

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EMERSON ELECTRIC CO.,
Petitioner,

v.

IP CO., LLC,
Patent Owner.

Case IPR2015-01901
Patent 8,000,314 B2

Before LYNNE E. PETTIGREW, STACEY G. WHITE, and
CHRISTA P. ZADO, *Administrative Patent Judges*.

WHITE, *Administrative patent Judge*.

FINAL WRITTEN DECISION

35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Emerson Electric Co. (“Petitioner”) filed a Petition (Paper 3, “Pet.”) seeking to institute an *inter partes* review of claims 10–19 of U.S. Patent No. 8,000,314 B2 (Ex. 1001, “the ’314 patent”) under 35 U.S.C. §§ 311–319. IP Co., LLC (“Patent Owner”) filed a Preliminary Response. (Paper 7). Based on our review of these submissions, we instituted *inter partes* review of claims 10 and 12–19 of the ’314 patent on three grounds of unpatentability under 35 U.S.C. § 103. Paper 9 (“Dec.”). Specifically, we authorized *inter partes* review as to the following grounds:

References	Instituted Claims
Meier ¹ and Gollnick ²	10
Kahn ³ , Jubin ⁴ , Burchfiel ⁵ , and Schwartz ⁶	12
Kahn, Jubin, Burchfiel, Schwartz, and Cerf ⁷	13–19

Id. at 31.

¹ U.S. Patent No. 5,394,436, Feb. 28, 1995 (Ex. 1008, “Meier”).

² U.S. Patent No. 5,940,771, Aug. 17, 1999 (Ex. 1009, “Gollnick”).

³ Robert E. Kahn, *Advances in Packet Radio Technology*, Proceedings of the IEEE, Vol. 66, No. 11, Nov. 1978 (Ex. 1003, “Kahn”).

⁴ John Jubin & Janet D. Tornow, *The DARPA Packet Radio Network Protocols*, Proceedings of the IEEE, Vol. 75, No. 1, Jan. 1987 (Ex. 1005, “Jubin”).

⁵ J. Burchfiel, et al., *Functions and structure of a packet radio station*, National Computer Conference presented paper, 1975 (Ex. 1004, “Burchfiel”).

⁶ Mischa Schwartz, *TELECOMMUNICATION NETWORKS: PROTOCOLS, MODELING AND ANALYSIS*, Addison-Wesley Pub. Co., 1988 (Ex. 1007, “Schwartz”).

⁷ Vinton G. Cerf & Peter T. Kirstein, *Issues in Packet-Network Interconnection*, Proceedings of the IEEE, Vol. 66, No. 11, Nov. 1978 (Ex. 1006, “Cerf”).

Patent Owner filed a Patent Owner's Response (Paper 13, "PO Resp."), and Petitioner filed a Corrected Reply (Paper 16, "Reply"). An oral hearing was conducted on October 28, 2016. A transcript of the oral hearing is included in the record. Paper 27 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. For the reasons discussed below, Petitioner has demonstrated by a preponderance of the evidence that claims 10 and 12–19 of the '314 patent are unpatentable.

A. Related Proceedings

Petitioner informs us that *SIPCO, LLC, v. Emerson Electric Co.*, No. 6:15-cv-00907-JRG-KNM (E.D. Tex.) may be impacted by this proceeding. Paper 8 (Petitioner's Amended Mandatory Notices). In addition, there are pending patent applications, Nos. 14/337,738 and 14/820,687, that claim priority to the '314 patent. Pet. 1, Paper 8, 1.

B. The '314 patent

The '314 patent describes a digital computer network. Ex. 1001, 1:13–15. This network is depicted in Figure 1, which is reproduced below.

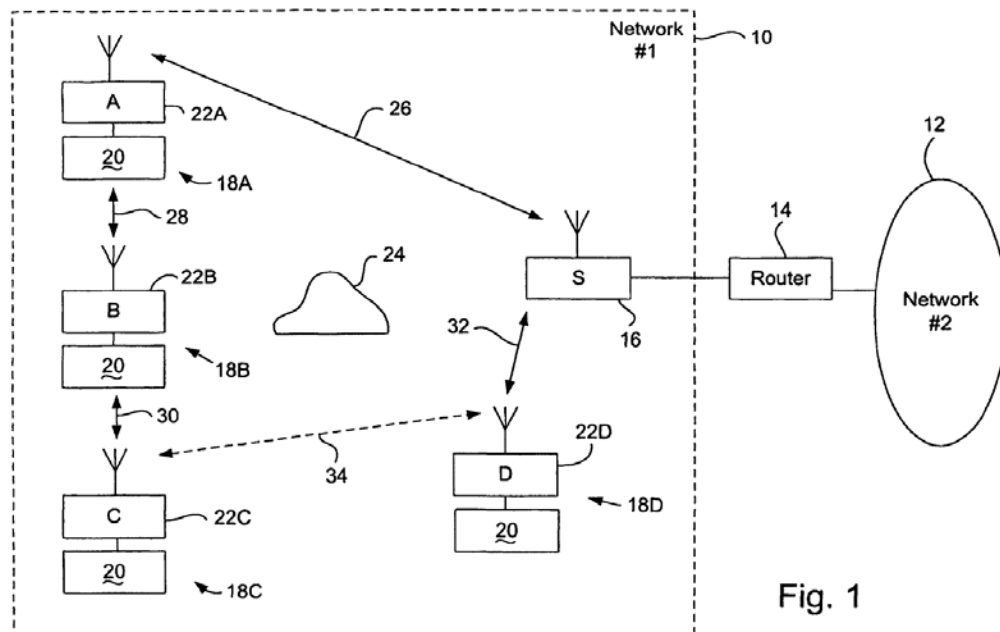


Fig. 1

Figure 1 shows wireless network 10 that is in communication with second network 12. *Id.* at 7:18–22. Wireless network 10 includes one or more servers 16 that may act as a gateway between the two networks. *Id.* at 7:42–46. Servers include a digital controller that “maintains a map of the links of the first network and provides a map to the first network clients on request.” *Id.* at 5:53–55. The network also includes any number of clients 18. *Id.* at 7:64–67. Servers implement processes for receiving and transmitting data packets from the clients. *Id.* at 5:6–9. Clients implement processes for receiving and transmitting data packets to and from the server and other clients. *Id.* at 5:9–11. “Preferably, the client process of each of the clients initiates, selects, and maintains a radio transmission path (“link”) to the server . . . [and] also constantly searches for improved paths to the server.” *Id.* at 5:11–15, 5:19–21.

