

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM SERVICES LLC
Petitioner,

v.

SMART SPEAKER LLC
Patent Owner.

Patent No. 12,401,721

Inter Partes Review No. IPR2026-00276

PETITIONER'S REPLY TO PATENT OWNER RESPONSE

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Amazon.com Services LLC (“Petitioner”) provides this Reply under 37 C.F.R. § 42.23 to the “Patent Owner Response” (Paper No. 13; “Response”) by Smart Speaker LLC (“Patent Owner”).

I. INTRODUCTION

Patent Owner’s Response confirms that all challenged claims should be canceled. Rather than defending the claims as written, Patent Owner invents narrow, unclaimed limitations to evade art that discloses every claim element.

For Grounds 1-8, Patent Owner rewrites “first message” to require an “actuator-directing” message. (Response, 14-15; EX2011, ¶38.) That construction contradicts plain claim language, the specification’s definition of “message,” and claim differentiation between “message” and “control message.” Patent Owner’s arguments regarding “second message” also fail, because Lim discloses both speech processing result and codeset from the server, each of which causes the local device to transmit a control signal and thus qualifies as “second message.”

For Grounds 9-16, Patent Owner’s arguments rely on the incorrect construction of “message” above and mischaracterization of Williams. (Response, 22-29.) Patent Owner also miscasts the Petition as conceding that Williams does not disclose the “second message,” contradicting the Petition’s express mapping to services 218. (Pet., 90.) Failing to find gaps in the combination, Patent Owner resorts to improperly attacking Williams and Lim individually.

Patent Owner's dependent-claim attacks fare no better. Each demands a level of granularity the obviousness law does not require, or mischaracterizes the Petition and Dr. Houh's testimony.

II. GROUND 1-8: LIM (CLAIMS 1, 5-6, 10, 12, 16, 20-21, 23, 29)

A. Patent Owner's Challenge to Lim Hinges on an Incorrect, Narrow Construction of "Message"

Despite alleging that "the Board need not construe any term" (Response, 11) and identifying no disputed terms in the district court (EX1103), Patent Owner takes a contrary claim construction position here. Patent Owner anchors its arguments on narrowly interpreting the "first message" as a "server-generated," "actuator-directing" message having a three-part criterion. (Response, 1-2, 13-16; EX2011, ¶¶12-13, 38, 48-50.) Patent Owner should not be permitted to endorse plain meaning in district court while importing unstated limitations before this Board. This narrow construction finds no support in the intrinsic record and should be rejected. (EX1101, ¶¶11-14.)

First, the specification provides a generic definition that encompasses "information": "[t]he term 'message' is used generically herein to describe at least an ordered series of characters or bits intended to convey a package of **information**. . . ." (EX1001, 148:30-35; *see also id.*, 142:66-143:4.) As another example, a message "may include a **notification of the event of processing**." (*Id.*,

123:64-124:8.) This is consistent with plain and ordinary meaning of “message” as provided in the Cambridge Dictionary: “a short piece of written or spoken **information** that is given or sent to someone.” (EX1099, 4; EX1101, ¶14.) Lim’s speech processing result, whether text strings, semantic results, or information associated with the next prompt, falls squarely within that definition.

Second, claim 1 of the ’721 patent itself distinguishes generic “first and second messages” from the downstream “*control* message that comprises a control data for controlling a first actuator.”¹ (EX1001, Claim 1; EX1101, ¶12.) Patent Owner’s narrow construction effectively eliminates the distinction between a generic “message” and a “control message.” “[I]n the absence of any evidence to the contrary, we must presume that the use of . . . different terms in the claims connotes different meanings.” *CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000).

¹ To the extent that Patent Owner also construes “control message” consistent with the three-part criterion, Petitioner does not agree. Regardless, Patent Owner does not dispute that Lim’s message for controlling home devices discloses “control message.” (Pet., 13-18.)

B. Lim’s Speech Processing Result(s) Triggers Audio Output and thus Discloses “First Message”

In Lim, user speech captured by the first device is sent to a remote server for speech recognition. (Pet., 28-29, quoting EX1005, [0027], [0028].) That recognition result dictates the next prompt at the first device. For example, if “the speech recognition means is *unable to uniquely identify* the desired brand,” Lim “solicit[s] additional identifying information. . . .”² (*Id.*, 28-29, 35-36, quoting EX1005, [0028], [0036].) If the brand or model “has been *successfully identified*,” the first device advances to prompting for “appliance type and/or model number information,” “device type,” or “service provider.” (*Id.*, 36; EX1002, ¶102, quoting EX1005, [0029].) Lim discloses that these next prompts can be audio outputs (*e.g.*, “synthesized spoken message,” “buzzer”). (EX1005, [0019], [0027].) In summary, the speech processing result from the server is a message that *triggers and dictates* the next audio output, thus disclosing “sound . . . digital audio content in response to the received first message.” (EX1101, ¶¶15-17.)

