

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LENNOX INDUSTRIES INC.,
Petitioner,

v.

ROSEN TECHNOLOGIES LLC,
Patent Owner.

IPR2023-00715
Patent 6,619,555 B2

Before MEREDITH C. PETRAVICK, JAMES P. CALVE, and
JASON W. MELVIN, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

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

I. BACKGROUND

Lennox Industries Inc. (“Petitioner”) filed a petition seeking an *inter partes* review of claims 18 and 20 (the “challenged claims”) of U.S. Patent No. 6,619,555 (“the ’555 patent”) (Ex. 1001). Paper 2 (“Pet.”), 1, 5. Rosen Technologies LLC (“Patent Owner”) timely filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Petitioner filed an authorized Reply. Paper 7 (“Reply”); *see* Ex. 1052 (authorizing Petitioner to file a Reply). Patent Owner filed an authorized Sur-Reply. Paper 8 (“Sur-Reply”); *see* Ex. 1052. Petitioner filed an authorized Sur-Sur-Reply. Paper 9 (“Sur-Sur-Reply”).

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2022) (“The Board institutes the trial on behalf of the Director.”). An *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Upon consideration of the evidence and arguments in the record, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. We therefore grant institution of an *inter partes* review.

A. Related Proceedings

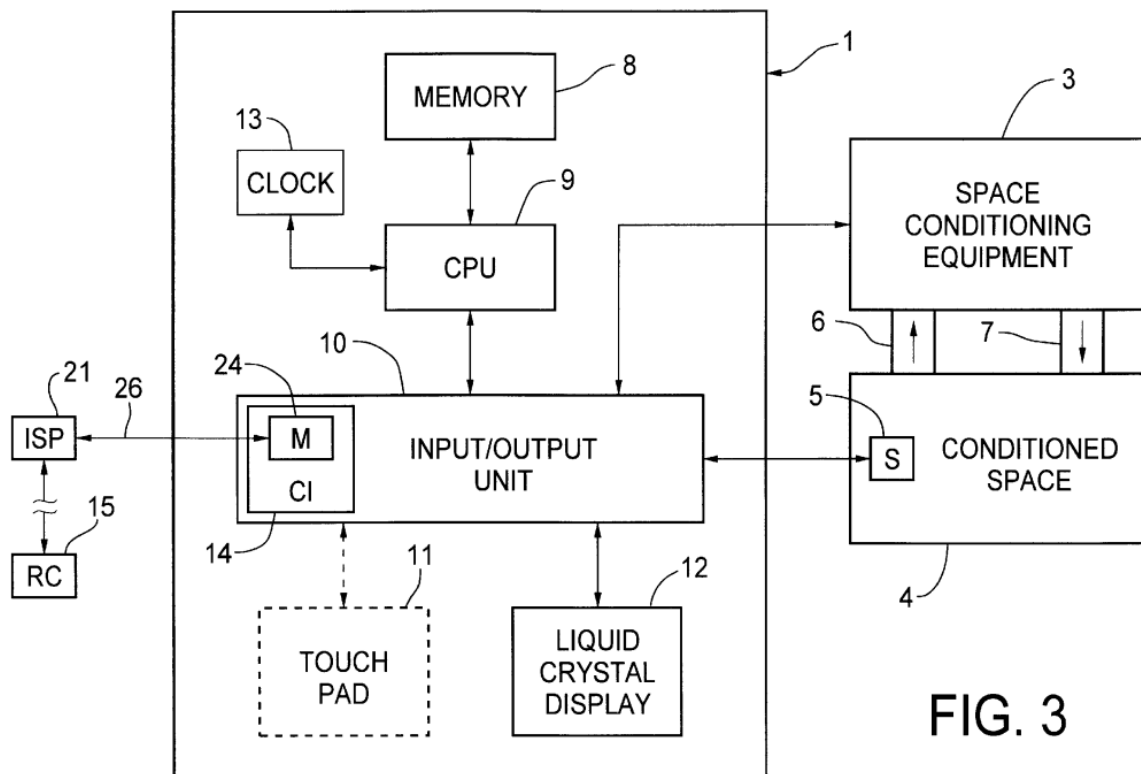
The parties identify the following proceedings involving the ’555 patent: *Rosen Techs. LLC v. Lennox Indus. Inc.*, No. 3:22-cv-00732 (N.D. Tex.) (“the Texas proceeding”); *Rosen Techs. LLC v. Resideo Techs., Inc.*, No. 6:22-cv-00131 (W.D. Tex.); and *Verdant Envtl. Techs. v. Ecobee Inc.*, No. 1:10-cv-02771 (N.D. Ill.). Pet. 2; Paper 3, 1.

B. Real Parties in Interest

Petitioner identifies Lennox Industries Inc., Lennox International Inc., Heatcraft Inc., Heatcraft Technologies Inc., and Lennox Procurement Company Inc. as the real parties in interest. Pet. 1. Patent Owner identifies Rosen Technologies LLC as the real party in interest. Paper 3, 1.

C. The '555 Patent (Ex. 1001)

The '555 patent describes a thermostat with a communication interface (CI) 14 that establishes communication with a remote correspondent (RC) 15. Ex. 1001, 1:9–11. Figure 3 is reproduced below to illustrate the arrangement.



CPU 9 communicates with settable real time clock 13 and memory 8, which stores data and program information via I/O unit 10. Communications interface (CI) 14 coordinates communications between CPU 9 and RC 15 via serial link 16 to obtain current information such as weather. Ex. 1001, 3:12–29, 4:4–15, 6:1–18. CI 14 also may communicate with RC 15 via external modem 20, data link 26, and Internet Service Provider (ISP) 21 (Figure 2) or via integrated modem 24, data link 26 and ISP 21 (Figure 3). *Id.* at 6:1–18.

Processor 1 includes a liquid crystal display (LCD) 12 and a real time clock 13 that keeps time so temperature set points (desired temperatures) can be set for different periods of the day cycle. Ex. 1001, 3:13–25.

Users may store key terms in memory 8 for local weather including temperature, relative humidity, high, and low using touchpad 11 and LCD 12. Ex. 1001, 3:61–4:3. At predetermined times or on demand, CPU 9 issues signals to I/O unit 10 to cause communications interface 14 to establish communications with remote correspondent 15 via link 16 to obtain local weather information using the Internet and ISP 21. *Id.* at 4:4–14. When the current local weather information is received from remote correspondent 15 via link 16 at communications interface 14 and modem 24, CPU 9 parses the information against the key terms stored in memory 8 to identify a match. *Id.* at 4:16–21. If CPU 9 senses a match, the information is searched for values. If a value is found, CPU 9 displays a first alphanumeric message for the matched key term and a second alphanumeric message for the key term on LCD 12. *Id.* at 4:23–31. If the information includes a “temperature” term and particular value (e.g., “+18° C”), CPU 9 displays message parts for the term and value as “Current Montreal Temperature: 18° C”. *Id.* at 4:40–59.

D. Challenged Claims

Of the challenged claims, claim 18 is independent, and claim 20 depends from claim 18.

We reproduce claim 18 below.

18. A thermostat system for controlling space conditioning equipment comprising:

- A) a temperature sensor for providing an electrical signal indicative of the temperature of a conditioned space in which the temperature sensor is situated;
- B) a liquid crystal display for selectively displaying an alphanumeric message;
- C) a processor, said processor including:
 - 1) a central processing unit;
 - 2) a real time clock;
 - 3) a memory coupled to said central processing unit for storing program and data information; and
 - 4) an input/output unit including:
 - a) a sensor input coupled to said temperature sensor for receiving said electrical signal therefrom;
 - b) a control output coupled to the space conditioning equipment for issuing control signals thereto; and
 - c) a communications interface adapted to establish bi-directional communications between said processor and a first remote correspondent which is a source of current information; and
- D) means coupling said communications interface and said first remote correspondent; and
a program stored in said memory for displaying messages received from said first remote correspondent, which received messages do not pertain to the operation of said thermostat system, on said liquid crystal display.

Ex. 1001, 8:41–9:3.

E. Asserted Grounds of Unpatentability

Ground	Challenged Claims	35 U.S.C. §	References
1	18, 20	103(a) ¹	Shamoon, ² Rainer ³
2	18, 20	103(a)	Inoue, ⁴ Peters, ⁵ weather.com ⁶
3	18, 20	103(a)	Glorioso, ⁷ Shah ⁸

Pet. 5. Petitioner also relies on the Declaration of Dr. R. Jacob Baker.

Ex. 1002.

II. DISCUSSION

A. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art would have had a bachelor of science degree in Electrical Engineering or a year or two of experience working with or designing processor-based systems with network connectivity, and a person with less or different education but more relevant practical experience may meet this standard. Pet. 6–7 (citing Ex. 1002 ¶ 49).

¹ The Leahy-Smith America Invents Act (“AIA”) revised 35 U.S.C. § 103 effective on March 16, 2013. Because the ’555 patent has an effective filing date before March 16, 2013, we use the pre-AIA version of 35 U.S.C. § 103.