C. Illustrative Claims

As noted above, we instituted *inter partes* review of claims 10 and 12–19 of the ’314 patent, of which claims 10, 12, 14, and 15 are independent. Claims 10 and 12 are illustrative of the instituted claims and are reproduced below:

10. A client node in a network including a server node having a server radio modem and a server controller which implements a server process that includes controlling the server node to receive and transmit data packets via said server node to other nodes in the network,
the client node comprising:
a client node radio modem; and
a client node controller;
said client node controller implementing a process including receiving and transmitting data packets via said client modem;

selecting a radio transmission path to said server node that is one of a direct link to said server node and an indirect link to said server node through at least one other client node;
implementing a process requesting updated radio transmission path data from said server node, and in response thereto, implementing by the server node changes to upgrade the selected transmission path to an optimized transmission path.

12. A first node providing a gateway between two networks, where at least one of the two networks is a wireless network, said first node comprising:
- a radio modem capable of communicating with a first network that operates in part, by wireless communication; a network interface to communicating with a second network;
 - a digital controller coupled to said radio modem and to said network interface, said digital controller communicating with said first network via said radio modem and communicating with said second network via said network interface, said digital controller passing data packets received from said first network that are destined for said second network to said second network, and passing data packets received from said second network that are destined for said first network to said first network, said digital controller maintaining a map of data packet transmission paths to a plurality of second nodes of said first network, where a transmission path of a second node of said first network to said first node can be through one or more of other second node[s] of said first network;
- wherein said digital controller changes the transmission paths of each of the second nodes to optimize the transmission paths including changing each transmission path from on[e] of the plurality of said second nodes to the first node so that the path to the first node is chosen from the group consisting essentially of the path to the first node

through the least possible number of additional second nodes, the path to the first node through the most robust additional second nodes, the path to the first node through the second nodes with the least amount of traffic, and the path to the first node through the fastest second nodes.

II. CLAIM CONSTRUCTION

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144 (2016). Pursuant to that standard, the claim language should be read in light of the specification, as one of ordinary skill in the art would interpret it. *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1260 (Fed. Cir. 2010). Thus, absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

For purposes of the Decision to Institute, we construed the terms “selecting a radio transmission path to said server node” and “a map of data packet transmission paths” / “a map of transmission paths.” Dec. 7–12. In its Patent Owner Response, Patent Owner provides claim construction arguments regarding the terms (1) “selecting a radio transmission path” (claim 10); (2) “transmission path of a second node of said first network to said first node” (claim 12); “transmission path from the second node to the

first node” (claim 14); and “transmission path of a second node to the gateway” (claim 15); and (3) “a map of data packet transmission paths to a plurality of second nodes of said first network” (claim 12); and “a map of transmission paths of the first network” (claim 15). PO Resp. 11–18. Based on the issues before us, we discern a need to discuss the construction of “selecting a radio transmission path” and “a map of data packet transmission paths” / “a map of transmission paths.”

A. Selecting a Radio Transmission Path to Said Server Node

In the Decision to Institute, we preliminarily determined the broadest reasonable interpretation of “selecting a radio transmission path” to be “choosing the entire path from the client to the server including the identification of all nodes in the path.” Dec. 9. Patent Owner argues that this construction is not the broadest reasonable interpretation because it “limits the description of a path to ‘including the identification of all nodes in the path’” and one of ordinary skill in the art “would have known of many other ways to describe a path.” PO Resp. 12. Thus, Patent Owner asserts that the construction should be “choosing a path to the server including an identification of an entire path from the client to the server.” *Id.* at 13.

At the oral hearing, we asked both parties whether this broader interpretation would impact the case before us. Patent Owner’s counsel was not sure if it would impact the issues before us. Tr. 39:3–8. Similarly, Petitioner’s counsel stated that “I don’t think that it impacts your specific analysis.” *Id.* at 7:9–10. Based on our review of the issues before us, we determine that it is unnecessary to determine whether this broader construction would be correct. The Federal Circuit has cautioned that “only those terms need be construed that are in controversy, *and only to the extent*

necessary to resolve the controversy.” *Vivid Techs., Inc. v. Am. Sci.*, 200 F. 3d 795, 803 (Fed. Cir. 2000) (emphasis added). Thus, we decline to decide whether the interpretation sought by Patent Owner would be the broadest reasonable interpretation. Therefore, we determine that the construction of “selecting a radio transmission path” is at least broad enough to encompass “choosing the entire path from the client to the server including the identification of all nodes in the path.”

B. “A Map of Data Packet Transmission Paths” / “A Map of Transmission Paths”

Claim 12 recites “maintaining a map of data packet transmission paths to a plurality of second nodes of said first network.” Claim 15 recites “maintaining a map of transmission paths of the first network,” “sending the map of transmission paths to any second node that requests the map,” and “updating the map of transmission paths.” In the Institution Decision, we preliminarily construed the map of transmission paths recited in these claims to be a map that contains all of the transmission paths. Dec. 11. Under this construction, where there is only one transmission path in the first network, the map of transmission paths would include only one transmission path. Patent Owner asserts that the proper construction of this term is “a data structure containing a representation of a plurality of transmission paths.” PO Resp. 16. Under Patent Owner’s construction, the map would need to include more than one transmission path. Petitioner argues that Patent Owner’s proposed construction is improper in that it “fails to identify which paths would need to be included in that map and it lacks any evidentiary support from the ‘314 patent specification.” Reply 16.

The issue we need to decide is whether the map of transmission paths can contain only one path, or whether it must contain a plurality of paths. Patent Owner argues that “a term ending in a letter ‘s’ like the claim term ‘paths’ would ordinarily be understood as being plural (*i.e.*, a plurality).” PO Resp. 17. Patent Owner also asserts that requiring the map to contain all of the paths is improper because such a construction would import limitations from the specification into the claims. *Id.* at 18.