Patent Owner takes contradictory positions on Lim. On one hand, Patent Owner accuses the Petition of “filling [the] gap by inference,” alleging that Lim does not identify *what data* is transmitted by the server. (Response, 14.) Yet, in

² All emphases are added unless otherwise noted.

the very next paragraph, Patent Owner concedes that Lim’s “server . . . returns ***recognition data***” to the first device. (*Id.*, 15.)

Neither can Patent Owner nor Dr. Shamos offer any plausible alternative account of what Lim’s server could return after processing user speech. Dr. Houh’s opinion—that a POSITA would understand Lim’s ***speech-processing*** server to return ***speech processing*** result(s)—is supported by background references confirming that this was a conventional operation. (EX1002, ¶120; EX1101, ¶¶18-19.) Obviousness turns not only on what a reference expressly “talks about,” “mention[s],” or “write[s],” but on what a POSITA would understand it to teach. *Syntex (U.S.A.) LLC v. Apotex, Inc.*, 407 F.3d 1371, 1380 (Fed. Cir. 2005). The Federal Circuit likewise permits consideration of a skilled artisan’s general knowledge together with a printed publication in an IPR proceeding. *See Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337–39 (Fed. Cir. 2020). Indeed, Dr. Shamos testified that, by 2012, it was “known for client devices to send audio to servers” and “for servers to return data to client devices.” (EX1102, 31:17-32:2.) Thus, a POSITA would understand that Lim’s server returns speech processing result(s).

Patent Owner contends that Lim’s speech processing result (server message) cannot be the first message simply because the next prompt is allegedly determined by its “***preprogrammed app logic***, not by any server message.” (Response, 15.)

But these are not mutually exclusive. (EX1101, ¶20.) Even if the first device has preprogrammed app logic (not conceded), it does not mean that the prompt is therefore independent of the server-provided speech processing result. Without the speech processing result (first message) from the server, the local device has nothing that triggers it to provide the next prompt. (*Id.*)

Indeed, the '721 patent summarizes its invention as “system and method in a building or vehicle for an actuator operation *in response to a sensor according to a control logic*. . . .” (EX1001, Abstract.) Thus, by the patent’s own description, “logic” does not preclude the actuator operation to be “in response to” received information. (EX1101, ¶21.) Patent Owner insists that the message must be the “cause of the sounding.” (Response, 15.) That is precisely what Lim discloses. The speech processing result (first message) *is* the cause of the sounding. (*See* EX1002, ¶¶120-124, 133-134.)

Nor does Lim require that any speech synthesis occur locally. (Response, 16.) Lim discloses that the output may be a synthesized spoken message, but does not specify that synthesis must occur at the local device. (*See, e.g.*, EX1005, [0027]; EX1101, ¶22.) And even if synthesis occurs locally, the synthesized output is still generated in response to—and dictated by—the speech-processing result received from the server.

C. Patent Owner’s “Second Message” Attacks Fail Under the Proper Interpretation of “Message”

Regarding Lim’s “[a]ppliance command” workflow (*e.g.*, EX1005, FIG. 6, [0035]), Patent Owner characterizes that the server acts as an “off-screen *speech-recognition* engine and as the database from which *codesets* may be downloaded.” (Response, 18.) This confirms the Petition’s mapping: either the speech processing result or the codeset from the server discloses the “second message” because the local device transmits a control signal in response to receiving them from the server. (Pet., 44-46.)

1. Lim’s Speech Processing Result in the “Appliance Command” Workflow Discloses “Second Message”

Regarding the “second message,” Patent Owner again labels Lim’s speech processing result in Lim’s “[a]ppliance command” workflow as local, “intermediate processing” insufficient to qualify as the “second message.” (Response, 17.) Lim’s FIG. 6 shows that once the speech processing result of the user command is received from the server, the local device is triggered to, for example, load the necessary codesets (block 610) for transmission (step 614) to the controlled device. (Pet., 31, quoting EX1005, [0036].) The speech processing result is the cause and trigger of the transmission. (EX1101, ¶¶23-24.)

2. Lim's Downloaded Codeset Also Discloses "Second Message"

In Lim's "[a]ppliance command" workflow (*e.g.*, FIG. 6), based on the speech processing result, the local client device proceeds to "load" the appropriate command codeset at step 610, which can involve "downloading the data itself." (Response, 16-17; EX1005, [0035]-[0036].) Patent Owner does not dispute that this command codeset is a "message" downloaded from the "server" or that Lim's control message is sent "in response to" the codeset. (Response, 17; Pet., 32-33, 45-46; EX1005, [0024], [0036].) In other words, Patent Owner *effectively concedes that the command codeset discloses all elements* of "send[ing] . . . a control message . . . in response to the received second message." (EX1101, ¶¶25-26.)

