

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OLYMPUS AMERICA INC. and
OLYMPUS MEDICAL SYSTEMS CORPORATION,
Petitioner,

v.

PERFECT SURGICAL TECHNIQUES, INC.,
Patent Owner.

Case IPR2014-00241
Patent 6,682,527 B2

Before FRANCISCO C. PRATS, BENJAMIN D. M. WOOD, and
JAMES B. ARPIN, *Administrative Patent Judges*.

ARPIN, *Administrative Patent Judge*.

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

I. INTRODUCTION

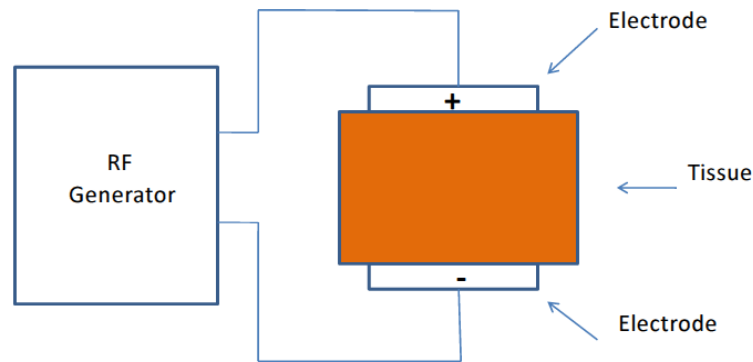
Olympus America Inc. and Olympus Medical Systems Corporation (collectively, “Petitioner”) filed a corrected Petition requesting *inter partes* review of claims 17–30 of Patent No. US 6,682,527 B2 (Ex. 1011, “the ’527 patent”) pursuant to 35 U.S.C. §§ 311–319. Paper 5 (“Pet.”), 1–2. On June 16, 2014, we issued a Decision on Institution (Paper 15, “Dec. on Inst.”), instituting *inter partes* review of claims 17–23, 26, 29, and 30 of the ’527 patent. Dec. on Inst. 33. Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 28, “PO Resp.”), and Petitioner filed a Reply (Paper 35, “Pet. Reply”) thereto.

The parties requested an oral hearing (Papers 38 and 39) and appeared before us on February 23, 2015. The record includes a transcript of the hearing. Paper 50 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, addresses issues and evidence raised during the *inter partes* review. For the reasons that follow, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 17–23, 26, 29, and 30 of the ’527 patent are unpatentable.

A. *The ’527 Patent*

The ’527 patent discloses a radio frequency generator for use in electrosurgery. Ex. 1101, col. 5, ll. 35–38. Bipolar systems use two or more electrodes of opposite polarity that are in direct or indirect contact with the treated tissue. *See id.* at col. 1, ll. 18–21; col. 2, ll. 20–31; col. 7, ll. 37–57. Petitioner’s declarant presented a block diagram of a bipolar system, reproduced below:



Pet. 7 (citing Ex. 1113 ¶ 28). As shown in the block diagram above, in such bipolar systems, current flows from the radio frequency (“RF”) generator to the electrodes and through the treated tissue. *Id.* Among other things, the electrosurgical effect may be a function of the profile of the power output of the generator (e.g., the level of power, the variation of power over time, the frequency of the power, etc.). *See* Ex. 1101, col. 3, ll. 23–26. Regardless of the type of surgical instruments carrying the electrodes, the principles and tissue effects of electrosurgery are the same. *See id.* at col. 1, ll. 57–60; col. 5, ll. 35–38; *see also* Pet. 7–8 (citing Ex. 1113 ¶ 32).

According to the Specification of the ’527 patent, under certain circumstances, charring of the treated tissue (Ex. 1101, col. 1, ll. 30–36), and premature increase in impedance between the electrode and the tissue, may prevent complete, thorough, and uniform heating of the tissue under treatment (*see id.* at col. 2, ll. 54–61). The Specification of the ’527 patent suggests that the cause of this premature increase in impedance is due to the formation of a vapor layer between the electrodes and the treated tissue. *Id.* at col. 2, l. 49–col. 3, l. 9.