Our preliminary construction requires that the map contain all paths as opposed to Patent Owner’s proposal that the map contain a plurality of paths or in other words that the map contain two or more paths. *See id.* Thus, Patent Owner’s proposal would exclude maps that contain only one path. Claim 15 recites “a map of transmission paths of the first network.” The claim further recites that the network has “at least one second node” and that “the transmission path of a second node to the gateway can be directly from the second node to the gateway.” Patent Owner argues that a network with one second node would not meet the limitations of the claim because such a network would only have one path. Tr. 42:8–19. We, however, are not convinced that such a network would be excluded. The plain language of the claim states that the network needs “at least one second node.” Thus, we find that claim 15 contemplates a network with one node and one transmission path between that node and the gateway. Therefore, the map of transmission paths must be construed broadly enough to encompass the situation where there is only one path.

III. ANALYSIS

A. *Objective Evidence of Nonobviousness*

All of the instituted grounds in this proceeding are based on allegations that the challenged claims would have been obvious over the cited art. As part of the obviousness inquiry we must consider evidence of relevant secondary considerations such as long-felt need in the art and unexpected results. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)).

Patent Owner asserts that the claims of the '314 patent solved a long-felt need in regards to the reduction of overhead in wireless networks. PO Resp. 52. Specifically, Patent Owner asserts that prior to the '314 patent, “routing overhead had long been a bottleneck for wireless networks.” *Id.* Dr. Kevin Almeroth supported Patent Owner’s argument by explaining why he believed that several prior art references documented the existence of a long-felt need for a solution of the problem of routing overhead. *Id.* at 54 (citing Ex. 2003 ¶ 196). Patent Owner asserts that “[t]he invention claimed in the '314 patent solved this long-felt need by significantly reducing the overhead of a distributed network through the use of both centralized and decentralized techniques.” *Id.* Patent Owner also argues that the claims of the '314 patent provided an unexpected result by decreasing overhead (and increasing bandwidth) even as the number of nodes in the system increased. *Id.* at 56. Dr. Almeroth supports this assertion with testimony regarding the “minimal overhead” of the network claimed in the '314 patent. *Id.* (citing Ex. 2003 ¶ 201).

To be relevant, evidence of nonobviousness must be commensurate in scope with the claimed invention. *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir.

2011). Thus, to be accorded substantial weight, there must be a nexus between the claimed invention and the evidence of secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). Nexus is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining nonobviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988). In the absence of an established nexus with the claimed invention, secondary consideration factors are not entitled to much, if any, weight and generally have no bearing on the legal issue of obviousness. *See In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1577 (Fed. Cir. 1985). The burden of showing that there is a nexus lies with the Patent Owner. *See Paulsen*, 30 F.3d at 1482.

Patent Owner has failed to provide sufficient evidence of nexus between the challenged claims and any purported improvement in bandwidth availability or reduction in overhead. “[T]here is a presumption of nexus for objective considerations when the [Patent Owner] shows that the asserted objective evidence is tied to a specific product and that product “is the invention disclosed and claimed in the patent.” *WBIP v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 2016) (citing *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997)). Patent Owner, however, has not cited any specific products and bases its arguments on the invention of the ’314 patent. Further, we note that the ’314 patent does not mention network overhead. Further, the term bandwidth only appears once in the specification and there it is part of a discussion of prior art. Ex.1001, 2:50–56. In addition, Patent Owner’s declarant, Dr. Kevin Almeroth, does not cite

to any specific portion of the '314 patent's specification or its claims as part of his discussion of secondary considerations. *See* Ex. 2003 ¶¶ 190–201. Also, the discussion of secondary considerations in Patent Owner's Response fails to include any citation to the '314 patent's specification or its claims. *See* PO Resp. 50–56. Belatedly, at oral hearing, Patent Owner directs us to column 4 of the specification, which mentions that the “process of the present invention preferably includes an optimization process which minimizes the number of hops . . . on the theory that the fewer [t]he number of hops, the better the performance of the system.” *Id.* at 4:63–67; *see* Tr. 55:1–58:7. That portion of the specification goes on to state that “the optimization process can also factor in traffic and transmission reliability of various links to determine an optimal path to the server.” *Id.* at 4:67–5:2. Patent Owner argues that claim 10, when viewed in light of such disclosures in the specification, explicitly shows the required nexus because claim 10 recites “an optimized transmission path” and the other claims include a more implicit reference to such features. Tr. 55:1–58:7; *see* Ex. 1001, 25:35–36. Even if we were to consider this untimely argument it would not be persuasive. A general discussion of network robustness, improved efficiency, and optimized routes is not sufficient to support Patent Owner's assertion that the claims of the '314 patent reduce overhead or increase bandwidth. A network could become more efficient or robust for reasons unrelated to reduced overhead or increased bandwidth. Neither claim 10 nor the specification links the recited optimization to reduced overhead or increased bandwidth. Thus, we are not persuaded that Patent Owner has presented sufficient evidence of nexus between its asserted secondary considerations and the challenged claims. Therefore, we give little weight to

Patent Owner's assertions of secondary considerations of non-obviousness.
See Vamco Machine & Tool, Inc., 752 F.2d at 1577.

B. Analysis of Asserted Ground Based on Meier and Gollnick

1. Overview of Meier

Meier describes “[a]n apparatus and a method for routing data in a radio data communications system having one or more host computers, one or more intermediate base stations, and one or more RF terminals.” Ex. 1008, Abstract. Figure 1 of Meier is reproduced below.