Patent Owner instead argues that the command codeset is not *generated* by the server. (Response, 17.) But "generate" is not in the claim, and Patent Owner does not explain where the "generate" requirement comes from. The claim merely recites "*receive, from the server device . . . first and second messages*, in response to the sending of the respectively captured first and second human voice data." (EX1001, Claim 1; EX1101, ¶¶27-28.) Patent Owner thus invents another requirement.

Patent Owner also notes FIG. 6 “does not itself disclose any server generating or sending messages.” (Response, 18.) Lim discloses the server’s speech processing and returned results with reference to FIG. 6 and throughout the specification. (*E.g.*, EX1005, [0027]-[0030], [0035]-[0036].) A POSITA would read those disclosures together. (EX1101, ¶29.)

D. The Petition’s Background References Evidence a POSITA’s Understanding of Lim; They Do Not Transform Ground 1 into a Multi-Reference Combination

Patent Owner’s remaining argument—that Ground 1 became an improper “multi-reference obviousness” ground because the Petition cited background evidence—is equally mistaken. (Response, 18-21.)

Ground 1 maps all the limitations to Lim itself. The Petition’s citations to Gruber, Chang, Tu, Chatterjee, and Doherty do not convert Ground 1 into an improper multi-reference ground. They document how a POSITA would have understood Lim’s server-client architecture to operate: that remote speech processing results return to the local device and that networked home appliances can communicate over WiFi. (EX1101, ¶¶30-31, 77-79, 98-101.)

The same is true of the Petition’s citations to background references (*e.g.*, Goldsmith, Sinclair, Roberts, Yadav) in the dependent claims for a POSITA’s knowledge of conventional implementations. (Response, 20-21; EX1101, ¶¶32, 77-79, 85-87, 95, 98-101.) For example, Lim discloses that the first/controlling

device communicates with the remote server 500 via WiFi. (Pet., 48-49, quoting EX1005, [0027], Figure 5b.) A POSITA reading Lim would understand that WiFi is based on the IEEE 802.11 standard group and that the 802.11b standards use ISM Band II frequencies. Goldsmith is cited to corroborate that background knowledge, not to supply a missing limitation or to create a new obviousness combination.

As another example, Lim itself discloses that the first device may include a display and an LED. (Pet., 46-47, quoting EX1005, [0019], [0023].) A POSITA reading Lim would understand that displays and LEDs are electric light sources recited in claims 26-27. (EX1101, ¶33.) Sinclair is cited merely to corroborate that background knowledge; it does not supply missing limitations.

Patent Owner and Dr. Shamos do not dispute that these teachings were well-known by the priority date and within a POSITA's general knowledge. (EX1102, 31:17-32:6; EX1101, ¶34.) They object simply because the teachings appear in other references. It is well established that a reference's teaching is not "limited to what a reference specifically 'talks about' or what is specifically 'mentioned' or 'written' in the reference." *Syntex*, 407 F.3d at 1380. Additional art may likewise document skilled-artisan knowledge without joining the obviousness combination. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1365 (Fed. Cir. 2015) ("art can legitimately serve to document the knowledge that skilled artisans

would bring to bear in reading the prior art” without being “one of the pieces of prior art defining a combination for obviousness.”) The 2025 Stewart Memorandum did not—and cannot—foreclose the use of prior art to “demonstrate the knowledge of a person having ordinary skill in the art.” (Memorandum, 1-2.)

Patent Owner identifies no deficiency in limitations 1[D][1], 1[D][2], or 1[D][4]. (Response, 19-20.) Lim supplies the “message” limitations. Grounds 2-8 do not rely on secondary references for them. (EX1101, ¶35.)

III. GROUNDS 9-16: WILLIAMS-LIM (CLAIMS 1-15, 17-29, 31, 33)

A. Williams’ “Services 218” Constitutes “Second Message”

Patent Owner attempts to import a “relay” requirement into the claims, asserting that “the second [message] causes the first device to relay a ‘control message.’” (Response, 22.) Under this false premise, Patent Owner takes a step further to equate the claimed “second message” with a “control message,” despite the claim’s express distinction between the two. (*Id.*, 23.)