² US 2003/0034898 A1, published Feb. 20, 2003 (Ex. 1004, “Shamoon”).

³ US 7,398,821 B2, issued July 15, 2008 (Ex. 1005, “Rainer”).

⁴ EP 1,085,399 B1, published Dec. 15, 2004 (Ex. 1006, “Inoue”).

⁵ US 6,470,289 B1, issued Oct. 22, 2002 (Ex. 1007, “Peters”).

⁶ Archived 1999 source code for weather.com, available at <https://web.archive.org/web/19991128144159/http://www2.weather.com/> (Ex. 1008, “weather.com”).

⁷ US 5,926,776, issued July 20, 1999 (Ex. 1009, “Glorioso”).

⁸ US 6,621,507 B1, issued Sept. 16, 2003 (Ex. 1010, “Shah”).

Patent Owner asserts that a person of ordinary skill in the art would have a bachelor's degree in engineering, computer science, or a comparable field with at least 2 years' experience in temperature controls, embedded control systems, electronic thermostats, or HVAC controls, or similarly relevant industry experience, with relevant experience substituting for education and vice versa. Prelim. Resp. 5. We perceive no significance to how any difference between the two definitions might affect our analysis. To the extent either party believes its proposed level of skill affects part of the unpatentability analysis, it should explain how during the instituted trial.

B. Claim Interpretation

We interpret claims “using the same claim construction standard that would be used to construe the claims in a civil action [held] under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). This standard includes construing a claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.* We only need to construe the claims to the extent necessary to resolve the parties' disputes. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019).

1. “means coupling said communications interface and said first remote correspondent”

The parties agree that this limitation is covered by 35 U.S.C. § 112, ¶ 6 to perform the function of “coupling the communications interface and the remote correspondent” with structure of “a serial link and/or data link and any equivalents.” *See* Pet. 7–8; Prelim. Resp. 5; Ex. 1016, 2–5 (Joint Claim Construction). The District Court in the Texas proceeding interpreted this term under Section 112, ¶ 6 with additional structures. Ex. 1056, 11–13, 107.

The '555 patent describes several structures by which communications interface 14 communicates with remote correspondent (RC) 15. In one embodiment, communications interface 14 communicates with RC 15 via serial link 16. Ex. 1001, 4:4–10, Fig. 1. Communications interface 14 may couple to RC 15 via serial link 16, external modem 20, and Internet Service Provider (ISP) 21. *Id.* at 6:1–11, Fig. 2. Communications interface 14 also couples to RC 15 via integrated modem 24, data link 26, and ISP 21. *Id.* at 6:12–18, Fig. 3. Thus, the structure to perform this function is (1) a serial link, a modem external to the thermostat system, and a communications link provided by an ISP or (2) a modem integrated into the communications interface, a data link, and a communications link provided by an ISP and equivalents thereof. *See* Ex. 1056 (Claim Construction Order), 13, 107.

2. *“a program stored in said memory for displaying messages received from said remote correspondent”*

The parties assert each other's proposed construction from the Texas proceeding. *See* Ex. 1016, 26–31. Patent Owner asserts that this limitation should be interpreted under 35 U.S.C. § 112, ¶ 6, for “displaying messages received from said remote correspondent” by the algorithm in Figure 5 and column 4, lines 40–59 and column 4, lines 16–31 and equivalents. Prelim. Resp. 6. Petitioner asserts the plain and ordinary meaning applies. Pet. 8.

In the Texas proceeding, the limitation was construed under § 112, ¶ 6, as “displaying messages received from said remote correspondent” by the structure in Figure 7, column 5, lines 41–56, that establishes communication at predetermined times with a RC, reads current information from the RC, and displays the current information. Ex. 1056, 27–30, 108. We note that, based on the server-client relationship, processor 1 or RC 15 may start a transfer at predetermined times or on demand. Ex. 1001, 5:60–64.

We disagree that Figure 5 provides structure for “displaying messages received from said first remote correspondent” because Figure 5’s flowchart does not display messages received from a RC. Figure 5’s flowchart *parses key terms in information* read from a RC, searches for values associated with a matched key term, and displays a message with components representative of the key terms and values found in the information. Ex. 1001, 4:4–65. The displayed messages concatenate *prestored message components* for matched key terms and associated values. *Id.* at 4:40–65, Fig. 6. Thus, as an example, the message “Current Montreal Temperature: +18C” concatenates a *first prestored component* “CURRENT MONTREAL TEMPERATURE” that is associated with a parsed term “temperature” received from a site providing local Montreal weather with a second message component “18 C” based on a value “18° C.” Ex. 1001, 4:40–65. This displayed message was not received from RC 15. Similarly, parsing stock quotation information to match a term “FMAGX” and an associated value of “102.75” causes display of a message “CURRENT QUOTE FOR MAGELLAN: 102.75” where the value 102.75 is concatenated with a component “CURRENT QUOTE FOR MAGELLAN.” *Id.* at 5:2–13; *see* Prelim. Resp. 6–7 (asserting if key terms and values are found when the received information is *parsed*, an alphanumeric message is generated for display by *reading the prestored first message component* that is a connotation of the matched key term from memory and *concatenating it with a second message component* for the value); Pet. Reply, 6–7.

The claimed program thus displays information received from a remote correspondent by push or by pull. *See* Ex. 1001, 5:60–64.

3. *Other terms*

Based on the current record, we determine that it is not necessary to construe any other terms to reach our decision. To the extent either party believes a particular claim term's scope affects our unpatentability determination, during the trial, it should explain the correct construction and how that construction affects the analysis.

C. *Principles of Law*

A patent claim is unpatentable under 35 U.S.C. § 103 if 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. 35 U.S.C. § 103; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416. Similarly, “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *Id.* at 417.

The question of obviousness is resolved based on 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. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

D. *Ground 1: Alleged Obviousness Over Shamoon and Rainer*

Petitioner asserts that claims 18 and 20 are unpatentable under 35 U.S.C. § 103(a) over Shamoon and Rainer. Pet. 5, 16–38.

1. *Shamoon (Ex. 1004)*

Shamoon discloses a remote control apparatus for a thermostat as illustrated in Figure 6, which is reproduced below.

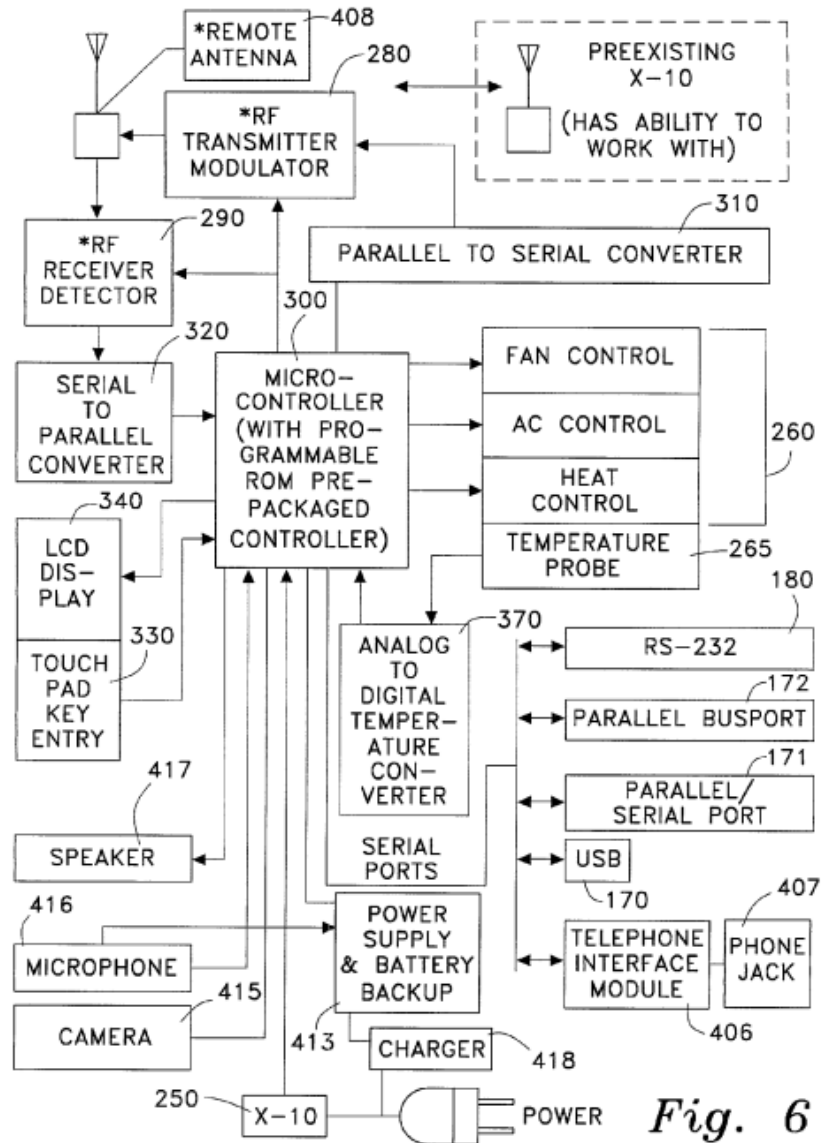


Figure 6 depicts controller with microcontroller 300, temperature probe 265 that sends signals to microcontroller 300 with memory, LCD display 340 to display date, time, and current temperature, a built-in clock, and bus to connect microcontroller 300 to the Internet, USB port 170, and RS-232 port 180. Ex. 1004 ¶¶ 19, 48, 59–62, 71, 73, 74, 83, Fig. 2.