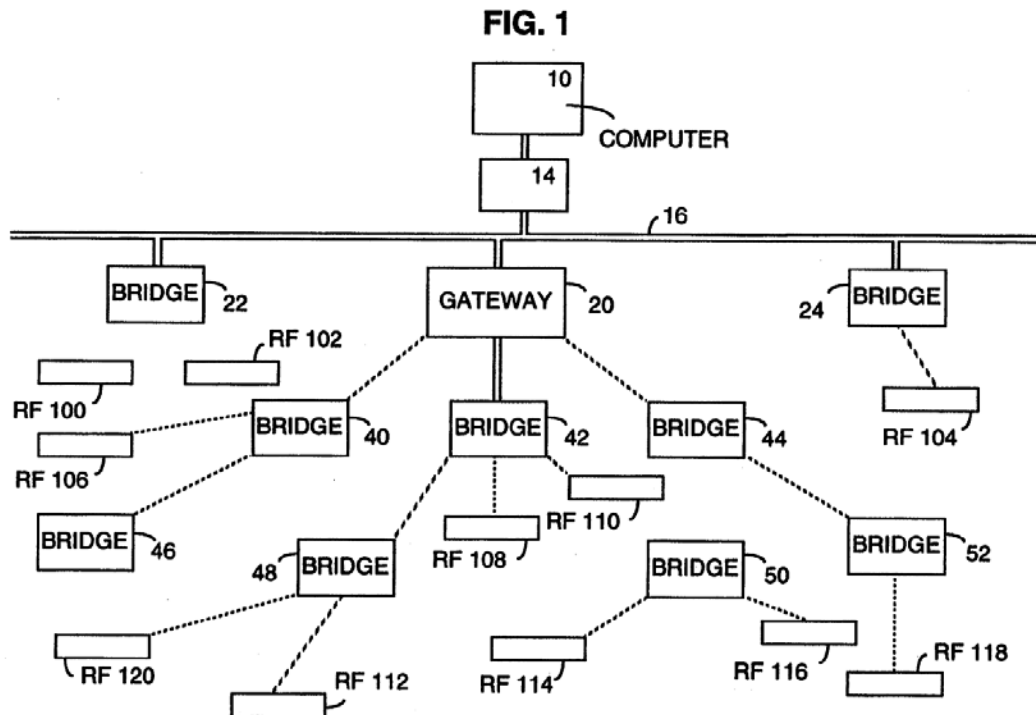


Figure 1 depicts a functional block diagram of an RF data communication system. *Id.* at 2:64–66. Host computer 10 and network controller 14 are attached to gateway 20, “which acts as the root node for the spanning tree of the RF data network.” *Id.* at 3:7–11. Bridges 40, 42, 44, 46, 48, 50, and 52 are attached to gateway 20 via wireless or wired links. *Id.* at 3:11–16. The bridges preferably are intelligent base transceiver units of the type RB4000

of the Norand Corporation. *Id.* at 3:43–45. RF terminals 104, 106, 108, 110, 112, 114, 116, 118, and 120 are attached wirelessly to various bridges in the network. *Id.* at 3:20–25. “The RF links, as shown, are dynamic and subject to change.” *Id.* at 3:34–35.

The system is organized as a spanning tree with the gateway at the root, the bridges as the branches, and the RF terminals as the leaves of the tree. *Id.* at 2:44–46. Data are sent along the branches of the spanning tree and “[n]odes in the network use a backward learning technique to route packets along the correct branches.” *Id.* at 2:46–50. RF terminals listen to HELLO packets being broadcast in order to determine which bridges are in range. *Id.* at 6:38–40. After listening to these messages, an RF terminal will send an ATTACH message to the closest node.

For example, RF terminal 110 is physically closer to node 44. However, node 44 is three hops, via an RF link, away from the gateway root node 20 and node 42 is only one hop, via a hard-wired link, away from the gateway root node 20. Therefore, RF terminal 110, after hearing HELLO messages from both nodes 42 and 44, attaches to node 42, the closest node to the gateway root node 20.

Id. at 6:43–51. Meier describes choosing to attach to the least busy node as an “efficient practice,” but notes that other embodiments may determine which node to choose based on criteria other than “attaching to the least busy node of equal distance to the gateway root node 20.” *Id.* at 6:59–65.

2. Analysis of Asserted Obviousness of Claim 10

Petitioner asserts that claim 10 of the ’314 Patent would have been obvious over Meier and Gollnick. Pet. 49–54. Petitioner’s arguments as to claim 10 may be summarized as follows: Petitioner argues that Meier’s bridges and RF terminals correspond to the claimed client nodes. Pet. 50.

Meier's bridges preferably are RB4000 transceivers and Gollnick provides additional information about RB4000 transceivers. *Id.* The claimed server corresponds to Meier's gateway/server node 20. *Id.* at 49. Petitioner asserts that "selecting a radio transmission path" is taught by Meier's description of nodes learning the address of terminals in the network by monitoring traffic on the network. *Id.* at 52–53. Petitioner also cites Meier's description of RF terminals selecting the closest bridge. Declaration of Dr. Stephen Heppe, Ex. 1010 ¶ 89 (citing Ex. 1008, Fig. 1, 6:38–65). Meier also is relied upon to teach "implementing a process requesting updated radio transmission path data." *Id.* at 53–54. Petitioner contends that Meier's client and server nodes have routing tables. *Id.* at 53. The node's routing table is updated as packets arrive from terminals that are not listed in the routing table. *Id.* The various nodes in the system send HELLO, ATTACH.request, and ATTACH.confirm messages. *Id.* Nodes monitor these messages, and "[i]f a HELLO message indicates that a much closer route to the root node is available, the attached bridge sends a DETACH packet to its old parent and an ATTACH.request packet to the closer node." *Id.* at 54 (citing 1008, 6:11–18). The server will then send back an ATTACH.confirm packet. *Id.* Petitioner asserts that the ATTACH.request teaches the claimed request and the ATTACH.confirm teaches the claimed "response by the server node." *Id.* (citing Ex. 1010 ¶¶ 104–106).

As to motivation to combine, Petitioner asserts that one of ordinary skill in the art would have combined the teachings of Meier and Gollnick because "Gollnick describes the design details of the Norand Corporation's RB4000 transceiver unit disclosed in the Meier." Pet. 16. Petitioner's declarant Dr. Heppe further asserts that Meier and Gollnick share common

inventors, a common assignee, similar elements, and each one teaches “a combination of wired and wireless links, RF nodes that can ‘roam’, and a tree-like network topology.” Ex. 1010 ¶ 45. We find Petitioner’s arguments and evidence applying the teachings of Meier and Gollnick to claim 10 of the ’314 patent to be persuasive. In addition, we find Petitioner’s stated rationale for combining the teachings of the references to be reasonable and persuasive. Thus, we find that one of ordinary skill in the art would have looked to the teachings of Gollnick to provide further detail regarding the RB4000 transceivers discussed in Meier.

Patent Owner asserts that the cited art does not teach “selecting a radio transmission path to said server node.” PO Resp. 24–28. Specifically, Patent Owner argues that in order to meet this claim limitation the cited art must teach a client that selects the entire path from client to server and that Meier’s nodes only select their parent node and not the entire path. *Id.* at 24–25. According to Patent Owner, Meier’s nodes have routing tables, but these routing tables are not used to perform route selection. *Id.* at 25.

