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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* JOSEPH A. PAULUS

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Appeal 2017-011776  
Application 13/525,853  
Technology Center 3700

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Before BART A. GERSTENBLITH, CYNTHIA L. MURPHY, and  
SCOTT C. MOORE, *Administrative Patent Judges*.

MURPHY, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant<sup>1</sup> appeals under 35 U.S.C. § 134 from the Examiner's rejection of claims 1–16. We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> “The real party in interest is the assignee of the entire interest in this patent application, Covidien LP, which is a wholly-owned subsidiary of Medtronic PLC.” (Appeal Br. 1.)

## STATEMENT OF THE CASE

The Appellant's invention "relates generally to medical / surgical ablation systems and methods for delivering electrosurgical energy to tissue," and, more particularly, "to the spectral frequency content of the energy delivered to tissue to achieve deep penetration of energy." (Spec. ¶ 2.)

### *Illustrative Claim*

1. A method for delivering electrosurgical energy to a target tissue, the method comprising:
  - providing a di-pole microwave antenna attached to a distal end of a microwave energy transmission line, the di-pole microwave antenna including:
    - proximal and distal radiating portions configured to resonate at at least two resonant, microwave frequencies;
    - positioning the di-pole microwave antenna relative to the target tissue;
    - connecting a microwave generator to a proximal end of the microwave energy transmission line, the microwave generator configured to generate a microwave signal containing energy at the at least two resonant, microwave frequencies;
    - estimating energy delivery to the target tissue of a resulting current density waveform of the microwave signal at a plurality of instantaneous time points, each time point of the plurality of instantaneous time points corresponding to a phase angle of the resulting current density waveform, such that the phase angle of each time point is shifted by a predetermined phase angle from a preceding time point;
    - generating the microwave signal; and
    - delivering the microwave signal through the microwave energy transmission line and to the di-pole microwave antenna, wherein the microwave signal resonates the di-pole microwave antenna at the at least two resonant, microwave frequencies.

*Rejection*

The Examiner rejects claims 1–16 under 35 U.S.C. § 103(a) as unpatentable over Kassayan<sup>2</sup> and Miller.<sup>3</sup> (Final Action 2.)

ANALYSIS

Claims 1 and 9 are the independent claims on appeal, with the rest of the claims on appeal (i.e., claims 2–8 and 10–16) depending therefrom. (*See* Appeal Br., Claims App.)

Independent claim 1 recites “[a] method for delivering electrosurgical energy to a target tissue,” and independent claim 9 recites “[a] method of increasing penetration of microwave energy into a target tissue.” (Appeal Br., Claims App.) The Examiner determines that the claimed methods would have been obvious over the combined teachings of Kassayan and Miller (*see* Final Action 2–9); and the Appellant argues that the Examiner errs in making this determination (*see* Appeal Br. 4–5). As discussed below, we are unpersuaded by the Appellant’s arguments because they are not aligned with the Examiner’s rejection.

Independent claims 1 and 9 recite a “di-pole microwave antenna,” and a “microwave generator” that is configured to “generate a microwave signal” for delivery thereto. (Appeal Br., Claims App.) Independent claims 1 and 9 also recite that this “microwave signal” contains energy at two or more “microwave frequencies.” (*Id.*)

The Examiner finds that Kassayan discloses a method in which a microwave generator generates a microwave signal for delivery to a di-pole

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<sup>2</sup> US 2005/0205566 A1, published September 22, 2005.

<sup>3</sup> US 6,503,191 B1, issued January 7, 2003.

microwave antenna. (*See* Final Action 2–3; *see also* Kassayan ¶¶ 7, 11, 12.) The Examiner also finds that, in Kassayan, the generator is configured to generate a microwave signal containing energy at “two microwave frequencies.” (Final Action 2, 6; *see also* Kassayan ¶ 59.)

Independent claims 1 and 9 require the two or more “microwave frequencies” of the microwave signal to be “resonant” microwave frequencies. (Appeal Br., Claims App.) Independent claim 1 further recites that “the microwave signal resonates the di-pole microwave antenna at the at least two resonant, microwave frequencies.” (*Id.*) Independent claim 9 similarly recites “resonating the di-pole microwave antenna at the at least two resonant, microwave frequencies.” (*Id.*)

The Examiner finds that Miller teaches that, when the aim is “to destroy unwanted molecules and cells,” a “resonant frequency” makes “it possible to target specific, undesirable cells.” (Final Action 5.) To this end, Miller teaches a generator “designed to provide a resonant frequency signal to destroy unwanted molecules and cells.” (*Id.* at 4.) In other words, Miller teaches the generation and delivery of a signal containing energy at a resonant frequency corresponding to the unwanted tissue. (*See* Miller, col. 5, l. 64 – col. 6, l. 3.)

The Examiner further finds that “Miller discloses using one or more resonance frequencies.” (Final Action 5.) This finding by the Examiner is based upon Miller’s explanation that the unwanted “molecules” have a unique family of “resonance frequencies,” and “[w]hen irradiated at exactly, or very nearly, one or any number of these frequencies, by electromagnetic (EM) waves, resonance absorption occurs transforming the EM energy into heat energy.” (Miller, col. 7, ll. 51–54.) Thus, Miller discloses that, when

radiating unwanted tissue at a single resonant frequency, this “single resonant frequency” can be selected from a number of “resonance frequencies” corresponding to this unwanted tissue.

The Examiner determines that it would have been obvious, in view of the teachings of Miller, to modify Kassayan’s method to generate a microwave signal containing energy at “two resonant microwave frequencies” in order to “more selectively destroy targeted tissues.” (Final Action 5.) Put another way, when Kassayan is radiating unwanted tissue at two microwave frequencies, these two frequencies can be selected from a number of “resonance frequencies” corresponding to this unwanted tissue.

The Appellant advances arguments premised upon neither Kassayan nor Miller individually disclosing “the at least two resonant, microwave frequencies” required by independent claims 1 and 9. (*See* Appeal Br. 4–5.) As for Kassayan, the Appellant asserts that the Examiner “concedes” that it does not disclose causing its antenna to resonant at two *resonant* frequencies. (*Id.* at 4.) As for Miller, the Appellant contends that its antenna “is merely resonated at a single frequency at a given time.” (*Id.* at 5, emphasis omitted.)

We are not persuaded by these arguments because they are not aligned with the Examiner’s rejection, which relies upon Kassayan to teach a microwave signal containing energy at two microwave frequencies to destroy unwanted tissue, and relies upon Miller only to teach that a plurality of resonance frequencies correspond to this unwanted tissue. The Appellant does not find fault with the Examiner’s finding that Kassayan teaches using a microwave signal, containing energy at two microwave frequencies, to destroy unwanted tissue. (*See* Final Action 2–3.) And the Appellant does

not dispute that Miller teaches that a number of “resonance frequencies” can correspond to this unwanted tissue. (*See id.* at 4.)

The Appellant also advances arguments that appear to be premised upon Miller’s method being modified to accommodate a microwave signal containing energy at two resonant frequencies. (*See Reply Br.* 2–6.) For example, the Appellant asserts that “Miller is entirely devoid of any disclosure of the output device having the capability of resonating at at least two resonant, microwave frequencies when supplied by microwave energy containing the at least two resonant, microwave frequencies.” (*Id.* at 2–3.) Along this same line, the Appellant contends that the Examiner has failed to provide “evidentiary support” that Miller’s output device is capable of resonating at two resonant microwave frequencies. (*Id.* at 3.)

We are not persuaded by these arguments because, again, they are not aligned with the Examiner’s rejection. In the Examiner’s proposed combination of the prior art, it is Kassayan’s method that is modified. In this modified method, the microwave signal, containing energy at two microwave resonant frequencies, is delivered to Kassayan’s output device. And the Appellant does not assert that Kassayan’s output device would not be capable of resonating at two resonant frequencies.

Thus, the Appellant does not show sufficiently that the Examiner errs in determining that the methods recited in independent claims 1 and 9 would have been obvious over the prior art. The Appellant does not argue the dependent claims separately. (*See Appeal Br.* 5.) We, therefore, sustain the Examiner’s rejection of independent claims 1 and 9, and the claims on appeal depending therefrom, under 35 U.S.C. § 103(a) as unpatentable over Kassayan and Miller.

Appeal 2017-011776  
Application 13/525,853

DECISION

We AFFIRM the Examiner's rejection of claims 1–16.

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