Shamoon's wall thermostat controller and handheld remote controller use the same operating system and similar hardware that performs the same. Ex. 1004 ¶ 40. The thermostat and remote control have display screen 120 to display icons for each function and programming and messaging. Ex. 1004 ¶¶ 48, 59, Fig. 2. Shamoon's thermostat and controller include touchpad 330 and LCD display 340 for interface 15. *Id.* ¶ 61, Figs. 5, 6. "Thermostat setting and time and date are continually displayed on the screen, unless disabled. *Id.* ¶ 48, Fig. 2. The thermostat includes a built-in clock. *Id.* ¶ 74.

Shamoon's remote control apparatus can connect via bus 530 to the Internet and server 500. Ex. 1004 ¶ 83, Fig. 7. Shamoon's thermostat and remote control apparatus 10 provide the status of controlled and monitored devices and the temperature, time, on/off activation switches for the HVAC, and control and monitoring functions that monitor and control the air flow and individual spaces and humidity. *Id.* ¶¶ 25, 39, 40, 42, 59, 65, 66, 75. Shamoon's thermostat and remote control apparatus 10 monitor user health, home security, air and drinking water quality with messaging. *Id.* ¶¶ 77–82.

2. *Rainer (Ex. 1005)*

Rainer's thermostat connects to the Internet to obtain information for control and display. Ex. 1005, 4:31–34, 5:28–41. It has an LCD screen and user interface to display text-based onscreen instructions of control settings and system operation. *Id.* at 4:26–30, 5:47–52, 6:10–30. It connects to control module 3, which connects to the Internet via communications link 32 to obtain current weather, utility prices, and energy costs associated with various temperature settings. *Id.* at 4:31–57, 4:42–47, 5:28–41, Fig. 1. An outdoor temperature sensor 5 connects to control module 3 by control wires 4. *Id.* at 4:52–53.

3. *Motivation to combine*

Petitioner contends that a skilled artisan would have been motivated to combine Shamoon's "web based thermostat" with that of Rainer to improve Shamoon's thermostat with additional features of Rainer such as obtaining current utility pricing and weather information. Pet. 16–17 (citing Ex. 1002 ¶¶ 91–95). Petitioner asserts that it was known that the Internet provides a diverse source of current information that is useful to a user and that can be displayed on a thermostat once the thermostat is connected to the Internet so that once a thermostat is connected to the Internet, any type of information from the Internet can be displayed on the screen of the thermostat especially types of current information taught by Rainer. *Id.* at 17–18. Petitioner contends that a skilled artisan would have had a reasonable expectation of success because Shamoon has the hardware, software, and circuitry for the modification that would involve no substantial modification or undue experimentation to combine known prior art elements (communication links to the Internet) by known methods (coupling) to yield predictable results (connecting the thermostat to the Internet to obtain current information).

Dr. Baker testifies that Shamoon's web-based thermostat connects to the Internet and displays alphanumeric messages on its LCD screen but does not obtain current information unrelated to operation of the thermostat but a skilled artisan would be motivated to improve Shamoon's thermostat by adding additional features from Rainer's Internet-connected thermostat to eliminate the need for obtaining such information using a PC as Shamoon desires to do. Ex. 1002 ¶¶ 91–93 (citing ex. 1004 ¶¶ 39, 40, 62, 83, 84, Figs. 6, 7; Ex. 1005, 3:28–32, 4:31–34, 5:28–31, 5:37–41, 6:14–19, 7:15–19, Figs. 1, 2).

4. *Independent Claim 18*

- a. *18[pre]: “A thermostat system for controlling space conditioning equipment comprising:”*

Petitioner asserts that Shamoon’s thermostat system controls space conditioning equipment. Pet. 20 (citing Ex. 1004 ¶¶ 25, 40, 57; Ex. 1002 ¶¶ 102–104). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- b. *18[a]: “a temperature sensor for providing an electrical signal indicative of the temperature of a conditioned space in which the temperature sensor is situated;”*

Petitioner asserts that Shamoon’s temperature probe 265 sends signals to analog to digital temperature converter 370, which signals microcontroller 300 indicative of a temperature of a conditioned space where probe 265 is situated. Pet. 20–22 (citing Ex. 1004 ¶ 71, Fig. 6; Ex. 1002 ¶¶ 105–108). Patent Owner asserts that the inventor admits such a sensor is not inventive. *Id.* at 22 (citing Ex. 1012, 289:14–24). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- c. *18[b]: “a liquid crystal display for selectively displaying an alphanumeric message;”*

Petitioner asserts that Shamoon’s LCD displays temperature and time selectively with programming and messaging. Pet. 22–24 (citing Ex. 1004 ¶¶ 40, 48, 61, 65, 66, 70, Figs. 2, 6; Ex. 1002 ¶¶ 109–115). Petitioner asserts that Rainer’s LCD explains control functions, settings, and system operation and displays utility prices and weather selectively. Pet. 24 (citing Ex. 1005, 4:26–34, 5:37–41, 5:47–52, Fig. 1; Ex. 1002 ¶ 113). Petitioner asserts that the ’555 patent admits thermostat systems display alphanumeric messages selectively on an LCD. Pet. 24 (citing Ex. 1001, 1:48–55; Ex. 1002 ¶ 114).

These contentions, which Patent Owner does not contest at this stage, are supported by record evidence. Data input into microcontroller 300 from touchpad 330 are displayed on Shamoon's LCD display 340 with time and temperature unless disabled. Ex. 1004 ¶¶ 43, 48, 61, Figs. 2, 6. Rainer's LCD screen displays instructions for control functions, settings, operation, utility prices, costs, and weather predictions. Ex. 1005, 4:26–34, 5:37–49.

*d. 18[c][1]: “a processor, said processor including:
1) a central processing unit;”*

Petitioner asserts that Shamoon's microcontroller 300 is a processor that includes a central processing unit. Pet. 25–26 (citing Ex. 1004 ¶ 40, Fig. 6; Ex. 1002 ¶¶ 116–119). Petitioner asserts that the inventor admits a CPU or microprocessor is not inventive. *Id.* at 26 (citing Ex. 1012, 101:14–20, 121:14–22, 287:22–24, 288:16–19). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

e. 18[c][2]: “(2) a real time clock;”

Petitioner asserts that Shamoon's processor has a real time clock as a built-in clock on the thermostat that a skilled artisan would have understood is a real-time clock that would have been used by Shamoon's processor to provide the current time and date on the thermostat's display. Pet. 26–28 (citing Ex. 1004 ¶¶ 19, 40, 48, 59, 69, 73–75, Fig. 2; Ex. 1002 ¶¶ 120–123). Petitioner asserts that, to the extent the built-in clock is not in the processor, it was common knowledge and obvious to place different system functions in the same or different chips, and a real-time clock is not inventive as the inventor admits. Pet. 28 (citing Ex. 1012, 101:1–13, 287:22–24, 288:8–11). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

f. 18[c][3]: “3) a memory coupled to said central processing unit for storing program and data information; and”

Petitioner contends that Shamoon’s microcontroller runs programs to control the thermostat, processes information and includes a memory coupled to the CPU so the CPU can execute software in memory because Shamoon’s memory includes programs that run on the thermostat. Petitioner asserts that Shamoon’s microcontroller processes data and includes RAM memory that would not be needed if no data was stored, e.g., for thermostat set points, as the ’555 patent acknowledges and as the inventor admits is not inventive. Pet. 28–29 (citing Ex. 1004, Abstract, ¶¶ 19, 54, 60, 65; Ex. 1002 ¶¶ 124–128; Ex. 1012, 287:22–288:7). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

*g. 18[c][4]/18[c][4][a]: “4) an input/output including:
a) a sensor input coupled to said temperature sensor for receiving said electrical signal therefrom;”*

Petitioner asserts that Shamoon-Rainer discloses an input/output unit that combines the structures of elements 18[c][4][a]–[c] for these elements, and it would have been obvious to include such components in a single chip if claim 18 requires such configuration. Petitioner also asserts that such a configuration would have been an obvious design choice as the inventor admits that skilled artisans understood different functions could be combined into a single chip or separate chips in a microprocessor system and that such input/output unit is not inventive as acknowledged by the ’555 patent itself that all the processor components are off the shelf items. Pet. 29–30 (citing Ex. 1004 ¶¶ 66, 130, 143; Ex. 1002 ¶¶ 129–143; Ex. 1001, 1:28–55, 3:54–60; Ex. 1012, 101:6–16, 287:22–24, 289:18–21, 290:8–11).