Petitioner disputes Patent Owner’s interpretation of Meier and quotes the portion of Meier that states

Nodes learn the addresses of terminals by monitoring the traffic from terminals to the root. If a packet arrives from a terminal that is not contained ***in the routing table of the node***, an entry is made ***in the routing table***. The entry includes the terminal address and the address of the node that sent the packet.

Reply 5–6 (quoting Ex. 1008, 7:6–11). Petitioner points out that the information in the routing table is populated by a process known as backward learning. *Id.* at 6 (citing Ex. 1008, 2:48–50 (“Nodes in the

network use a backward learning technique to route packets along the correct branches.”)). In this process,

[t]he attached node acknowledges the ATTACH.request and sends the ATTACH.request packet to the gateway root node. Then, the gateway root node returns an end-to-end ATTACH.confirm packet. In this manner, the end-to-end ATTACH.request functions as a discovery packet enabling the gateway root node, and all other nodes along the same branch, to learn the address of the RF terminal quickly.

Id. at 6–7 (quoting Ex. 1008, 6:66–7:6). Based on these passages from Meier, Petitioner argues that the reference teaches client nodes that learn the entire path and not just the address of the parent node. *Id.* at 7–8.

We are persuaded by Petitioner’s interpretation of the reference. Meier’s nodes consult their routing tables as part of their analysis as to whether a route should be modified and thus, we find that Meier discloses a routing table that is used in the process of selecting a transmission path. *See* Ex. 1008, 7:6–11. Therefore, we are persuaded that Petitioner has put forth sufficient evidence to establish that the cited art teaches “selecting a radio transmission path to said server node.”

Patent Owner also argues that Meier and Gollnick fail to teach “implementing a process requesting updated radio transmission path data from said server node” and “implementing by the server node changes to upgrade the selected transmission path to an optimized transmission path.” PO Resp. 28–32. Specifically, Patent Owner argues that the cited art does not teach (1) a client node selecting a path to a server node and (2) a server that selects a new device to which the bridge node will be attached. PO Resp. 29–32.

Patent Owner asserts that Meier's bridge nodes cannot select a transmission path to the server node; instead, Meier's bridge nodes select a new parent node in response to a HELLO packet and that packet does not contain the entire path to the server. *Id.* at 30. Patent Owner notes that the HELLO packet contains "1) the address of the sender, 2) the hopping distance that the sender is from the root, 3) a source address, 4) a count of nodes in the subtree which flow through that bridge, and 5) a list of system parameters." *Id.* (quoting Ex. 1008, 4:9–16). For nodes such as RF transceiver 110, however, we find that the HELLO packet would identify the entire route. *See* Ex. 1008, Fig. 1. RF transceiver 110 would receive a HELLO packet indicating that Bridge 42 is only one hop away from Gateway 20. *Id.* at 6:43–51. Thus, we find that one of ordinary skill in the art would have understood Meier to teach that a HELLO packet received by RF transceiver 110 identifies Bridge 42 and Gateway 20 as the sender and source and therefore, that HELLO packet would identify every node in the transmission path. *See* Ex. 1008, 6:11–18.

Patent Owner also argues that Meier's server node does not change the node to which a bridge is connected. PO Resp. 31. Patent Owner asserts that the phrase "implementing by the server node changes to upgrade the selected transmission path to an optimized transmission path" requires the server to make the changes to the path. *Id.* We do not agree.

Claim 10 is directed to "[a] client node in a network" and it enumerates elements comprising this client node. Ex. 1001, 25:16–36. The claim recites that the client node includes a "client node controller" and that this controller implements a process that receives and transmits data packets, selects a radio transmission path, and implements a process requesting

updated radio transmission path data. *Id.* at 25:24–36. The phrase “implementing by the server node changes to upgrade the selected transmission path to an optimized transmission path” is found at the end of the portion of the claim reciting the processes implemented by the client node controller. *Id.* Under Patent Owner’s interpretation of the claim language, the term “by” requires that the server perform the changes to the transmission path. This interpretation, however, ignores the surrounding claim language that indicates that the client node and specifically the client node’s controller is the element that implements the processes recited in the claim. The term “by” is broad enough to indicate more than just the element performing an action. *See, e.g.*, Ex. 3001 (defining “by” as a preposition meaning “[w]ith the use or help of; through”). Thus, we are persuaded that the structure of the claim indicates that the phrase should be construed to include a client controller that implements the changes to the path with the help of the server node.

With that construction in mind, we review the disclosures of Meier. Figure 2 of Meier is reproduced below.

