UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/184,692	07/18/2011	Youn M. Lee	ARL 10-03	1938

21364 7590 11/10/2016
U S ARMY RESEARCH LABORATORY
ATTN: RDRL-LOC-I
2800 POWDER MILL RD
ADELPHI, MD 20783-1138

EXAMINER
TRAN, HAI V

ART UNIT	PAPER NUMBER
2845	

MAIL DATE	DELIVERY MODE
11/10/2016	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YOUN M. LEE

Appeal 2015-006264
Application 13/184,692
Technology Center 2800

Before MAHSHID D. SAADAT, JOHNNY A. KUMAR, and
JON M. JURGOVAN, *Administrative Patent Judges*.

KUMAR, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] appeals under 35 U.S.C. § 134(a) from the Final Rejection of claims 1–19 and 21.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

---

[1] According to Appellant, the real party in interest is the United States of America, as represented by the Secretary of the Army (App. Br. 2).
[2] Claim 20 was canceled.

STATEMENT OF THE CASE

Invention

Appellant's invention relates to a planar monopole antenna with an ultra-wideband characteristic having a microwave absorber on an opposing face of the antenna substrate (Spec. ¶ 2).

Representative Claim

1. A planar monopole antenna comprising:

a dielectric substrate having a first surface and an opposing rearward surface;

an electrically conductive antenna element adhered to the first surface of said dielectric substrate;

an electrically conductive coplanar waveguide in electrical communication with said antenna, said coplanar waveguide adhered to the first surface of said dielectric substrate;

two ground planes adhered to the first surface of said dielectric substrate as part of the coplanar waveguide; and

a microwave absorber layer adhered to the rearward surface of said dielectric substrate, the microwave absorber layer extending to the periphery of the rearward surface of the dielectric substrate.

The Examiner's Rejections

Claims 1–3, 5, 6, 8, 9, 11–13, and 15–19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Varadan et al. (US 6,525,691 B2; issued Feb. 25, 2003) and Johnson (US 5,828,340; issued Oct. 27, 1998) (Final Act. 2–14).

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Varadan, Johnson, and Kuroda (US 7,180,466 B2; issued Feb. 20, 2007) (Final Act. 15).

Claims 7, 10, and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Varadan, Johnson, and Connolly et al. (US 4,038,660; issued July 26, 1977) (Final Act. 15–17).

Claim 14 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Varadan, Johnson, and Pelissier et al. (*LNA-Antenna Codesign for UWB Systems*, Proceedings of the IEEE International Symposium on Circuits and Systems 4711 (2006)) (Final Act. 18).

Appellant's Contentions

Appellant contends the following:

1. Regarding independent claims 1, 11, 15, and 16, the Examiner fails to explain how or why Johnson's coplanar waveguide would benefit Varadan's antenna, thus, one of ordinary skill in the art would have no reason to combine the teachings of Varadan and Johnson (App. Br. 7–9).

2. The Examiner erred by asserting the use of Johnson's coplanar feeding structure with Varadan's antenna structure is a matter of design choice, because the structure and function of each antenna is different (App. Br. 9–10). Specifically:

   a. Varadan uses a fractal pattern monopole antenna, which is independent of wavelength and has a hemispherical radiation profile, whereas Johnson uses a tab monopole antenna that is based on operational wavelength and has an omni-directional radiation pattern in azimuth (App. Br. 11 and 14–15; Reply Br. 5–6).

b. Varadan's antenna is either perpendicular to the ground plane or stacked behind the substrate; Johnson's co-planar antenna and ground plane are arranged parallel to one another (App. Br. 12–13; Reply Br. 3–4).

c. The arrangement of Varadan's substrate and ground plane, which are individually produced and then joined together, does not suggest the entire antenna structure is amenable to printing, as suggested by the Examiner (App. Br. 16; Reply Br. 6–7).

3. Varadan teaches away from the use of conventional antennas, such as the tab antenna of Johnson, by disclosing the advantages of fractal antennas over conventional antennas (App. Br. 12).

4. The combination of Varadan and Johnson does not teach enabling the antenna with a microwave absorber layer to operate with a reduced return loss and lower operating frequency, as required in claims 11 and 16 (App. Br. 16–17; Reply Br. 7). Varadan teaches the return loss with an absorber remains above -10 dB for the lowest frequencies, and shows an increase in return loss for some frequencies (*id.*).