The claim neither recites “relay” nor equates “second message” with “control message.” Instead, the claim recites “send . . . a control message . . . in response to the received second message.” The two claim terms are distinct and not interchangeable. The second message is a generic message that encompasses information, not a control message. (*Supra* §II.A) Thus, Dr. Shamos’ attempt to impose additional requirements to the second message—that it be device-

addressed, hardware/software actionable, and produce actuation without user involvement—fails. (EX2011, ¶38.)

Patent Owner concedes Williams’ services 218 include “information content” sent to the local device. (Response, 23 (“the system delivers [] information content”); *id.*, 23-24.) That is precisely the Petition’s mapping: “[a] POSITA would have understood that providing services 218 involves sending *information* related to the services 218.” (Pet., 86-87; EX1006, [0036], [0042]).) Thus, Williams’ “service 218” discloses the recited “second message.”

Patent Owner then faults “services 218” for not “trigger[ing] a relayed ‘control message’.” (Response, 23-24.) But where obviousness rests on a combination, it “cannot be overcome ‘by attacking references individually where the [ground] is based upon the teachings of a combination of references.’” *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1050 (Fed. Cir. 2019) (citation omitted). In the combination, *Lim* supplies the architecture where a server communication causes sending of a control message. *See infra* §III.D; Pet., 71-72.

B. Williams Independently Discloses the First Message and Responsive Sounding

Patent Owner does not challenge Williams’ first-message mapping. Williams’ server provides audio 222 for transmission to interface device 116 and

playback on speaker 206, thereby disclosing a received “message” and responsive sounding. (Pet., 88-89; EX1006, [0037], [0045], [0048]; EX1101, ¶39.)

C. Paragraph [0051] is Not Aspirational

Patent Owner’s mischaracterization of paragraph [0051] as “aspirational” is untenable in context. (Response, 23-25.) The paragraph is placed in the “Example Services” section that starts: “[t]he architecture *above* can be utilized to provide a wide variety of services and functionality, of which the *following are simple examples.*” (EX1006, [0043].) The placement of paragraph [0051], which discusses home-device *control*, within “Example Services,” is a clear disclosure of home-device *control* as a service. Patent Owner cannot credibly argue that paragraphs [0044]-[0050] are concrete examples of services while ignoring paragraph [0051] in the same section. (EX1101, ¶44.)

Furthermore, the paragraphs preceding [0051], aided by the architectural diagrams in FIGS. 1-3, provide detailed implementation of services such as audio-based control of networked “home automation and security devices.” (Pet., 69-71, 85-87; EX1006, FIGs. 1-3, [0021], [0036], [0051]; EX1101, ¶45.) Williams explains in detail processing of audio commands, resulting provision of services 218 to various controlled devices, and the architecture of network environments. (EX1006, [0011]-[0015], [0021]-[0022], [0036], [0042], [0051]-[0052], FIGs.1-3; EX1002, ¶¶321-324, 333-334, 384-386.)

Patent Owner nonetheless demands more: “whether the server generates³ any message,” “what form it would take,” and “how the first device would receive it.” (Response, 24.) But Claim 1 recites none of those implementation details, and prior art need not supply production-level engineering specifications for a conventional implementation. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (a prior-art reference need not “explain every detail”); *C.R. Bard, Inc. v. Medline Indus., Inc.*, No. 2020-1900, 2021 WL 3574043, at *6 (Fed. Cir. Aug. 13, 2021); *see also* EX1102, 19:13-18; M.P.E.P. §2121.01(II).

Finally, Patent Owner’s focus on paragraph [0051] improperly “attack[s] references individually[.]” *See supra* §III.A; *Bradium*, 923 F.3d at 1050.

D. Williams-Lim Renders Obvious Receiving of Second Message by the Client Device

Patent Owner misreads the Petition as conceding that Williams does not disclose a “second message.” (Response, 24.) The Petition says the opposite. Immediately before the sentence Patent Owner invokes, the Petition expressly maps Williams’ services 218—the server-provided information—to the claimed

³ Patent Owner improperly adds an unclaimed requirement that the second message be “generated [] by the server.” (Response, 17-18; EX2011, ¶50.) As discussed above, nothing in Claim 1 requires that. *See supra* § II.C.2.

“second message” received by the first device. (Pet., 91.) The ensuing discussion of Lim did not abandon that mapping; it explained how Lim additionally teaches the subsequent device-control operation performed after receipt of that message.

Patent Owner’s argument again attacks references individually rather than addressing the asserted combination. *See supra* § III.A; *Bradium*, 923 F.3d at 1050. Ground 9 is a **combination** of Williams and Lim. Williams supplies a second message, while Lim supplies an architecture where the second message is received by the local/first device to cause sending of a separate control message. (EX1101, ¶¶46-48.)