Petitioner asserts that Shamoon's microcontroller receives electrical signals from temperature sensor 265 through analog to digital converter 370 and circuitry within the microcontroller as "a sensor input coupled to said temperature sensor for receiving said electrical signal therefrom" as part of the input/output unit. Pet. 30–31 (citing Ex. 1004 ¶¶ 40, 71, Fig. 6; Ex. 1002 ¶ 133). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence. Shamoon uses internal software to provide an interface for control, communications, and software functions to process input/output (I/O) stimuli for controlling, monitoring, and processing signals from temperature probe 265 to microcontroller 300. Ex. 1004 ¶¶ 66, 71.

h. 18[c][4][b]: "b) a control output coupled to the space conditioning equipment for issuing control signals thereto; and"

Petitioner contends that the Shamoon's input/output unit has a control output coupled to space conditioning equipment to issue control signals such as "fan control," "AC Control," and "heat control" in Figure 6, and the fan, air conditioning, and heat controlled by Shamoon's system are examples of "space conditioning equipment." Petitioner asserts that microcontroller 300 sends a signal to the fan control, air conditioning control, and heat control of thermostat 260 and thus has "control output" circuitry for "issuing control signals" to "the space conditioning equipment." Petitioner contends that a skilled artisan would understand that circuitry in the microcontroller that generates these signals is "control output" and would understand or consider it obvious that "control output is coupled to the space conditioning equipment for providing control signals thereto." Pet. 31 (citing Ex. 1004 ¶ 71, Fig. 6; Ex. 1002 ¶¶ 135–136; Ex. 1012, 96:5–8). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- i. *18[c][4][c]: “c) a communications interface adapted to establish bi-directional communications between said processor and a first remote correspondent which is a source of current information; and”*

Petitioner contends that Shamoon’s “web-based thermostat” and microprocessor 300 connect to the Internet via bus 530, and microcontroller 300 is linked to USB port 170 and RS-232 port 180 to provide bidirectional communications over the Internet, which is known to provide bidirectional communications. Pet. 31–32 (citing Ex. 1004 ¶¶ 62, 83, Fig. 7; Ex. 1001, 3:29–30; Ex. 1002 ¶¶ 137–142).

Petitioner asserts that Rainer discloses a communications interface as link 32 connected to the processor to obtain current utility price information and weather information using the Internet communications link. Petitioner asserts that a skilled artisan would understand Rainer’s thermostat connects to a remote correspondent or two (web server) that is a source of current information (current utility price/weather information) using the disclosed communications interface in a bidirectional manner as recited in element 18[c][4][c]. Pet. 32–33 (citing Ex. 1005, 4:31–34, 5:28–31, 5:37–51, 6:14–19, 7:15–19, Fig. 1; Ex. 1002 ¶ 141; Ex. 1015, 685–686).

Petitioner asserts it would have been obvious to provide an interface with bidirectional communications to connect the thermostat to the Internet, as in the prior art, to obtain and display current information in a desired language, and to use bidirectional communications. Pet. 33 (citing Ex. 1002 ¶¶ 61, 62, 142; Ex. 1012, 290:19–291:14; Petition § VIII.A. contentions).

These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- j. *18[d]: “D) means coupling said communications interface and said first remote correspondent; and”*

Petitioner asserts that Shamoon discloses coupling a communications interface with a remote correspondent as microcontroller 300 connected to the Internet and interfacing with server 500 to exchange data via a serial link, data link, and equivalents of bus 52, USB ports 170, or RS-232 port 180.

Petitioner asserts that Rainer’s communications link 32 connects a thermostat to the Internet and data sources as a “data link.” Pet. 33–35 (citing Ex. 1004 ¶¶ 62, 83, 84, Figs. 6, 7; Ex. 1005, 5:28–34, 5:38–41, Fig. 1; Ex. 1002 ¶¶ 44–152). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence. The ’555 patent discloses a means for coupling communications interface 14 to send/receive serial data to/from the thermostat as modem 20, serial link 16, and an ISP 21 interface to RC 15 or integrated modem 24, data link 26, and ISP 21 to complete the link to RC 15 in a well-known manner. Ex. 1001, 4:4–16, 6:1–23, Figs. 2–4.

- k. *18[e]: “a program stored in said memory for displaying messages received from said first remote correspondent, which received messages do not pertain to the operations of said thermostat system, on said liquid crystal display.”*

Petitioner asserts that Shamoon’s thermostat memory stores programs that display information received from a web server on an LCD, and it would have been obvious to include a program in memory to display information that does not pertain to thermostat operations. Petitioner asserts that Rainer stores software in memory to display utility prices and weather information that do not pertain to thermostat operations. Pet. 35–38 (citing Ex. 1004 ¶¶ 39, 77–81, 83; Ex. 1005, 4:31–34, 5:28–41; Ex. 1002 ¶¶ 153–162; Ex. 1001, 4:10–15, 4:45–48, 6:19–45; Ex. 1003, 73).

l. Displaying messages that do not pertain to operation of the thermostat system

Patent Owner argues that Rainer is silent about the messages that are displayed on an LCD. Prelim. Resp. 15. Patent Owner asserts that a program of the '555 patent does not display every message but parses it against key terms stored in the memory to identify a match and searches for a “value” associated with the matched term to generate an alphanumeric message for display based on the key term and value. Prelim. Resp. 15–16.

Patent Owner does not dispute that Shamoon’s LCD displays time, temperature, and programming messages (Ex. 1004 ¶¶ 40, 48, 66, 70, 111, Fig. 2) and Rainer’s LCD displays text-based instructions, utility prices, and weather information (Ex. 1005, 4:31–34, 5:37–41). Pet. 23–24. Shamoon leaves messages regarding environmental air and drinking water that are not related to thermostat operation. Ex. 1004 ¶ 81. As modified, Shamoon may display other information unrelated to thermostat operation as Rainer teaches. *See In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.”).

Patent Owner’s arguments that the program parses information for key terms and values to display prestored messages are not consistent with our interpretation of element 18[e] in Section II.B.2. The function of “displaying messages received from said first remote correspondent” does not involve parsing or matching terms and values or displaying prerecorded messages. A skilled artisan would understand that the thermostats of Shamoon and Rainer store programs in memory to display information as Petitioner asserts. Pet. 36 (citing Ex. 1002 ¶¶ 155–159; Ex. 1005, 5:28–41); *see* Ex. 1004 ¶ 66.

On this record, we find that Petitioner has established a reasonable likelihood that claim 18 is unpatentable over Shamoon and Rainer.

5. *Claim 20*

Petitioner contends that Shamoon discloses a “web-based thermostat” connected to the Internet for communication. Pet. 38 (citing Ex. 1004 ¶ 83, Fig. 7). Petitioner contends that Rainer discloses a thermostat connected to the Internet. *Id.* (citing Ex. 1005, 5:28–31, Fig. 1). Petitioner asserts that its contentions for elements 18[d]–18[e] describe how Shamoon and Rainer disclose communications between a first remote correspondent (web server) and said communications interface are carried out via the Internet. *Id.*

Patent Owner argues that Shamoon and Rainer fail for claim 20 because they fail for claim 18. Prelim. Resp. 16. Petitioner has established a reasonable likelihood that claim 18 is unpatentable over Shamoon and Rainer, and we find that Petitioner has established a reasonable likelihood that claim 20 is unpatentable over Shamoon and Rainer.

E. Ground 2: Alleged Obviousness Over Inoue, Peters, and weather.com

Petitioner asserts that claims 18 and 20 are unpatentable under 35 U.S.C. § 103(a) over Inoue, Peters, and weather.com. Pet. 3, 38–62.

1. *Inoue (Ex. 1006)*

Inoue discloses a personal computer 10 with a central processing unit and LCD. Ex. 1006 ¶¶ 20. Temperature sensor 18 is embedded in CPU 17 to detect CPU temperature. Cooling fan 32 is controlled by fan controller 33 to generate an air stream that absorbs heat before leaving main enclosure 11. *Id.* ¶¶ 23, 29. Inoue includes modem 29 that connects CPU 17 to a network such as the Internet as shown in Figure 2 reproduced below. *Id.* ¶ 28, Fig. 2.