5. Regarding claim 8, the Examiner errs by finding the thickness of the microwave absorber layer is a design choice, because Varadan does not recognize absorber thickness as a result-effective variable, and Varadan's return loss with the absorber is not improved for all frequencies (App. Br. 18–20; Reply Br. 7–8).

6. Claims 12 and 13 require an energizing step to occur at a frequency range of between 0.16 and 1.2 gigahertz, whereas Varadan teaches a return loss mostly above -10 dB at the claimed frequency range (App. Br. 20; Reply Br. 9).

7. Claims 17 and 18 require a return loss of 10 dB or better between 0.88 GHz and 1.2 GHz, whereas Varadan shows a return loss well above -10 dB under 1 GHz.

8. Regarding claim 4, the Examiner erred in combining Kuroda's circular antenna with the structure of Varadan and Johnson, because geometry is an important design feature for antenna structures and the Examiner has not explained why one of ordinary skill would replace Varadan's fractal antenna with Kuroda's antenna (App. Br. 22–23; Reply Br. 10).

9. The Examiner erred in relying on Connolly to teach the microwave absorber layer being formed of carbon powder impregnated on sponge, as recited in claim 7, because Connolly teaches a spacer layer coated with a carbon film, not an impregnated structure (App. Br. 23–24; Reply Br. 11). Further, Connolly's absorber for preventing radar reflection would not improve the performance of an antenna (*id.*).

10. The Examiner has not provided a reason, other than impermissible hindsight, for combining the low noise amplifier of Pelissier with the antenna structure of Varadan and Johnson to reject claim 14 (App. Br. 25–26; Reply Br. 12).[3]

ANALYSIS

We have reviewed the Examiner's rejections in light of Appellant's arguments (App. Br. 7–26; Reply Br. 3–12) that the Examiner erred. We

[3] Separate patentability is not argued for dependent claims 2, 3, 5, 6, 9, 10, 19, and 21 (App. Br. 16). Except for our ultimate decision, these claims are not discussed further.

disagree with Appellant's above contentions 1–10. We adopt as our own (1) the findings and reasons set forth by the Examiner in the action from which this appeal is taken (Final Act. 2–18) and (2) the reasons set forth by the Examiner in the Examiner's Answer (Ans. 3–11) in response to Appellant's Appeal Brief. We concur with the conclusions reached by the Examiner. We highlight and address specific findings and arguments for emphasis as follows.

Independent Claims 1, 11, 15, and 16

Regarding Appellant's contentions 1 and 2, we do not agree that the different structure and function of the antennas of Varadan and Johnson preclude the Examiner's asserted combination. The test for obviousness is "what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). When combining references, "a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007). Here, the Examiner finds both Varadan (Ans. 4–6 (citing Varadan, col. 3, ll. 36–40, which refers to parallel ground plane structure of Fig. 11A)) and Johnson (*id.* (citing Johnson Fig. 1)) teach a planar antenna and waveguide structure formed on a substrate. We agree with the Examiner's finding that it was within the grasp of a skilled artisan to substitute one type of known waveguide (i.e., Johnson's top surface coplanar waveguide, Fig. 1, elements 12/14) for another known type (i.e., Varadan's back surface waveguide, Fig. 11A, element 82) to arrive at the claimed co-planar antenna structure (Ans. 3–7). *See KSR*, 550 U.S. at 416 (mere substitution of one element for

another known in the art is likely to be obvious when it does no more than yield predictable results). Thus, the Examiner has provided "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness," specifically that the waveguides of Varadan and Johnson are known functional equivalents (Ans. 7; *see KSR*, 550 U.S. at 417–18 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006))).

We are unpersuaded of Examiner error by Appellant's contention 3 that Varadan's discussion of the advantages of a fractal antenna teaches away from the combination with Johnson. The Examiner's proffered combination of Varadan and Johnson does not replace the antenna of Varadan, but, rather, substitutes the waveguide of Johnson for the waveguide of Varadan, as discussed *supra* (Ans. 4–7).

Appellant's contention 4 that Varadan does not teach a reduced return loss and lower operating frequency is not persuasive of error, because claims 11 and 16 do not require any specific return loss value or frequency value. Thus, we agree with the Examiner's finding that Varadan teaches at least some points where the operating frequency is lowered due to the reduced return loss (Ans. 8 (citing Varadan Fig. 6: around 1 GHz, operating frequency is lowered with the absorber reducing return loss below -10 dB)).