Nor can Patent Owner “reduce” Ground 9 to Lim alone. (Response, 25.) The relevant question is what Williams and Lim together teach, not whether Williams or Lim standing alone supplies every limitation in isolation. *See supra* § III.A.

E. The Combination⁴ Is Grounded in Concrete, Reference-Based Motivation

Patent Owner’s motivation-to-combine arguments misstate both the record and the obviousness inquiry. (Response, 26-28.) That Williams can communicate directly with home devices does not render Lim’s client-mediated architecture

⁴ Patent Owner mischaracterizes the rationale for the Williams-Lim combination as a “Relay Rationale.” Petitioner never mentions a “relay.”

pointless. (EX1101, ¶¶49-60.) The Petition and Dr. Houh identified concrete benefits of routing control through a centralized local first device: fewer server connections, simpler network and firewall management, reduced number of devices exposed directly to the Internet, and improved reliability, security, scalability, responsiveness, and troubleshooting. (Pet., 71-72; EX1002, ¶¶324–328.) Such an architecture is well-known and predates the '721 patent by decades. (*Id.*; EX1101, ¶54.)

Lim's architecture is advantageous because it uses the client device as a centralized control point that can "identify the appliance to be controlled and the command data to which it is responsive," then transmit the appropriate command using whatever control path the appliance supports. (EX1002, ¶324; EX1005, [0007], [0020]–[0021].) That design permits the client device to act as a protocol-conversion and device-control hub, supporting IR, RF, point-to-point, or networked protocols rather than requiring the server to communicate directly with every appliance via the Internet. (EX1002, ¶325; EX1005, [0017].) Such architecture broadens compatibility with heterogeneous legacy devices, permits more flexible deployment, and more reliable local control. (EX1101, ¶¶51-52, 55-56.)

Dr. Shamos overlooks that hub-and-spoke architectures were a well-established way to connect remote services with heterogeneous local devices, as

Lim itself illustrates. (EX1005, [0026]-[0033]; EX1101, ¶¶51-54.) Far from being “contrary to the engineering reality,” the proposed architecture reflects a conventional design expressly taught by the prior art. (*Id.*; EX2011, ¶60.)

Nor would the proposed combination require inventing a new communication path. Patent Owner’s assertion that the combination “dismantl[es] Williams’ existing server-to-device path” ignores that Williams’ architecture already includes an interface device 116 as a persistent in-home endpoint. (EX2011, ¶61.) Routing control through this existing device does not “dismantle” Williams; it leverages Williams’ existing infrastructure. (EX1101, ¶¶57-59.)

Petitioner’s showing bears no resemblance to *Innogenetics, N.V. v. Abbott Lab’ys*, 512 F.3d 1363, 1373 (Fed. Cir. 2008), in which an expert “merely listed a number of prior art references and then concludes with the stock phrase ‘[] it would have been obvious to perform the [claimed method]’.” Here, Dr. Houh explained precisely why a POSITA would leverage the client device as a hub to transmit control signals, grounded in both references’ disclosures and in concrete networking principles. (EX1101, ¶60.) And unlike *In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017), the Petition supplies a reasoned analysis, not a bare “common sense” assertion.

Patent Owner’s outside-the-ground objection likewise fails. The Petition properly cites background references to corroborate conventional implementations

and a POSITA's background knowledge; the asserted combination remains Williams and Lim. (EX1101, ¶61.) They are not substitute references supplying an otherwise missing element. The Board has consistently permitted such use. *See supra* §II.D; *Ariosa Diagnostics*, 805 F.3d at 1365.

Patent Owner argues Grounds 10–16 fail because they inherit Ground 9's alleged deficiency. Because Ground 9 does not fail, Grounds 10–16 likewise survive. (EX1101, ¶62.)

IV. THE DEPENDENT CLAIMS ARE UNPATENTABLE

A. Claim 2: Wittenberg Identifies a Specific Person's Voice

Patent Owner argues Wittenberg's authorized-user determination does not “identify which specific person is speaking.”⁵ (Response, 29-30.) But there is no technical difference here. As explained in the Petition, Wittenberg discloses “comparing the characteristics . . . of the audio signal to stored voice information to determine whether the audio signal voice matches that of an authorized user.” (Pet., 52-53, 98; EX1008, 5:61-6:6; EX1002, ¶¶200, 447-448.) Dr. Shamos testified that it is “obvious” that Wittenberg's “stored voice information” comes from “hav[ing] people . . . give samples of their voice.” (EX1102, 46:22-47:4.) In

⁵ Claim 2 only requires “identifying the voice of a specific person,” not “use or output of any speaker's individual identity” as Patent Owner contends.

other words, Wittenberg compares the audio signal against voice information of a specific individual or individuals and, in identifying a match, identifies the voice of a specific person that supplied the reference voice information. Dr. Shamos agreed that this procedure was known by January 2012 and that claim 2's identifying of a specific person's voice is satisfied "[a]s long as the algorithm knows who the person is." (*Id.*, 32:7-10, 42:4-12.) And during prosecution of parent '710 patent, the Board found analogous voice-characteristics matching sufficient for Claim 2. (EX1004, 438-439, 934-942, 956.)

Patent Owner's so-called "authorization gate" theory also fails. (Response, 30.) Wittenberg does not disclose any such "gate," and security is not achieved by it. The Petition articulated rationales for combining Wittenberg with Lim and Williams-Lim, as Wittenberg's "*voice recognition processing* provides an additional degree of security" in voice-command systems such as Lim and Williams-Lim. (EX1008, 5:61-6:6; EX1002, ¶¶199-206; Response, 30; EX1101, ¶¶63-66.) Williams even discloses "[a]uthorization and authentication safeguards," and Wittenberg supplies the authorization technique that identifies a person. (EX1002, ¶¶450-452; Pet., 98; EX1006, [0008].)

B. Claim 3: The Combination Discloses All Elements

Patent Owner faults the Petition for not separately mapping claim 3's requirement that "the first message is further responsive to the sent sensor data."

(Response, 31.) But Lim (or Williams-Lim) already discloses *receiving the first message in response to the voice processing* (Pet., 28-34, 84-88), and Gruber discloses that voice processing is based on *sensor* data, thereby disclosing the limitation. (Pet., 54-56, 98-99; EX1002, ¶¶209-218, 455-462.) Specifically, Gruber uses sensor data in processing audio, for example, to “clarify the user’s intent” and to “interpret[] the received user input.” (EX1009, [0058], [0198]–[0199], [0218]–[0225], claims 42, 52.) Indeed, in the combination, Lim’s server supplements speech processing with sensor data and “transmit the speech processing result(s) (e.g., first message) back to the first device.” (EX1002, ¶216.) The combination thus involves the first message sent responsive to voice processing (claim 1) which in turn is based on sensor-data processing (claim 3). (EX1101, ¶¶67-69.)

C. Claim 4: The Sensor-Type Mapping Requires No Outside Reference

Gruber indisputably discloses a thermometer and light sensor. (Response, 32-33; Pet., 56-57; EX1009, [0222], [0225].) Claim 4 further recites conventional manners of operation for these components. Fraden, a background reference, properly corroborates Dr. Houh’s explanation that a POSITA would have understood that these components encompass these conventional operations. *See supra* §II.D.

Requiring express recitation of this commonplace knowledge would let patentees evade obviousness. *See C.R. Bard*, 2021 WL 3574043, at *6 (faulting Board for demanding “express guidance from individual references” without considering skilled-artisan knowledge). During prosecution of the ’710 parent (having the same claim language), the Board held—and Applicant did not dispute—that Beliles discloses claim 4, though Beliles merely discloses a sensor sensing “temperature.” (EX1004, 239-240, 371-372; EX1100, [0028], [0052]; EX1101, ¶¶70-72.)

D. Claims 7-8: Combination Involves Array’s Estimation Capacity

The Petition does not merely add “multiple microphones.” (Response, 34-36.) It relies upon Benesty’s directional microphone-array techniques, including localization. (Pet., 57-59; EX1002, ¶¶229-235, 487-492.) Benesty teaches beam scanning and time-delay-estimation for speech-source localization to “enhance the signal coming from one direction while suppressing noise and interference from other directions.” (Pet., 57-59; EX1002, ¶¶224-227; EX1010, 1021, 1044.) Those techniques supply Claim 8’s estimation functionality, including Direction-of-Arrival, which Patent Owner does not dispute.

The rationale is specific. Lim and Williams-Lim each describes voice capture at home—an environment of reverberation, ambient noise, and variable speaker positions, while Benesty improves speech capture and localization in

precisely such environments. (Pet., 57-59; EX1002, ¶¶231-233, 489-491; EX1101, ¶¶73-76.) This matches a specific design problem to a specific known solution—not a generic invitation to “consult[] the handbook.” (Response, 35.)

The ’710 parent prosecution history further corroborates the Petition’s rationale because the Board previously found use of directional microphone arrays, including Direction-of-Arrival functionality, to be a predictable improvement for detecting speech while attenuating sounds from other directions. (EX1004, 372-373.)

E. Claim 11: Device Addressing Reflects Basic, Inherent Networking Properties

Patent Owner does not dispute that MAC-layer addressing was conventional and within a POSITA’s general knowledge by the priority date. (Response, 33-34.) MAC-layer addresses (and their storage in device memories) were routine features of networked devices, and the Petition properly provided background references to support Dr. Houh’s opinion that a POSITA would have recognized Lim and Williams-Lim’s WiFi/WLAN interfaces to encompass these. (Pet., 47-48, 93-94; EX1002, ¶¶169, 423; EX1101, ¶¶77-79.)

Moreover, Patent Owner ignores express teachings of references in the Grounds. For Grounds 3 and 11, Gruber expressly discloses “MAC addresses” as “signatures of connected networks.” (Pet., 57; EX1009, [0218]-[0225].) Doherty

and Yadav merely corroborate the conventional MAC-48/EUI-48/EUI-64 implementations identified in the Petition. (Pet., 47-48, 93-94.)

During prosecution of the '710 parent, the Board found that making networked devices addressable and storing those addresses in device memory were obvious implementations of ordinary TCP/IP networking. (EX1004, 373-374.)

See supra §II.D.

F. Claims 13-15: Alternative Wireless Protocols Were Obvious to Try and Well Known

Claims 13-15 recite laundry lists of conventional wireless technologies, which Goldsmith discloses. (Pet., 62-64.) Patent Owner contends that Goldsmith discloses mere protocols, not the network architecture (*e.g.*, “via the WLAN”, “over the Internet”) in claim 1. (Response, 38-39.) But the network architecture is already addressed under claim 1. (Pet., 13-15, 24-28, 72-74, 80-84; EX1002, ¶¶78-85, 106-120, 328-341, 360-381.) Goldsmith shows how these network features could be implemented using well-known protocols. (Pet., 62-64, 102; EX1002, ¶¶266-284, 508-518.) Dr. Shamos confirmed those technologies such as IEEE 802.11, ISM-band networks, and cellular were known. (EX1102, 32:15-21; EX1040, 12-13, 22-23, 600-601.)

The Petition goes a step further beyond these disclosures and explains that a POSITA would understand that such implementations were technically feasible

and commonplace. (Pet., 62-64, 102.) These background references (*e.g.*, Wang) thus support rationales to combine, not supply missing elements. For example, the Petition's principal mapping rests on Lim's wireless smartphone together with Goldsmith's expressly disclosed cellular protocols. (*Id.*, 63-64.) Wang merely corroborates that cellular connectivity in consumer devices was well known by the priority date. Patent Owner also conspicuously ignores the Petition's express discussion of a finite number of predictable solutions, reasonable expectation of success, and known design incentives and market forces. (*Id.*, 62-64; EX1101, ¶¶80-81.)

G. Claims 18-20, 23: Chatterjee Supplies the Recited Appliance Types

Claims 18-20 and 23 do not specify how the appliance is integrated with the controlled device; they merely recite laundry lists of conventional appliances. (EX1001, claims 18-20, 23.) The Petition explained that Chatterjee discloses these appliances and even discusses their ability to be remotely controlled. (Pet., 65, 102, quoting EX1012, [0012]; EX1002, ¶¶290-292, 519-523.) The combination is straightforward: a POSITA would apply Lim and Williams-Lim's server-based voice control to appliances Chatterjee already teaches were remotely controllable. (Pet., 64-67, 102-103; EX1002, ¶¶285-305, 519-529.) The motivation to expand capabilities is supplied by the primary references themselves, each of which

teaches controlling a wide variety of home devices. (Pet., 65-66, 102; EX1006, [0051]; EX1005, [0017]; EX1101, ¶¶82-84.) The Petition need not explain how to “integrate” Chatterjee’s appliances into Lim or Williams-Lim. (Response, 40-41.) *See In re Mouttet*, 686 F.3d 1322, 1333 (Fed. Cir. 2012) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.”).

H. Claims 5-6, 26-28: Rosenberger Supplies the Recited Light-Source Actuator

Patent Owner’s argument attacks requirements these claims do not impose. (Response, 41-42.) Claims 5-6 require only a second actuator in the first device that affects a recited physical phenomenon, while claims 26-27 require an electric light source. None requires that actuator or light to operate in response to a server message. Rosenberger expressly supplies those features through its multi-colored LED status light, which indicates device states and modes. (Pet., 67-69, 100.)

Nor is the combination unexplained merely because Lim independently discloses LEDs. (Response, 41.) Grounds 8 and 12 provide alternative obviousness showings. Lim itself uses an illuminated LED for feedback during voice interaction, while Rosenberger teaches using a multi-colored LED to communicate device states and modes. (Pet., 67-69.) Applying that known status-

indicator functionality to Lim/Williams-Lim provides the identified, predictable usability benefit. (EX1101, ¶¶88-90.)

For Ground 12, Patent Owner again attacks the secondary reference in isolation. (Response, 41-42.) In the combination, Lim and Williams-Lim's server-side processing produces the first message, and Rosenberger's LED status indicator is provided for visual feedback on speech recognition states. (Pet., 67-69, 100; EX1002, ¶¶309-316, 472-476.) The motivation is supplied by the primary reference itself, teaching use of an LED for feedback during voice interaction. (Pet., 67-69, 100; EX1002, ¶¶309-316, 472-476.)

For claim 28, Patent Owner's argument misconstrues Rosenberger's role in the combination. Claim 28 depends from Claim 27, and Rosenberger is relied on to supply Claim 27's electric-light-source limitation—not Claim 28's added sounding limitation. (Pet., 67-69, 99-101.) Claim 28's additional requirement is supplied by Lim's "synthesized spoken message" in Ground 8 and Williams' synthesized audio 222 in Ground 12. Thus, Patent Owner's observation that Rosenberger is not cited for the sounding identifies no deficiency in the asserted combinations.

I. Claims 9, 29, 33: Rossing Supplies Conventional Implementations and Expressly Teaches Claim 33's Omnidirectional Alternative

For claim 9, Rossing confirms the recited microphone mechanisms were conventional. (Pet., 59-61; EX1014, 757-759.) The claim itself specifies no particular design; it strings together a laundry list of conventional microphone features joined by “or”. (EX1001, Claim 9.) As the Petition explained, the ’721 patent “recites laundry lists of interchangeable components” (Pet., 2), and textbooks such as Rossing describe precisely those conventional components and serve as the very sources a POSITA would review to implement Lim and Williams-Lim’s microphones. (Pet., 59-61, 101-102; EX1002, ¶¶165-166, 237-253, 494-498.) A POSITA would thus routinely select among Rossing’s conventional microphone types. (EX1101, ¶¶91-93.) The Petition does not merely invite a POSITA to “consult[] a reference book.” (Response, 36.)

For claim 29, the same point applies. The ’721 patent states that “[a] loudspeaker (a.k.a. speaker) is a sounder.” (EX1001, 105:61-106:4.) Rossing confirms, and Patent Owner does not dispute, that magnetic, piezoelectric, and electrostatic loudspeaker configurations were well-known and conventional loudspeaker implementations by 2012. (Pet., 61; EX1014, 763.) Since Lim and Williams-Lim already deploy speakers, selecting an established configuration is a routine implementation. Like claim 9, claim 29 is a laundry list of conventional

components and textbooks such as Rossing describe precisely those conventional components and are sources a POSITA would consult to implement Lim or Williams-Lim. (Pet., 2, 59, 61, 101-102; EX1002, ¶¶19-22, 237-244, 254-257, 499-503; EX1101, ¶94.)

For claim 33, Patent Owner misreads the Petition. It does not apply claim 33 onto any loudspeaker; it instead relies on Rossing's express teaching that "[s]ound radiates from a loudspeaker in all directions" and is "almost unavoidably omni-directional at low frequencies." (Pet., 59-62; EX1002, ¶¶242, 258-259 (quoting EX1014, 765).) That directly supports claim 33's disjunctive omnidirectional alternative for Lim and Williams-Lim's speaker.

Nor does this render claim 33 "meaningless." (Response, 37.) The limitation merely recites a conventional characteristic broadly exhibited by prior-art devices. Rossing expressly explains that directionality varies with frequency and that speakers are "almost unavoidably omni-directional at low frequencies." (EX1014, 765.) Claim 33 requires only an "omnidirectional, unidirectional, or bidirectional" pattern; it does not require a specially engineered or frequency-invariant pattern. (EX1101, ¶¶96-97.) Dr. Shamos offers no technical explanation why Rossing's express omnidirectional teaching fails that language.

V. CONCLUSION

For the foregoing reasons, and those in its Petition, Petitioner respectfully requests cancellation of claims 1-15, 17-31, 33 of the '721 patent.

Dated: October 9, 2026

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Certification of Word Count (37 C.F.R. § 42.24)

I hereby certify that this PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE has 5,551 words (as counted by the “Word Count” feature of the Microsoft Word™ word-processing system), exclusive of “a table of contents, a table of authorities, a listing of facts which are admitted, denied, or cannot be admitted or denied, a certificate of service or word count, or appendix of exhibits.”

Dated: October 9, 2026

By /s/ Alex S. Yap
Alex S. Yap

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Patent No. 12,401,721

Certificate of Service (37 C.F.R. § 42.6(e)(4))

I hereby certify that the attached PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE was served on the below date on the Patent Owner via e-mail (by consent) to the following counsel of record for the Patent Owner:

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