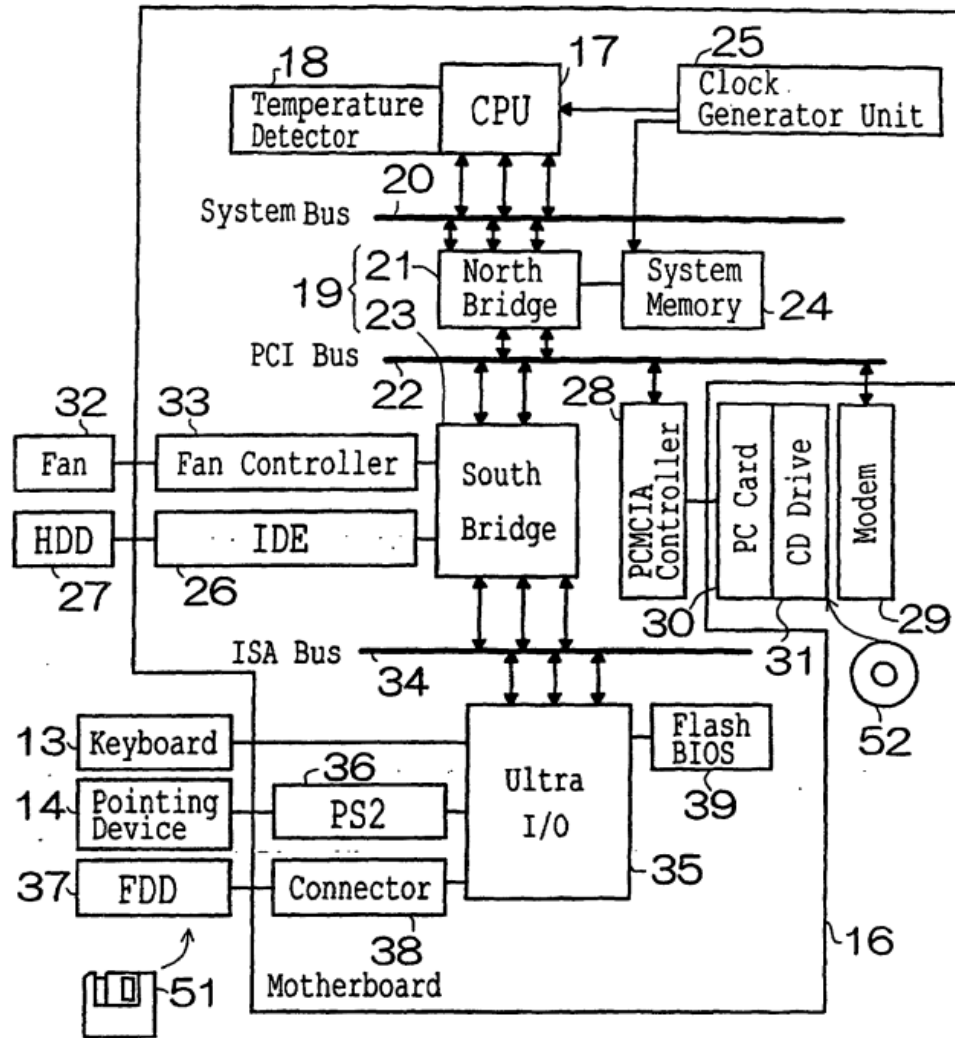


Fig. 2

Figure 2 is a block diagram of the circuit structure of printed circuit board and motherboard 16 incorporated into main enclosure 11 of Inoue's laptop computer 10. Ex. 1006 ¶ 22. Temperature detector 18 generates a temperature signal identifying the temperature of CPU 17, and fan controller 33 controls cooling fan 32 to remove heat from CPU 17 and blow it out of the main enclosure 11 of the computer 10. *Id.* ¶¶ 1, 2, 23, 29. System memory 24 connects to north bridge 21 to allow CPU 17 to fetch programs of the operating system and application software stored therein. *Id.* ¶ 25.

2. *Peters (Ex. 1007)*

Peters discloses a computer cooling system that uses a fan to blow warm air around hot components through a vent to outside of the computer. Ex. 1007, 1:16–18, 1:42–47. The CPU core adjusts the fan speed based on the detected current temperature. *Id.* at 4:23–30. Peters locates temperature sensor 114 at CPU core 104 and semiconductor die 105 and another thermal sensor 116 apart from CPU 102 to detect the temperature in external region 109 of the system that is not influenced by heat generated by CPU core 104. *Id.* at 5:19–6:11. Figure 1 is reproduced below to illustrate this arrangement.

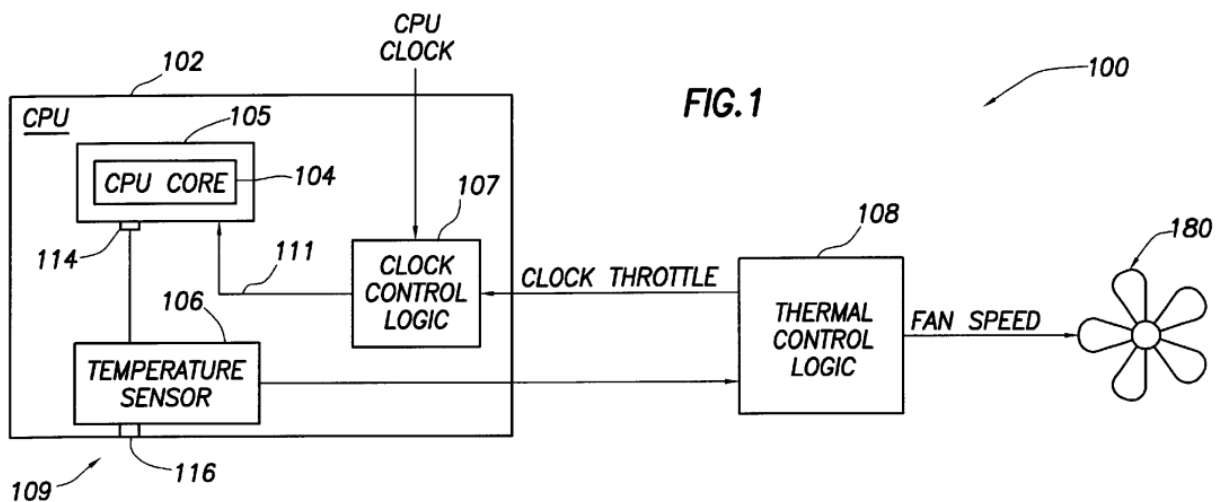


Figure 1 shows temperature sensor 106 arranged to detect temperatures of die 105 and exterior region 109 of CPU 102 by receiving signals from sensors 114, 116. Ex. 1007, 5:32–62. Thermal control logic 108 reads CPU temperatures from temperature sensor 106 and adjusts the speed of fan 180 and/or the CPU core clock frequency. *Id.* at 6:30–49.

3. *Weather.com (Ex. 1008)*

Weather.com is code for an Internet website that provides weather data to a user. Ex. 1008. It was obtained from the Internet Archive. *See* Ex. 1013 (Affidavit of Nathaniel E. Frank-White from the Internet Archive).

4. *Motivation to combine Inoue and Peters*

Petitioner contends that a skilled artisan would have been motivated to combine the teachings of Inoue and Peters, which are analogous art that solve similar programs of controlling the temperature of laptop computers. Pet. 39. Petitioner asserts that a skilled artisan would have been motivated to modify Inoue's laptop computer to include the second exterior temperature sensor of Peters to monitor the temperature of the computer outside the CPU because other components of the computer are in need of temperature control besides the main CPU that Inoue's temperature sensor already monitors for cooling. *Id.* at 39–40. Petitioner asserts that one benefit would be to minimize the laptop computer getting too hot in a consumer's lap. *Id.* at 40. Petitioner contends that a skilled artisan would have had a reasonable expectation of success in combining Inoue and Peters because their laptop cooling systems are complementary by using a combination of sensors, thermal control logic, and fans to monitor and control the temperature in a laptop computer. *Id.* at 39–41.

5. *Motivation to combine Inoue and Peters with weather.com*

Petitioner contends that a skilled artisan would have been motivated to combine Inoue and Peters with weather.com to obtain current information for the weather from a remote correspondent to display on the laptop computer display because users of internet-connected devices often desire to know the weather in their particular area. Pet. 42. Petitioner asserts that a skilled artisan would have had a reasonable expectation of success in combining the teachings of these references as a skilled artisan would understand that web browsers are a common way to access weather information that is widely accessed on the Internet. *Id.* at 43.

6. *Independent Claim 18*

Petitioner contends that each of elements 18[pre]–18[d] are disclosed by Inoue and Peters and also are common knowledge in the art as admitted by the '555 patent. Pet. 43–44 (citing Ex. 1001, 1:18–64, 4:31–60, 4:13–15, 6:1–10; Ex. 1002 ¶¶ 65–72, 165–167).

a. *18[pre]: “A computer system comprising:”*

Petitioner asserts that Inoue discloses a laptop computer thermostat system that controls the temperature inside the laptop by the CPU controlling a cooling fan, which is space conditioning equipment. Petitioner asserts that Peters discloses a thermostat system that controls a fan as space conditioning equipment to cool a computer system. Pet. 45–46 (citing Ex. 1006, Abstract ¶¶ 1, 2, 6–11, 15, 29, 38; Ex. 1007, Abstract, 2:65–3:8, 3:50–4:6, 5:20–31, 6:30–49, 7:5–10, 7:40–59, 13:24–48, 16:52–65, Fig. 1; Ex. 1002 ¶¶ 180–183). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

b. *18[a]: “a temperature sensor”*

Petitioner asserts that Inoue uses a temperature sensor to measure the temperature inside of an electronic apparatus and provides an electrical signal indicative of the temperature of a conditioned space. Pet. 46 (citing Ex. 1006 ¶¶ 13, 23, 39; Ex. 1002 ¶¶ 184–186). Petitioner asserts that Peters discloses a temperature sensor that provides an electrical signal indicative of temperature of a conditioned space where it is situated such as the CPU core and exterior region 109 of CPU 102 and Peters adjusts a fan's speed if the temperature is excessive. *Id.* at 46–47 (citing Ex. 1007, Abstract, 4:7–31, 5:32–52, 6:12–21, 7:40–59; Ex. 1002 ¶¶ 187, 188). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

c. 18[b]: “a liquid crystal display”

Petitioner contends that Inoue’s laptop displays results of application software execution on an LCD screen in lid 12, and Peters’ LCD display 125 displays text and images selectively by a graphics controller as alphanumeric messages. Petitioner also asserts that Inoue, Peters, and weather.com would display a screen to obtain a zip code and display the weather returned from a website. Pet. 47–49 (Ex. 1006 ¶¶ 20, 21, Fig. 1; Ex. 1007, 8:3–4, 8:39–65, Fig. 1; Ex. 1013, 5; Ex. 1002 ¶¶ 82–85, 189–193). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

d. 18[c][1]: “a processor, a central processing unit;”

Petitioner asserts that Inoue’s computer 10 uses a processor and CPU to execute application software (Pet. 49–50 (citing Ex. 1006 ¶¶ 20, 25, 27; Ex. 1002 ¶¶ 194–195), and Peters’ computer includes a microprocessor and CPU 102 (*id.* at 50–51 (citing Ex. 1007, Abstract, 1:25–26, 2:15–33, 2:53–54, 2:65–3:28, 3:53–55, 4:7–31, 5:8–13, 5:20–6:21, 7:25–39, 7:65–8:8, 8:18–23, 9:41–52, Figs. 1, 2; Ex. 1002 ¶ 196)). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

e. 18[c][2]: “a real time clock;”

Petitioner contends that it was known and obvious to include a real time clock in a portable computer of Inoue or Peters to time stamp saved files. Pet. 51–52 (citing EX1027, 16:4–30, 132:32–54; EX1028, 6:8–17; EX1031, 2:12–26, 3:24–30, Fig. 1; EX1032, 11:23–28, 12:41–61, Fig. 1; EX1033, 4:55–60, 5:1–6, 6:36–40, Fig. 1; EX1034, 2:32–34, Figs. 88, 94, 97–99; EX1043, 96; EX1012, 121:11–121:22, 287:22–24, 288:8–15; Ex. 1002 ¶ 197). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

f. 18[c][3]: “a memory”

Petitioner asserts that Inoue discloses a memory coupled to the CPU for storing programs and data as system memory 24 and flash memory 39, and Peters uses main memory 124 for CPU 102 and computer 100 to store applications and data. Pet. 52–54 (Ex. 1006 ¶¶ 25, 27, Fig. 2; Ex. 1007, 4:7–31, 13:49–61, 14:63–15:21, 18:27–31, 19:1–4; 8:24–38, Fig. 2; Ex. 1012, 288:5–11; Ex. 1002 ¶¶ 199–203). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

*g. 18[c][4]–18[c][4][a]: “an input/output unit”
including “a sensor input”*

Petitioner asserts that the input/output (I/O) unit includes structures identified for elements 18[c][4][a]–[c], Inoue has a sensor input coupled to a temperature sensor as south bridge 23 coupled to temperature detector 18 to receive temperature signals, and Peters uses temperature sensor 116 with thermal control logic to control a fan based on a monitored temperature and sensor input. Pet. 54–56 (citing Ex. 1006 ¶¶ 19, 23, Fig. 3; Ex. 1007, 5:52–6:11, 7:40–59; Ex. 1002 ¶¶ 204–220). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

h. 18[c][4][b]: “a control output”

Petitioner asserts that Inoue couples control output of south bridge 23 to fan controller 33 to control cooling fan 32, and Peters uses thermal control logic coupled to a CPU module and fan to cool a computer system. Pet. 56–57 (citing Ex. 1006 ¶¶ 29, 32, Figs. 2, 3; Ex. 1007, 2:53–64, 3:50–4:6, 5:20–31, 6:30–49, 7:5–10, 7:40–59, 13:24–48, 16:52–65, Fig. 1, Ab.; Ex. 1012, 287:22–24, 289:3–13; Ex. 1002 ¶¶ 210–214). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

i. 18[c][4][c]: “a communications interface”

Petitioner contends that Inoue uses modem 29 to connect CPU 17 to the Internet or other network and establish bidirectional communication between Inoue’s CPU and Internet server such as weather.com’s server as a remote correspondent via south bridge 23 and PCI bus 22 as an interface or via southbridge/northbridge with PCI bus 22, and modem 29 as the claimed communications interface. Pet. 57–59 (citing Ex. 1006 ¶¶ 24, 28, Fig. 2; Ex. 1043, 95; Ex. 1002 ¶¶ 82–85, 215–219). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

j. 18[d]: “means coupling said communication interface and said first remote correspondent;”

Petitioner contends that the Inoue-Peters-weather.com combination discloses the function of “coupling said communications interface with said remote correspondent” as Inoue’s modem that connects the communication interface of the south or north bridge to a weather.com server via the Internet as asserted for element 18[c][4][c]. Petitioner asserts that the combination discloses corresponding structure of a serial link and/or data link and any equivalents, and a skilled artisan would have understood there is a data link between the communications interface and web server comprising a modem connected to the Internet. Pet. 59 (citing Ex. 1015, 685–686; Ex. 1002 ¶¶ 222–225). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence. Inoue’s system connects a phone or communication line to modem 29 and PCI bus 22 to connect CPU 17 to a network such as the Internet. Ex. 1006 ¶ 28. The ’555 patent describes communications interface 14 sending data via serial link 16/data link 26, modem 20, 24, and ISP 21 to RC 15. Ex. 1001, 6:1–11, Figs. 2–4.

k. 18[e]: “a program stored in memory”

Petitioner asserts that the Inoue-Peters-weather.com combination stores a program in memory for displaying messages from the first remote correspondent on the LCD of Inoue-Peters as a web browser for accessing the Internet to display weather from a weather.com server. Petitioner asserts that “[w]hen a user accesses weather.com on a laptop computer, such as *Inoue-Peters*’ laptop computer, weather.com sends data packets (messages) containing weather information, and that weather information is displayed on the screen of the laptop,” and a skilled artisan would understand that Inoue would have included a web browser stored in memory to access the Internet and display information received from weather.com. Pet. 60–62 (citing Ex. 1006 ¶ 27; Ex. 1007, 8:39–58; Ex. 1008, 6, 9; Ex. 1012, 60:9–15, 61:12–19; Ex. 1013, 5; Ex. 1035, Abstract, 3:8–49, Figs. 1, 2; Ex. 1036, 4:4–5:5; Ex. 1037, 50; Ex. 1041, 82, 93; Ex. 1002 ¶¶ 82–85, 226–232).

l. Is a web browser a program stored in memory?

Patent Owner argues that a browser application accesses weather.com to fetch weather data on a computer’s screen, but the ’555 patent does not display every message on an LCD. Patent Owner argues (Prelim. Resp. 19):

The ’555 discloses a program stored in a memory to read the current information from the remote correspondent and parse it against key terms stored in the memory to determine if there is a match. If a match is found, the received information is searched for the presence of a “value” associated with the matched term. If the value is found, a[n] alphanumeric message is generated for display by reading the prestored first message component that represents a connotation of the matched key term from the memory and concatenating it with the second message component that represents the value associated with the matched key term.

As discussed above for Ground 1, Patent Owner's arguments are not commensurate with the scope of claim 18, which does not recite any of these functions. As the '555 patent makes clear, "[d]epending upon the server-client relationship, either the processor 1 or the remote correspondent 15 may institute the current information transfer at the predetermined times or on demand." Ex. 1001, 5:61–64. "At predetermined times (or on demand), data communications is established between the processor 1 and the remote correspondent 15, which, in this case, provides the customized service. The current information is downloaded and displayed." *Id.* at 5:47–51. In one embodiment, the communications interface 14 sends/receives serial data to/from an external (to the thermostat system) modem 20 via serial link 16 and the modem interfaces conventionally with Internet Service Provider (ISP) 21 to complete the communications link to the remote correspondent in well-known manner. *Id.* at 6:1–7, Fig. 2. Petitioner asserts that the Inoue-Peters device would obtain and display information from weather.com using a web browser program stored in memory as is well-known in the art. Pet. 60–62.

m. Are Inoue and Peters analogous art?

Patent Owner argues that the '555 patent is directed entirely to a novel HVAC system whereas Inoue and Peters are directed to purely a computer CPU cooling device and therefore are non-analogous art. Prelim. Resp. 18.

Two separate tests define the scope of analogous prior art.

(1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.

In re Klein, 647 F.3d 1343, 1348 (Fed. Cir. 2011) (quoting *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004)).

“A reference is reasonably pertinent if . . . it is one which, because of the matter with which it deals, logically would have commended itself to an inventor’s attention in considering his problem.” *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992). In addition, “[i]f a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection.” *Id.*

Petitioner asserts that Inoue and Peters disclose thermostat systems that control a fan to control a temperature in a conditioned space and also receive information from remote correspondents. Pet. 45–62. The ’555 patent has the same purpose. Ex. 1001, 1:8–2:39, 3:3–4:65.

References with the same structure and function as an invention are in the same field of endeavor. *See Bigio*, 381 F.3d at 1326. The ’555 patent describes the field of endeavor as thermostats that control heating and/or cooling equipment to condition a space in which a temperature sensor is placed and establish communications with remote correspondents. Ex. 1001, 1:17–47, 2:1–27, 3:3–4:65, 6:1–23, Figs 1–4.

Petitioner contends that Inoue and Peters describe thermostat systems with the claimed structure and function of temperature sensors that measure temperature inside a conditioned space and processors that use the measured temperature signals to control space conditioning equipment that cools the conditioned space. Pet. 13–14, 45–57. Petitioner asserts that Inoue uses a modem 29 to connect the CPU to the Internet or other network to receive messages from a remote correspondent such as weather.com. *Id.* at 57–62.

On this record, Petitioner has established that Inoue and Peters have the same purpose as the claimed thermostat system and include the claimed structure to perform the functions of the claimed thermostat system.

On this record, we find Petitioner has made a sufficient showing that Inoue and Peters are analogous art to the claimed invention of claim 18.

n. Motivation to combine

Patent Owner argues that Inoue and Peters are directed to a computer CPU cooling device, and there is no suggestion or teaching to combine their standalone computer fan systems, which do not use or require an internet connection, to operate with a website such as weather.com to look up weather information. Prelim. Resp. 18–19.

Petitioner contends that a skilled artisan would have been motivated to combine Inoue and Peter with weather.com “to obtain current information (weather) from a remote correspondent (weather.com web server) to display on *Inoue-Peters*’ display” because it was well known and common sense to “to use a laptop connected to the Internet to obtain current information (*e.g.*, weather) from a weather website” such as weather.com so users would know the weather in their area by using a web browser to access websites such as weather.com to obtain current weather and information of interest to display on a screen of a laptop computer. Pet. 42–43 (citing Ex. 1002 ¶¶ 176, 177).

Petitioner’s reasons are supported by Dr. Baker’s testimony, teachings and suggestions of the references themselves, and the knowledge in the art. Pet. 43 (citing Ex. 1006 ¶¶ 21, 25, 27; Ex. 1035, 3:8–49, Abstract, Figs. 1, 2; Ex. 1036, 4:4–5:5; Ex. 1037, 50; Ex. 1002 ¶¶ 178, 179). The ’555 patent itself indicates that remote correspondents are known to provide sources of current information such as local weather and “[s]uch local current weather information sources are widely available and are routinely accessed by, for example, using the Internet.” Ex. 1001, 4:10–15.

Inoue's system and CPU 17 are configured with modem 29 and phone or communication line that connect CPU 17 to a network such as the Internet or an extranet. Ex. 1006 ¶ 28, Fig. 2. Peters' system includes a plurality of peripheral component interconnect ("PCI") devices such as network interface cards, and telephone cards. Ex. 1007, 9:5–14, Fig. 2.

[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 417 (2007).

"[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions."

KSR, 550 U.S. at 417; *see also DyStar Textilfarben GmbH & Co.*

Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356, 1368 (Fed. Cir. 2006)

(An implicit motivation to combine exists when an "improvement" makes a product stronger, cheaper, faster, lighter, smaller, more durable, or more efficient). Petitioner's reasons for combining the teachings of Inoue, Peters, and weather.com are supported by rational underpinnings of the prior art teachings and the knowledge in the art.

On this record, we find that Petitioner has established a reasonable likelihood that claim 18 is unpatentable over Inoue, Peters, and weather.com.

7. *Claim 20*

Petitioner asserts that Inoue discloses the elements of claim 20 such as accessing weather.com, which is an Internet web server, over the Internet. Pet. 62 (citing Ex. 1006 ¶ 28, Fig. 2; Ex. 1002 ¶¶ 233, 234). Patent Owner argues that Inoue, Peters, and weather.com fail for claim 18 and, therefore, they also fail for dependent claim 20. Prelim. Resp. 20.

Because Petitioner has established a reasonable likelihood that claim 18 is unpatentable over Inoue, Peters, and weather.com, this argument is not meritorious and we also find on this record that Petitioner has established that claim 20 is unpatentable over Inoue, Peters, and weather.com.

F. Ground 3: Alleged Obviousness Over Glorioso and Shah

Petitioner asserts that claims 18 and 20 are unpatentable under 35 U.S.C. § 103 over Glorioso and Shah. Pet. 5, 62–79.

1. Glorioso (Ex. 1009)

Glorioso discloses a smart thermostat for controlling cooling device 44 such as an air conditioner and heating device 46 such as a furnace as depicted in Figure 1, which is reproduced below. Ex. 1009, 2:54–3:8, 4:1–17, Fig. 1.

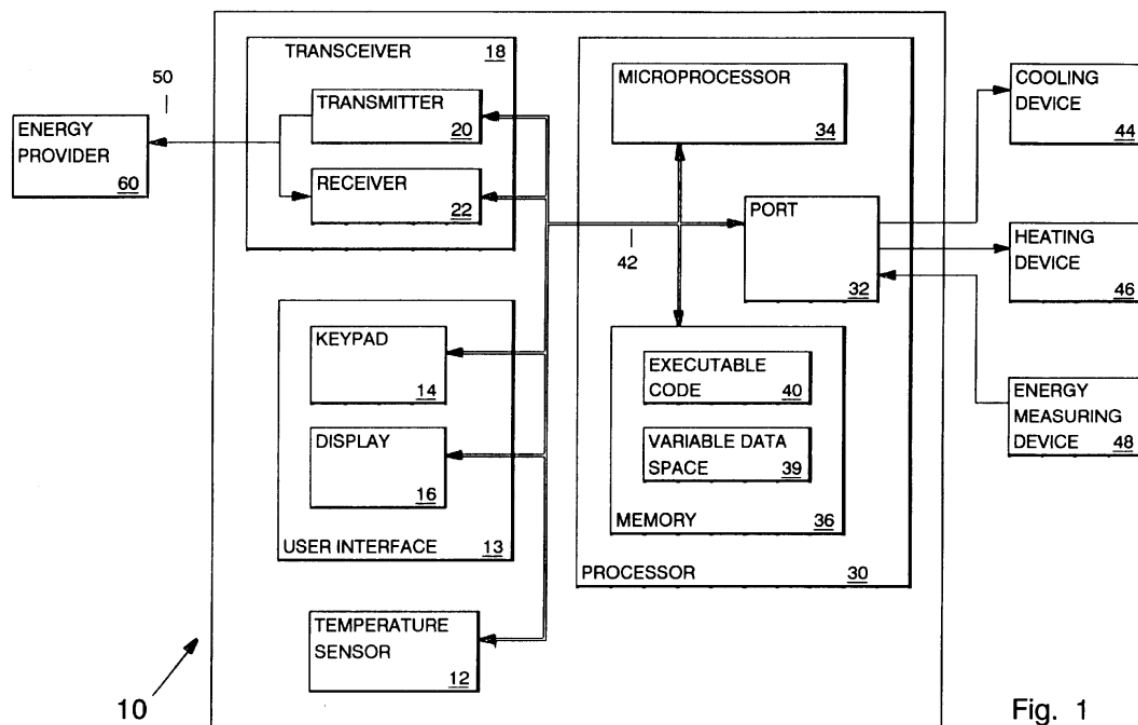


Fig. 1

Figure 1 illustrates smart thermostat 10 including temperature sensor 12, user interface 13, display 16, processor 30 and microprocessor 34 that controls the climate in a heated or cooled space. Ex. 1009, 2:54–3:8.

Processor 30 includes port 32 that connects to cooling device 44 and/or heating device 46 with temperature sensor 12 located within heated or cooled space for measuring the temperature. Ex. 1009, 1:53–63, 3:3–6. Transceiver 18 of smart thermostat 10 includes transmitter 20 to transmit output signals via communication network 50 to energy provider 60 like a utility company that provides services for gas or electricity. *Id.* at 3:8–17. Receiver 22 can receive input signals such as current energy price levels issued by provider 60 via network 50, and a user may enter temperature setpoints and energy costs for the system to maintain. *Id.* at 4:1–14, 6:4–30. Processor 30 issues control signals through port 32 for operating cooling device 44 and heating device 46 to maintain temperature setpoints and energy costs. *Id.* at 4:14–27.

2. *Shah (Ex. 1010)*

Shah discloses thermostats with a multiple language user interface and touch-sensitive LCD display 200 that displays time, temperature, date, day of the week, and a set-point temperature schedule. Ex. 1010, 1:6–8, 2:41–67, 3:1–19, Fig. 2. Shah's processor has a real time clock used to support a set-point schedule of times and associated temperatures. *Id.* at 3:1–20, Fig. 2.

3. *Motivation to combine*

Petitioner contends that a skilled artisan would have been motivated to modify Glorioso's display to include Shah's LCD display because LCDs were well known and widely used in electronic devices and desirable due to their low cost, low power consumption, and compact design. Pet. 63.

Petitioner asserts that a skilled artisan would have been motivated to include a real time clock in Glorioso as taught by Shah to display the time and to implement a set-point schedule that adjusts temperature based on time. Ex. 1010, 3:9–20.

4. *Independent Claim 18*

a. *18[preamble]: “A computer system comprising:”*

Petitioner asserts that Glorioso discloses a smart thermostat system for controlling space conditioning equipment of cooling device 44 and heating device 46. Pet. 68 (citing Ex. 1009, 2:54–3:8, 4:1–17, Fig. 1; Ex. 1002 ¶¶ 263–264). This contention, which Patent Owner does not contest at this stage, is supported by record evidence.

b. *18[a]: “a temperature sensor”*

Petitioner asserts that Glorioso discloses smart thermostat 10 including temperature sensor 12 situated in a conditioned space to provide an electrical signal indicative of a temperature of that space. Pet. 68–69 (citing Ex. 1009, Abstract, 1:55–59, 2:24–25, 2:54–3:8, Fig. 1; Ex. 1002 ¶¶ 265–268). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

c. *18[b]: “a liquid crystal display”*

Petitioner asserts that Shah discloses an LCD that selectively displays an alphanumeric message such as current data, day of the week, and indoor/outdoor relative humidity. Pet. 69–71 (citing Ex. 1010, Abstract, 2:41–55, 2:63–67, 3:9–20, Fig. 2; Ex. 1002 ¶¶ 269–273). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

d. *18[c][1]: “a processor” “a central processing unit”*

Petitioner asserts that Glorioso discloses a processor 30 with a central processing unit (microprocessor 34). Pet. 71–72 (citing Ex. 1009, 2:54–3:8, Fig. 1; Ex. 1012, 92:24–93:5, 288:16–23; Ex. 1002 ¶¶ 274, 275). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

e. 18[c][2]: “a real time clock”

Petitioner asserts that Shah’s real time clock would have been obvious to include in Glorioso’s thermostat. Pet. 71–72 (citing Ex. 1010, 3:1–20, 5:44–50; Ex. 1002 ¶¶ 69, 276–278; Pet. § VIII.A.). These contentions, which Patent Owner does not contest at this stage, is supported by record evidence.

f. 18[c][3]: “a memory”

Petitioner contends that Glorioso’s processor 30 includes memory 36 coupled to central processing unit 34 with instructions (executable code 40) for microprocessor 34 to direct actions of processor 30 and stored programs and information (data space 39). Pet. 72–73 (citing Ex. 1009, 2:54–3:8, 4:4–18, Fig. 1; Ex. 1002 ¶¶ 279–283). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

g. 18[c][4]/18[c][4][a] “an input/output unit including: a sensor input coupled to a temperature sensor”

Petitioner contends that Glorioso’s processor includes an input/output unit as transceiver 18 (transmitter 20 and receiver 22) and port 32 coupled to temperature sensor 12 to receive an electrical signal. Pet. 73–74 (citing Ex. 1009, 2:54–3:8, Fig. 1; Ex. 1002 ¶¶ 283–287). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

h. 18[c][4][b]: “a control output”

Petitioner asserts that Glorioso discloses control output (port 32) that is coupled to space conditioning equipment 44, 46 to issue control signals to operate cooling device 44 or heating device 46. Pet. 74–75 (citing Ex. 1009, 2:54–3:8, 4:1–36, 6:19–27; Ex. 1002 ¶¶ 288–291). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

i. 18[c][4][c]: “a communications interface”

Petitioner asserts that Glorioso’s input/output unit (transceiver 18, port 32) communicates through communication network 50 and thus includes a communication interface to establish bi-directional communication between processor 30 and a first remote correspondent such as energy provider 60 and its computer system 62 and transmitter. Pet. 75–76 (citing Ex. 1009, 3:8–12, 3:40–67, 4:1–4, 4:37–5:22, 6:4–30, 6:48–51, 6:63–65, Fig. 2; Ex. 1002 ¶¶ 292–295). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

j. 18[d]: “means coupling said communications interface and first remote correspondent”

Petitioner asserts that Glorioso couples a communications interface to a remote correspondent by coupling transceiver 18 to computer system 62 of energy provider 60 to communicate information through a serial link and/or data link and any equivalents because communications network 50 can be a wired/wireless wide area network that a skilled artisan would understand communicates over a data link. Pet. 76–77 (citing Ex. 1009, 3:8–10, 3:17–44, 4:1–4; Ex. 1030 ¶¶ 12, 17, 23, 41, 44–48, Fig. 4; Ex. 1002 ¶¶ 297–302; Ex. 1001, 6:1–11). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

k. 18[e] “a program stored in said memory”

Petitioner asserts that Glorioso’s thermostat has memory 36 with data space 39 and executable code 50 with instructions for microprocessor 34 to direct actions of processor 30 that would include a program stored in memory for displaying messages or information. Pet. 77–78 (citing Ex. 1009, 2:7–9, 2:59–53, 3:8–49, 5:54–6:3, Figs. 1, 2; Ex. 1036, 4:4–5:5; Ex. 1002 ¶ 305).

Petitioner asserts that Glorioso's thermostat system receives messages for outages, announcements, promotions, current energy prices, and billing information that "do not pertain to the operation of said thermostat system," and it displays requested information, announcements, and promotions via a user interface, and these messages would be displayed on Shah's LCD. Pet. 77 (citing Ex. 1009, 2:7–11, 4:1–4, 4:28–29, 4:52–5:3, 5:9–12, 6:4–6, 6:51–53; Ex. 1002 ¶¶ 303–306).

l. Disclosure of a program for displaying messages

Patent Owner argues that the '555 patent does not disclose displaying information fetched from the internet on the thermostat's interface. Prelim. Resp. 22. Patent Owner asserts that the '555 patent discloses that a program stored in a memory reads information from a remote correspondent, parses it against key terms to identify a match and associated value, and then displays alphanumeric messages based on the key term and value. *Id.* at 22–23.

Patent Owner's arguments are not consistent with our interpretation of element 18[e] in Section II.B.2. The claimed "displaying messages received from said first remote correspondent" does not parse or match terms or values or display prerecorded messages. Glorioso's thermostat displays requested information, announcements, and promotions to a user using a program stored in memory 36. Pet. 77–78; Ex. 1009, 2:7–13, 4:1–4, 4:28–29, 4:52–5:3, 5:9–12, 6:4–6, 6:51–53. Indeed, Patent Owner admits that the Figure 5 flowchart of the '555 patent does not display messages received from a remote correspondent. Prelim. Resp. 22 ("'555 does not disclose that the information fetched from the internet is directly displayed on the thermostat's user interface."). On this record, we find that Petitioner has established a reasonable likelihood that claim 18 is unpatentable over Glorioso and Shah.

5. *Claim 20*

Petitioner asserts that Glorioso's smart thermostat communicates over a wide area network with a first RC using a phone line or fiber optics and a CDPD protocol that would support communications over the Internet, which is a type of wide area network, and Shah's thermostat has a network interface that connects to the Internet. Pet. 78–79 (citing Ex. 1009, 3:31–39; Ex. 1010, 3:44–65; Ex. 1019, 4:35–40, 5:26–30; Ex. 1002 ¶¶ 307–309).

Patent Owner argues that claim 20 is not unpatentable because claim 18 is not unpatentable over Glorioso and Shah. Prelim. Resp. 23.

Because we find that Petitioner has shown a reasonable likelihood that claim 18 is unpatentable over Glorioso and Shah, this argument is not meritorious.

On this record, we also find that Petitioner has established a reasonable likelihood that claim 20 is unpatentable over Glorioso and Shah.

G. Exercise of Discretion under 35 U.S.C. § 314(a)

In its Preliminary Response, Patent Owner argued that *Fintiv* factors support denial of institution under 35 U.S.C. § 314(a). Prelim. Resp. 8–13. Patent Owner withdrew its arguments due to the administrative closure/stay of the Texas proceeding. Paper 8, 1; *see* Ex. 1038. Because Patent Owner has withdrawn its arguments concerning discretionary denial under 35 U.S.C. § 314(a), the issue is moot and we need not address it.

III. CONCLUSION

For the reasons discussed above, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in establishing that at least one of claims 18 and 20 of the '555 patent is unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that *inter partes* review of the '555 patent is hereby instituted as to claims 18 and 20 on all grounds set forth in the Petition;

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

FURTHER ORDERED that the trial will be conducted in accordance with a corresponding separately issued Scheduling Order.

IPR2023-00715
Patent 6,619,555 B2

PETITIONER:

David Wille
Clarke Stavinoha
Melissa Muenks
Caroline Duncan
Samir Bhavsar
david.wille@bakerbotts.com
clarke.stavinoha@bakerbotts.com
melissa.muenks@bakerbotts.com
caroline.duncan@bakerbotts.com
samir.bhavsar@bakerbotts.com

PATENT OWNER:

Hao Ni
Neal Massand
hni@nilawfirm.com
nmassand@nilawfirm.com