Accordingly, we sustain the Examiner's rejection of independent claims 1, 11, 15, and 16 under 35 U.S.C. § 103(a) as being unpatentable over Varadan and Johnson.

Claim 8

As to Appellant's contention 5 that the Examiner erred in finding the claimed microwave absorber thickness to be obvious over the combination

of Varadan and Johnson, we are not persuaded of error in the rejection, because Appellant's Specification leaves it to one of ordinary skill in the art to "conduct experiments to determine adequate thickness [of the microwave absorber 22] for an antenna or antenna array" (Spec ¶ 19). Thus, we agree with the Examiner's finding that it was within the grasp of a skilled artisan to select the claimed absorber thickness to achieve a desired antenna performance (Final Act. 7; Ans. 8–9), and we sustain the Examiner's rejection of claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Varadan and Johnson.

Claims 12, 13, 17, and 18

We are not persuaded of Examiner error by Appellant's contentions 6 and 7 that Varadan does not teach an energizing step that provides a return loss of -10 dB or better for a frequency range between 0.16 and 1.2 GHz (claims 12 and 13) or a frequency range between 0.88 and 1.2 GHz (claims 17 and 18). The broadest reasonable interpretation of the claims that is consistent with Appellant's disclosure does not require the return loss to be -10 dB or better throughout the entire range, but, rather, at any subset of frequencies within the range (*see In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004) ("[T]he PTO is obligated to give claims their broadest reasonable interpretation during examination.")). Thus, we agree with the Examiner's finding that Varadan teaches an energizing step, or operating frequency, at frequencies around 1 GHz that provide -10dB or better return loss (Ans. 9 (citing Varadan Fig. 6)), which are frequencies that fall within the claimed ranges. Accordingly, we sustain the Examiner's

rejection of claims 12, 13, 17, and 18 under 35 U.S.C. § 103(a) as being unpatentable over Varadan and Johnson.

Claim 4

Appellant's contention 8 that the Examiner has not explained why one of ordinary skill would replace Varadan's fractal antenna with Kuroda's circular antenna is not persuasive of Examiner error. We agree with the Examiner's finding that it was within the grasp of a skilled artisan to substitute one type of known antenna (i.e., Kuroda's circular antenna) for another known type (i.e., the antenna of the combination of Varadan and Johnson) to arrive at the claimed antenna structure (Ans. 10; *see KSR*, 550 U.S. at 416 (mere substitution of one element for another known in the art is likely to be obvious when it does no more than yield predictable results)). Thus, we sustain the Examiner's rejection of claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Varadan, Johnson, and Kuroda

Claim 7

Regarding Appellant's contention 9 that Connolly does not teach an absorber layer formed of carbon powder impregnated on sponge, we are not persuaded of Examiner error because claim 7 does not require the sponge itself to be impregnated *with* carbon, but, rather, carbon powder impregnated *on* sponge. Thus, we agree with the Examiner's finding that Connolly teaches a microwave absorber having a carbon powder impregnated layer (Ans. 10 (citing Connolly, col. 4, ll. 34–45 and Fig. 1, layer 8)) formed on sponge (*id.* (citing Connolly, Fig. 1, foam layer 6)). Further, Appellant has offered no persuasive evidence to rebut the Examiner's finding that a skilled

artisan would recognize Connolly's microwave absorber layer material is suitable for use as the microwave absorber of Varadan and Johnson (Final Act. 15–16; Ans. 10). As attorney argument alone is not evidence, we sustain the Examiner's rejection of claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Varadan, Johnson, and Connolly. *See In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997); *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974).

Claim 14

Appellant's contention 10 that the combination of Varadan, Johnson, and Pelissier is based on improper hindsight reasoning does not present sufficient evidence that the Examiner's rejection is based on knowledge gleaned only from Appellant's disclosure, or based on knowledge which was beyond the level of ordinary skill in the art at the time (*see In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971)). We agree with the Examiner's finding that a skilled artisan would recognize combining a low noise amplifier with a monopole antenna, as taught by Pelissier, would improve the performance of the antenna of Varadan and Johnson by boosting the antenna's signal gain (Final Act. 18; Ans. 10–11).

DECISION

We affirm the Examiner's rejections of claims 1–19 and 21 under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED