected or projected radiation] *on at least one of the at least one first region and the at least one second region of the at least one interactive surface element*" (emphasis added).

Reime's disclosures of an object touching the interactive surface also do not satisfy the disputed recitation under the correct construction, which is that proposed by Patent Owner. For instance, with respect to Reime's disclosure of a user using pencil 100 to make contact with touch pad 5 relied on by Petitioner (Pet. 13–14, 51 (citing Ex. 1010 ¶¶ 73, 75, Fig. 1)), pencil 100 is an object, not a source of electromagnetic radiation, so the contact of pencil 100 with touch pad 5 does not meet the claim recitation under the correct construction. Similarly, Reime's disclosure that the "touch pad device 1, as shown in FIG. 2A, can be used to select the 'ON' function or 'OFF' function, depending on the location of 'touching' point on the touch pad area 5" does not meet the claim recitation under the correct construction because the touching or approaching is performed by finger 100', not electromagnetic radiation. Ex. 1010 ¶ 75.

After consideration of the contentions and the evidence of record, we determine that Petitioner has not shown that either Reime alone or the combination of Reime and Hinckley teaches element 1[b] of claim 1. Accordingly, based on the complete record now before us, we conclude that Petitioner has not established by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over Reime alone or with Hinckley.

3. Independent Claim 30

Independent claim 30 is similar to independent claim 1, except claim 30 does not recite that the detector assembly includes a support substrate. Petitioner's analysis of claim 30 is the same as the analysis of claim 1. Pet. 48–60. Petitioner does not provide contentions for claim 30 that resolve the deficiency discussed with respect to claim 1. *Id.*

Accordingly, based on the complete record now before us, we conclude that Petitioner has not established by a preponderance of the evidence that claim 30 is unpatentable under 35 U.S.C. § 103(a) as obvious over Reime alone or with Hinckley.

4. Dependent Claims 2, 6–8, 13, 16, 18, 19, 21–23, and 26

We have considered Petitioner's arguments and evidence for dependent claims 2, 6–8, 13, 16, 18, 19, 21–23 and 26. Claims 2, 6–8, 13, 16, 18, 19, 21–23, and 26 depend, directly or indirectly, from claim 1. Petitioner does not present persuasive argument or evidence that remedies the deficiencies discussed with respect to claim 1 above. Accordingly, based on the complete record now before us, we conclude that Petitioner has not established by a preponderance of the evidence that claims 2, 6–8, 13, 16,

18, 19, 21–23, and 26 are unpatentable under 35 U.S.C. § 103(a) as obvious over Reime alone or with Hinckley.

III. CONCLUSION

The outcome for the challenged claims is set forth below.[10] In summary:

Claims Challenged	35 U.S.C. §	References/ Basis	Claims Shown Unpatent-able	Claims Not shown Unpatent-able
1, 2, 13, 14, 18, 21, 26, 30	103(a)	Newton		1, 2, 13, 14, 18, 21, 26, 30
1, 2, 13, 14, 18, 21, 26, 30	103(a)	Newton, Hinckley		1, 2, 13, 14, 18, 21, 26, 30
1, 2, 6–8, 13, 16, 18, 19, 21–23, 26, 30	103(a)	Reime[11]		1, 2, 6–8, 13, 16, 18, 19, 21–23, 26, 30
1, 2, 6–8, 13, 16, 18, 19, 21–23, 26, 30	103(a)	Reime, Hinckley		1, 2, 6–8, 13, 16, 18, 19, 21–23,

[10] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

[11] The Petition lists "Ground 3 and 4" as obviousness over Reime and Hinckley (Pet. 3, 46–60 (emphasis omitted)), and Ground 3 appears to be obviousness over Reime alone. *Id.* at 58. We treat the omission of the explicit obviousness identification of Reime "alone" as a typographical error.

Claims Challenged	35 U.S.C. §	References/ Basis	Claims Shown Unpatent-able	Claims Not shown Unpatent-able
				26, 30
Overall Outcome				1, 2, 6–8, 13, 14, 16, 18, 19, 21–23, 26, 30

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 6–8, 13, 14, 16, 18, 19, 21–23, 26, and 30 of the '170 patent have not been shown to be unpatentable;

FURTHER ORDERED Patent Owner's Motion to Exclude (Paper 30) is dismissed; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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