FIG. 2

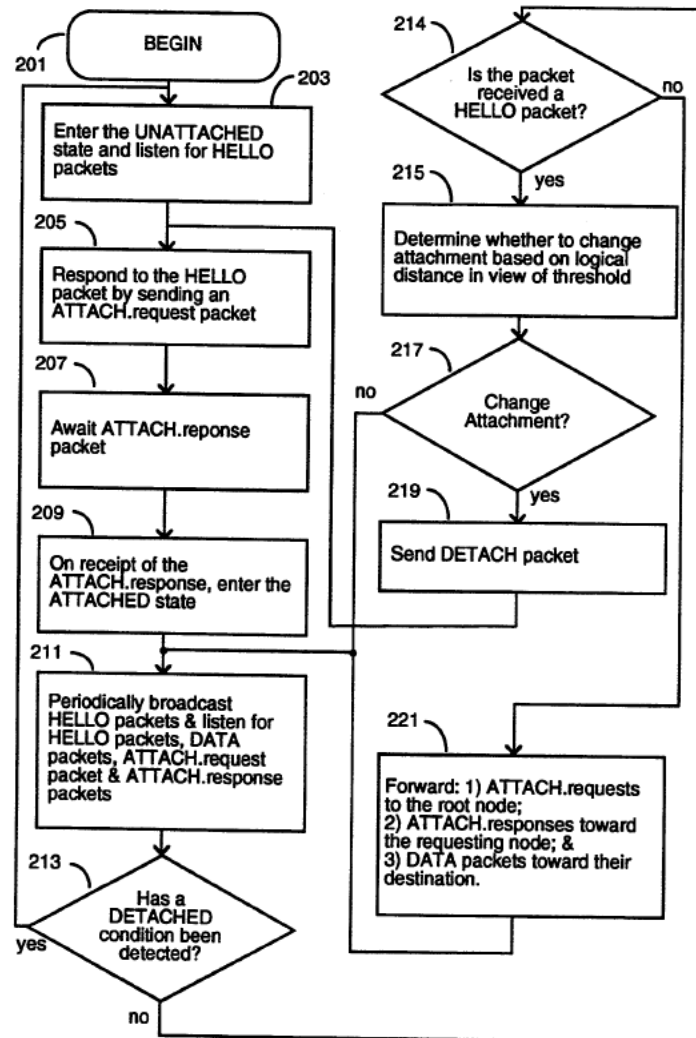


Figure 2 of Meier is a flow diagram depicting a bridge's participation in the construction and maintenance of the spanning tree. Ex. 1008, 4:20–22. A bridge listens to the HELLO messages being routed through the network and then determines that it would like to attach to a particular branch. In block 215, the bridge analyzes a HELLO packet to “[d]etermine whether to change attachment based on logical distance in view of threshold.” *Id.* at Fig. 2. Upon deciding in block 217 that a change should be made, the bridge sends an ATTACH.request packet to the device that sent the HELLO message. *Id.* at Fig. 2, 4:29–31. The ATTACH.request packet is forwarded to the root

node and then the root responds by sending an ATTACH.response packet back to the requesting bridge. *Id.* at 4:31–35. Upon receipt of the ATTACH.response packet, at block 209, the bridge attaches to the branch. *Id.* at 4:36–39. Thus, the path is changed by the bridge (client node) after it receives the ATTACH.response packet from the server. Ex. 1010 ¶ 105. We are persuaded that these disclosures teach the recited “implementing by the server node changes to upgrade the selected transmission path to an optimized transmission path.”

Based on our review of the full record, we find that Petitioner has established that one of ordinary skill in the art would have combined Meier and Gollnick and that the disclosures of these references would have taught the limitations of claim 10. *See* Pet. 49–54. As discussed above, we give little weight to Patent Owner’s assertion of secondary considerations. Accordingly, we determine that Petitioner has demonstrated by a preponderance of the evidence the unpatentability of claim 10 over the combined teachings of Meier and Gollnick.

C. Analysis of Asserted Grounds of Obviousness Based on Kahn, Jubin, Burchfiel, and Schwartz

1. Overview of Kahn

Kahn discusses “the basic concepts of packet radio.” Ex. 1003, Abstract. In particular, Kahn describes PRNET, a multi-hop, multiple access packet radio network. *Id.* at 1469, col. 1. Kahn notes that the network “should be capable of internetting in such a way that a user providing a packet address in another net can expect his network to route the associated packet to a point of connection with the other net or to an intermediate (transit) net for forwarding.” *Id.* at 1470, col. 1.

In PRNET, “all network control protocols which can have global effect are specifically initiated by one or more entities in the network call *stations*.” *Id.* at 1477, col. 1. Each station “is aware of all operational radios in the network.” *Id.* “The station determines the route to each of these radios and plays an active role in initializing, organizing, and maintaining the operational network. In particular, all routes are assigned by the station to minimize [packet radio (“PR”)] cost and complexity.” *Id.* Each station “deduces the overall connectivity of the network . . . and determines good routes to itself from each of the radios in its subset. The station then distributes to each radio in its subset the route from that radio to the station. This process is known as *labeling*.” *Id.* In the event of a failure or condition change in the network “routes will be dynamically reassigned by the station to satisfy the minimum-delay criteria.” *Id.* at 1480, col. 1.

2. Overview of Burchfiel

Burchfiel is titled “Functions and Structure of a Packet Radio Station.” Ex. 1004, Title. The prototypical station in Burchfiel is implemented in a Digital Equipment Corp. PDP-11, which is interfaced to ARPANET. *Id.* at 246, col 1. As described in the reference, “control functions performed by a station include initialization of the [Packet Radio Network (“PRN”)], dynamic routing changes, and multi-station coordination.” *Id.* at 247, col. 1. Packet Radio Units (“PRUs”) are “labelled” by stations and once a PRU is labelled it then contains routing parameters. *Id.*

Once the station has labelled all PRU’s and established connections to them, the information for maintaining these connections is entered into the station’s *connection table*. This contains the status information described above for handling the connection protocol. As terminals come ‘on-line’ within the

PRN, each terminal is also given a connection to its controlling station, and this information is added to the station's connection table.

Id. at 247, col. 2. The station's connection table "holds all status information for every connection being maintained by the station." *Id.* at 250, col. 1. The station constructs routes for each device and each "route is stored as part of the connection status in the connection table when the connection is established." *Id.*

3. *Analysis of Asserted Ground of Obviousness of Claim 12*

Petitioner alleges that claim 12 would have been rendered obvious by the combined teachings of Kahn, Jubin, Burchfiel, and Schwartz. Pet. 29–35. Petitioner's assertions may be summarized as follows: Kahn describes a station that teaches the claimed first node that acts as a gateway between two networks, specifically PRNET and ARPANET. Pet. 30–31. Burchfiel provides further information regarding these stations and in particular provides detail as to the station's connection table. Pet. 33. This table teaches the claimed map of data packet transmission paths. *Id.* Kahn and Burchfiel teach labeling the packet radios in the network and Burchfiel describes storing the routes in the station's connection table. *Id.* Kahn's stations "optimize the transmission paths" by dynamically reassigning routes in order to satisfy "minimum-delay criteria." *Id.* at 34. Schwartz provides specific algorithms that could be used to optimize routing based on "link length, speed, or bandwidth." *Id.* at 35 (citing Ex. 1007, 260).

Patent Owner argues that the cited art does not teach a "digital controller passing data packets received from said first network that are destined for said second network to said second network, and passing data packets received from said second network that are destined for said first

network to said first network.” PO Resp. 32. According to Patent Owner, Petitioner’s evidence fails because Kahn’s station nodes do not teach a gateway “because the gateway is required to be ‘between two networks.’” *Id.* at 33. Petitioner responds by noting that “between” refers to common or shared items. Reply 12 (citing Exs. 1017, 1018). Petitioner also directs us to the specification of the ’314 patent which describes a server as being part of wireless network 10 and acting as a gateway between the first and second networks.

The wireless network system 10 of the present invention [described in Fig. 1] *includes one or more servers 16*, the single example of which it herein labeled S. It should be noted that the server 16, serves as a gateway in that it performs a translation service *between* the first network and the second network.

Id. (quoting Ex. 1001, 7:41–48). We find Petitioner’s argument and evidence to be persuasive. The ordinary and customary usage of the term between and the ’314 specification support the argument that a server may be a part of a network and act as a gateway between networks. Thus, we are persuaded that the cited art teaches this limitation.

Patent Owner also asserts that the cited art does not teach “maintaining a map of data packet transmission paths to a plurality of second nodes of said first network.” PO Resp. 37. According to Patent Owner, Petitioner’s allegations only state that Kahn’s station processor determines the route to the packet radios. *Id.* Thus, Petitioner’s challenge falls short because this limitation requires more than just determining routes. *Id.* It also requires “a gateway to maintain a map of complete, data packet transmission paths to a plurality of second nodes in the first wireless network from the gateway.” *Id.*

Petitioner argues that the recited map is taught by the cited art's discussion of the "'labeling' process which maintains a map of network routes in the connection table in the station processor." Pet. 33 (citing Ex. 1003, 1477, 1482; Ex. 1004, 250). Patent Owner asserts that this disclosure is insufficient to teach the disputed limitation. PO Resp. 38–39. According to Patent Owner, Kahn's station receives neighbor tables from each packet radio and then uses these tables to "deduce the overall connectivity of the network." *Id.* at 38 (quoting Ex. 1003, 1477). Patent Owner argues that this "connectivity map" does not include the routes from each packet radio to the stations and thus, it is not a map of data transmission paths. *Id.* Patent Owner's arguments, however, do not address the disclosures of Burchfiel, which are cited in the Petition and in the Kahn reference itself. *See* Pet. 33; Ex. 1003, 1477. Burchfiel describes the stations as constructing routes for each device, and each "route is stored as part of the connection status in the connection table when the connection is established." Ex. 1004, 250, col. 1.

Once the station has labelled all PRU's and established connections to them, the information for maintaining these connections is entered into the station's *connection table*. This contains the status information described above for handling the connection protocol. As terminals come 'on-line' within the PRN, each terminal is also given a connection to its controlling station, and this information is added to the station's connection table.

Id. at 247. We are persuaded that these disclosures from Burchfiel viewed in light of Kahn's discussion of labelling teach "maintaining a map of data packet transmission paths to a plurality of second nodes of said first network."

Patent Owner also argues that Kahn, Jubin, and Schwartz would not have been combined by one of ordinary skill in the art. PO Resp. 40–46. Patent Owner asserts that Petitioner does not explain why a person of ordinary skill would modify the routing protocol found in Jubin or Kahn to instead use the algorithm from Schwartz. *Id.* at 40. Patent Owner also asserts that Kahn and Jubin would not have been combined because these references “offer fundamentally different ways to perform routing within the PRNET.” *Id.* at 42. As to claim 12, however, “Petitioner only relied on Jubin *as an alternative to Schwartz* for teaching alternative approaches to route optimization.” Reply 15. We agree with Petitioner’s characterization of its arguments and we find the disclosures of Schwartz to be sufficient to teach the recited route optimization. Thus, Jubin’s disclosures play no role in our analysis of the unpatentability of claim 12.

As to the combination of Kahn and Schwartz, Petitioner relies upon the disclosure of Kahn’s stations “optimiz[ing] the transmission paths” by dynamically reassigning routes in order to satisfy “minimum-delay criteria.” Pet. 33–34. Schwartz is relied upon to provide specific algorithms that could be used to optimize routing based on “link length, speed, or bandwidth.” *Id.* at 35 (citing Ex. 1007, 260). Kahn does not provide detail as to how to implement its “minimum-delay criteria.” *See* Ex. 1003, 1480. Petitioner explains that “one of skill in the art would have looked to Schwartz for additional information on routing algorithms to use in Kahn’s PRNET.” *Id.* at 28. On behalf of Patent Owner, Dr. Almeroth testifies that “Kahn’s centralized approach to routing and Schwartz’s decentralized Algorithm A are illustrative about the fundamental differences and incompatibility of various routing algorithms.” Ex. 2003 ¶ 177. Thus,

Patent Owner argues that one of ordinary skill in the art would not have combined these disparate approaches. PO Resp. 43. Petitioner, however, persuasively rebuts this argument. Petitioner asserts that Schwartz describes both centralized and decentralized routing algorithms. Pet. 13. Schwartz states that Algorithm A “lends itself to centralized computation” and describes how the computation would differ if performed for a centralized versus decentralized network. Ex. 1007, 268, 270. We are persuaded that one of ordinary skill in the art would look to a textbook such as Schwartz to obtain the details of an algorithm that may be used to implement the “minimum-delay criteria” referenced in Kahn. Thus, we are persuaded that one of ordinary skill in the art would have combined Kahn and Schwartz. Therefore, we are persuaded by Petitioner’s arguments and evidence and we find that one of ordinary skill in the art would have expanded upon the teachings of Kahn with Burchfiel’s teachings regarding stations and their connection tables and Schwartz’s teachings regarding routing algorithms. We find that one of ordinary skill would have combined the teachings of these references in order to obtain further information as to how to implement Kahn’s network.

Based on our review of the full record, we find that Petitioner has established that that one of ordinary skill in the art would have combined Kahn, Burchfiel, and Schwartz and that the disclosures of these references would have taught the limitations of claim 12. *See* Pet. 29–35. As discussed above, we give little weight to Patent Owner’s assertion of secondary considerations. Accordingly, we determine that Petitioner has demonstrated by a preponderance of the evidence the unpatentability of claim 12 over the disclosures of Kahn, Burchfiel, and Schwartz.

D. Analysis of Asserted Grounds of Obviousness Based on Kahn, Jubin, Burchfiel, Schwartz, and Cerf

Petitioner asserts that claims 13–19 would have been obvious over Kahn, Jubin, Burchfiel, Schwartz, and Cerf. Pet. 35–49. Independent claims 14 and 15 have many limitations similar to those of claim 12. Petitioner relies upon many of the same teachings from the references that were previously discussed in relation to claim 12. *Compare* Pet. 29–35 with *id.* at 37–46. Patent Owner maintains that the above discussed arguments directed to claim 12 also are applicable to claims 14 and 15. *See* PO Resp. 32, 37, 40. For reasons discussed above, we do not find those arguments to be persuasive.

Independent claims 14 and 15 contain additional limitations not found in claim 12 and we now turn to the analysis of Petitioner’s allegations directed to those limitations. Similar to claim 12, claim 14 is directed to a first node providing a gateway between a wireless network and a second network. Claim 14’s first node additionally includes “a first converter implementing a process to convert said data packet to a format used in said second network.” Petitioner asserts that Cerf teaches a gateway that translates packets from one protocol to another. *Id.* at 38. Cerf is a paper titled “Issues in Packet-Network Interconnection” that was referenced in Kahn. Ex. 1003, 1494, col. 2. n. 34. Cerf “introduces the wide range of technical, legal, and political issues associated with the interconnection of packet-switched data communication networks.” Ex. 1006, Abstract. One of the issues addressed in Cerf is the interconnection of networks using different protocols. *Id.* at 1387, col. 1. Cerf defines a protocol translator as “[a] collection of software, and possibly hardware, required to convert the high level protocols used in one network to those used in another.” *Id.* at

1387, col. 2. Cerf's Protocol Translation Gateways translate the packets from one network for use in another network. *Id.* at Fig. 13, 1398, col. 2–1399, col. 1. Petitioner relies upon these teachings from Cerf in conjunction with Kahn's previously discussed disclosure of a gateway node to teach the claimed converter. Pet. 38.

Claim 15, like claim 12, also is directed to a gateway between two networks. Claim 15 additionally recites “the digital controller sending the map of transmission paths to any second node that requests the map.” Petitioner argues that Kahn describes sending a map containing all of the transmission paths as part of its disclosure of a network that contains only one node. Pet. 44 (citing Ex. 1003, 1482, col. 1). That single node is labelled, and the server as part of that labeling process provides the node with the one and only route in the system. *Id.* (citing Ex. 1010 ¶¶ 187–189). Patent Owner argues that the single node system does not meet the limitations of claim 15 because in that scenario the system will not send a path of *transmission paths*; instead it will only send a single transmission path. PO Resp. 36. As discussed above in reference to the construction of this term, the proper construction of this term is broad enough to encompass the situation where there is only one node in the network. *See* § II.B. Thus, we do not agree with Patent Owner's argument. We are persuaded by Petitioner's argument and evidence and determine that Petitioner has demonstrated that the cited references teach “the digital controller sending the map of transmission paths to any second node that requests the map.”

Patent Owner contends that one of ordinary skill in the art would not have combined the teachings of Kahn, Jubin, Burchfiel, Schwartz, and Cerf. PO Resp. 47. As discussed above, we are persuaded that one of ordinary

skill in the art would have combined Kahn and Schwartz. *See* § II.C.3. In addition, we note that Kahn expressly cites the disclosures of Burchfiel that are relied upon in this combination. *See* Ex. 1003, 1477. Thus, we are persuaded that one of ordinary skill would have combined Kahn and Burchfiel in the manner contemplated by the asserted grounds.

As to Jubin, this reference is used as an alternative to Schwartz for all claims but claim 18. Claim 18 recites “wherein the second network is a TCP/IP protocol network.” Petitioner notes that Kahn predates the announcement of the TCP/IP protocol and relies upon Jubin for the use of this protocol. *Pet.* 48. Jubin notes that PRNET is part of the DARPA Internet systems and as such it must run Department of Defense standard protocols such as IP, TCP, and TELNET. *Ex.* 1005, 22. Petitioner asserts that one of ordinary skill in the art would have been motivated to combine Jubin and Kahn because “Jubin describes the same PRNET that was the subject of Kahn’s article, except that Jubin describes the PRNET as it existed eight years later, in early 1987.” *Pet.* 27. We are persuaded that one of ordinary skill in the art would have referred to the updated discussion of PRNET found in Jubin to understand what protocols may be used in regards to the network.

As to Cerf, Patent Owner argues that one of ordinary skill in the art would not know how to combine Cerf and Kahn due to the “many unresolved issues relating to how gateways between wireless networks and other networks would work.” *PO Resp.* 48 (citing *Ex.* 2003 ¶ 186). This discussion, however, does not address the fact that Kahn cites to Cerf as part of its discussion of connecting PRNET to ARPANET. *See* *Ex.* 1003, 1494, col. 2. n.34. Cerf is an article that describes the implementation (and related

issues) involved with communicating across networks. Ex. 1010 ¶¶ 37–39. Cerf describes the motivation for connecting disparate networks and the then current methods for achieving such connections. Ex. 1006, Abstract. We are persuaded that one of ordinary skill in the art would have taken the express suggestion found in Kahn and reviewed the discussion of interconnecting networks found in Cerf. Thus, we find that one of ordinary skill in the art would have combined the teachings of Kahn and Cerf.

Based on our review of the full record, we find persuasive Petitioner’s arguments and evidence that Kahn, Burchfiel, Schwartz, and Cerf teach the limitations of independent claims 14 and 15. *See* Pet. 37–46. We also have reviewed the full record as to dependent claims 13, 16, 17, and 19 and we are persuaded that Kahn, Burchfiel, Schwartz, and Cerf teach the limitations of these dependent claims. *See id.* at 35–37, 46–49. Similarly we have reviewed the full record as to claim 18 and we are persuaded that Kahn, Jubin, Burchfiel, Schwartz, and Cerf teach the limitations of this dependent claim. *Id.* at 48. As discussed above, we give little weight to Patent Owner’s assertion of secondary considerations. Accordingly, we determine that Petitioner has demonstrated by a preponderance of the evidence the unpatentability of claims 13–17 and 19 over the disclosures of Kahn, Burchfiel, Schwartz, and Cerf and claim 18 over the disclosures of Kahn, Jubin, Burchfiel, Schwartz, and Cerf.

IV. CONCLUSION

Based on the arguments in the Petition, as well as the evidence of record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 10 would have been obvious over Meier and Gollnick; claim 12 would have been obvious over Kahn, Burchfiel, and

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Schwartz; claims 13–17, and 19 would have been obvious over Kahn, Burchfiel, Schwartz, and Cerf; and claim 18 would have been obvious over Kahn, Jubin, Burchfiel, Schwartz, and Cerf.

V. ORDER

For the reasons given, it is

ORDERED that claims 10 and 12–19 of the '314 patent are held unpatentable;

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

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