The ’527 patent teaches that the problem of prematurely increased impedance may be avoided by selecting and applying an initial level of power to the electrodes and then increasing power from that initial level at a predetermined

rate. *Id.* at col. 3, ll. 16–20. The initial level and predetermined rate are “selected to avoid creating a vapor layer and to permit an impedance increase to occur as a result of complete tissue desiccation.” *Id.* at col. 3, ll. 20–22; *see also id.* at col. 7, ll. 1–20 (describing the flow chart of Fig. 3). As to the predetermined rate, the ’527 patent teaches that the rate “may be preselected by a user depending on the electrode sizes, the target tissue type, the degree of tissue perfusion, and the initial power level,” and that such rate may “be linear and increase at a rate in the range from 1 W/sec to 100 W/sec, preferably from 1W/sec to 10/W sec.” *Id.* at col. 3, ll. 23–28; *see id.* at col. 4, ll. 40–45.

Figure 3 of the ’527 patent is reproduced below with our annotations.

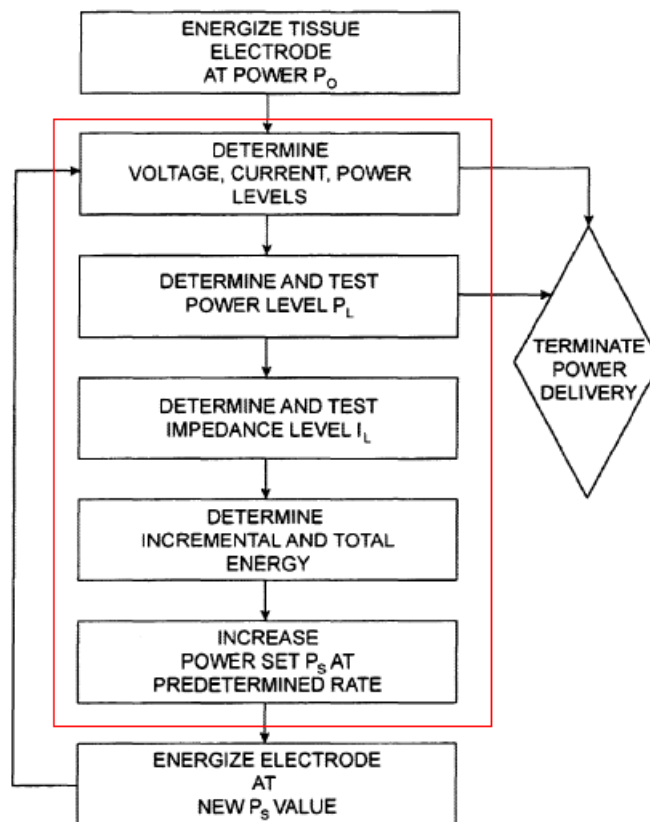


FIG. 3

The '527 patent explains:

As seen in FIG. 3, voltage, current, and power levels are determined and the power level is tested at 20 millisecond intervals. If the power level read is more than 5 watts greater than a power set value, the system automatically terminates power delivery and enters the fault state, where it remains until the system is re-powered. At this same interval, tissue impedance is measured and tested by comparing the measured impedance to an impedance limit, the impedance limit typically being in the range from 50 ohms to 1000 ohms. If the measured impedance exceeds the impedance limit, the power delivery is automatically terminated and the system returns to ready state. Incremental and total energy levels are also calculated during this 20 millisecond interval. *If the impedance limit is not exceeded, the power set level is increased at a predetermined rate from the initial level, wherein the initial level and predetermined rate are selected to avoid creating a vapor layer and to permit an impedance increase to occur as a result of complete tissue desiccation.* Typically, the predetermined rate is from 1 W/sec to 100 W/sec, and the electrode members are energized at this increased power set value at 100 millisecond intervals.

Id. at col. 7, ll. 1–20 (emphasis added).¹

B. Illustrative Claim

Claim 17 is independent and is illustrative. The remaining challenged claims 18–23, 26, 29, and 30 depend from claim 17. Claim 17 is reproduced below with disputed limitations emphasized.

17. A radio frequency generator comprising:
a radio frequency power source having a controlled voltage output and a bipolar connection for bipolar forceps having first and second jaws with first and second electrode members; and

¹ Petitioner alleges that Figure 3 contains certain errors. Pet. 23 n.7. The alleged errors are not relevant to our analysis in this Decision.

means for automatically increasing power delivered to the bipolar forceps;

*wherein the increasing means increases the power at a predetermined rate from an initial level, the initial level and predetermined rate avoiding formation of a vapor layer while permitting an impedance increase to occur as a result of complete tissue dessication.*²

Ex. 1011, col. 10, ll. 4–15 (emphasis added).

C. References, Declarations, and Depositions

Petitioner and Patent Owner primarily rely upon the following references, declarations, and depositions:

Exhibits Nos.	References, Declarations, and Depositions
1104	Patent No. US 6,139,546 (“US’546”)
1105	Patent No. US 5,954,717 (“US’717”)
1108	Patent No. US 6,398,779 B1 (“US’779”)
1110	Patent No. US 6,936,047 B2 (“US’047”)
1111	International Publication WO 97/40882 A2 (“WO’882”)
1113	Declaration of Roger Odell
2002	Declaration of Dr. Robert Tucker
2005	Deposition Transcript of Dr. Robert Tucker

D. Reviewed Grounds of Unpatentability

We instituted *inter partes* review on the following grounds of unpatentability (Dec. on Inst. 33):

Ground	References	Reviewed Claim(s)
§ 103(a)	US’717 and US’546	17, 18, 21, 22, 29, and 30

² We understand “dessication” to be a misspelling or alternative spelling of the word “desiccation.”

Ground	References	Reviewed Claim(s)
§ 103(a)	US'717, US'546, and US'779	19
§ 103(a)	US'717, US'546, and US'047	20 and 26
§ 103(a)	US'717, US'546, and WO'882	23

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are construed according to their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *In re Cuzzo Speed Techs., LLC*, 778 F.3d 1271, 1281–82 (Fed. Cir. 2015) (“Congress implicitly adopted the broadest reasonable interpretation standard in enacting the AIA,” and “the standard was properly adopted by PTO regulation.”); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Moreover, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A patentee may act as his or her own lexicographer by providing a special definition for a claim term in the specification with “reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Generally, in the absence of such a special definition or other considerations, “limitations are not to be read into the claims from the specification.” *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

In the Decision on Institution, we provided constructions for various terms of the challenged claims. Dec. on Inst. 10–16. Patent Owner does not challenge our constructions of these terms. *See* Tr. 95:12–97:5. Claim 17, however, recites

means for automatically increasing power delivered to the bipolar forceps; wherein the increasing means increases the power at a predetermined rate from an initial level, the initial level and predetermined rate avoiding formation of a vapor layer while permitting an impedance increase to occur as a result of complete tissue dessication.

Ex. 1011, col. 10, ll. 9–14. Petitioner only challenges our construction of this means-plus-function term. Pet. Reply 1–3.

In the Petition, Petitioner proposed a construction for this means-plus-function limitation. Pet. 19–24. In particular, Petitioner argued that we should apply a two-step analysis to this term: first, identify the particular function performed by the means, and, second, review the specification to identify the structure performing that function. *Id.* at 19; *see Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1210 (Fed. Cir. 2003). We agreed.

Regarding the first step, we determined that, in the function of “automatically increasing power delivered to the bipolar forceps,” the reference to bipolar forceps is merely a statement of intended use of the claimed generator, and this function is read as increasing power delivered *to the bipolar connection*, not to the bipolar forceps. Dec. on Inst. 11; *see* Pet. 20. Further, we determined that the means for automatically increasing power must (1) have an initial level; (2) must increase power at a predetermined rate from that initial level; and (3) the initial level and predetermined rate must be chosen to avoid formation of a vapor layer, e.g., avoid exceeding the impedance limit (Ex. 1101, col. 7, ll. 13–18), “while permitting an impedance increase to occur as a result of complete tissue dessication.” Dec. on Inst. 11; *see* Pet. 21.

Regarding the second step, the Specification of the '527 patent discloses the means for automatically increasing power is “a programmable digital controller, a control program embodied in a tangible medium, or other means for automatically increasing power delivered by the generator. In particular, the digital controller or other increasing means can be programmed to implement any of the methods described above independent of operator intervention.” Ex. 1101, col. 4, ll. 56–62; *see* Pet. 22. Thus, Petitioner concludes that “the corresponding structure must include the algorithm used to carry out the claimed function.” *Id.* at 22–23 (citing *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008)). Again, we agreed.

Referring to the discussion of Figure 3, as annotated above (*see* Ex. 1101, col. 7, ll. 1–20), we determined that the algorithm is depicted in Figure 3 (*see* Pet. 23). Dec. on Inst. 12. In particular, we determined that the algorithm

carries out four functions: (1) it determines (by measuring or calculating) the voltage, current, power and impedance levels (Ex. 1101 at Col. 7:1–3; Col. 7:6–7), (2) it shuts off power when the determined power level exceeds a predetermined level (Ex. 1101 at Col. 7:3–5), (3) it shuts off power when the calculated impedance level exceeds a predetermined impedance level (Ex. 1101 at Col. 7:9–12) and (4) it increases power from an initial level at a predetermined rate with the predetermined rate and initial level being selected to avoid the formation of a vapor layer (Ex. 1101 at Col. 7:13–17).

Id. at 12.

Nevertheless, Petitioner argues that we erred in construing the means-plus-function limitation for two reasons. Pet. Reply 1–3; *see* PO Resp. 11–12. First, Petitioner argues that we improperly broadened the claimed function by ignoring the requirement “to avoid formation of a vapor layer” of the “wherein” clause of claim 1. *Id.* at 2. We disagree and note that we expressly stated that this

requirement is both part of the description of the function of the limitation and a feature of the algorithm included in the corresponding structure described in the Specification. Dec. on Inst. 11–13. Second, Petitioner argues that “[our] conclusion that the corresponding structure is an algorithm for increasing power is also incorrect.” Pet. Reply 2 (citing Dec. on Inst. 13, 20). Petitioner argues that, “[a]s an initial matter, an algorithm per se is not structure.” *Id.* As noted above, however, we determined that “means for automatically increasing power to the bipolar forceps” may be a programmable digital controller. Ex. 1101, col. 4, ll. 56–62; *see* Pet. 22–23. The corresponding structure that performs the claimed function may include any computer or microprocessor, computer program, and/or algorithm. *WMS Gaming, Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999) (“In a means-plus-function claim in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm.” (citation omitted)). In *Eon Corp. IP Holdings LLC v. AT&T Mobility LLC*, the Federal Circuit confirmed that, on this point, *WMS Gaming* remains correctly decided and that

the disclosure of a general purpose computer or a microprocessor as corresponding structure for a software function does nothing to limit the scope of the claim and “avoid pure functional claiming.” [*Aristocrat*, 521 F.3d at 1336.] As such, when a patentee invokes means-plus-function claiming to recite a software function, it accedes to the reciprocal obligation of disclosing a sufficient algorithm as corresponding structure.

Eon Corp. IP Holdings, LLC v. AT&T Mobility LLC, No. 2014-1392, 2014-1393, 2015 WL 2083860 at *5 (Fed. Cir. May 6, 2015). Here, the Specification of the ’527 patent has done so. Thus, we do not determine that the algorithm alone is the structure; instead, we conclude that the digital controller programmed to perform

the disclosed algorithm is the corresponding structure. Dec. on Inst. 12 (“Thus, Petitioner concludes that ‘the corresponding structure *must include* the algorithm used to carry out the claimed function.’ We agree.” (emphasis added; citations omitted)).

Only terms which are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). Because neither party challenges our constructions for the other claim terms construed in the Decision on Institution, and because we discern no reason based on the complete record now before us to change these constructions, to the extent necessary, we adopt those constructions for the Final Written Decision. No additional claim terms need to be construed.

B. Grounds of Unpatentability

1. Overview

We instituted *inter partes* review of claims 17–23, 26, 29, and 30 of the ’527 patent on Petitioner’s asserted grounds that each of these claims is rendered obvious over US’717 and US’546, alone or in combination with US’779, US’047, or WO’882. Pet. 4–6, 31–60. A patent claim is obvious under 35 U.S.C. § 103(a) if the 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.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of 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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary

considerations.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). On this record, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that each of the claims 17–23, 26, 29, and 30 of the ’527 patent is rendered obvious over US’717 and US’546, alone or in combination with US’779, US’047, or WO’882.

2. *Person of Ordinary Skill in the Art*

Neither Petitioner nor its declarant proposes a definition for a person of ordinary skill in the art. PO Resp. 13; *see* Pet. Reply 3–4. Further, Petitioner argues that no express statement of or expert testimony regarding the level of ordinary skill is necessary unless the level of ordinary skill in the art is material to the determination of obviousness. Pet. Reply 3. Nevertheless, Petitioner’s declarant provides testimony as to what a person of ordinary skill would understand the terms of the reviewed claims to mean. *See, e.g.*, Ex. 1113 ¶ 48; *see also* PO Resp. 13 (“Mr. Odell states, at different times, that ‘one of ordinary of skill’ would have considered certain combinations of references.”).

Patent Owner contends that a person of ordinary skill in the art possesses a Bachelor’s Degree in either Physics, Electrical Engineering, or Mechanical Engineering and two to three years’ experience working in the field of electrosurgery. A person of ordinary skill in the art would be familiar with electrode designs and heating biological tissue through the application of various forms of electromagnetic energy, including RF energy.

PO Resp. 12–13 (citing Ex. 2002 ¶¶ 13–17). For purposes of the Decision on Institution, we determined that the prior art adequately reflects a level of ordinary

³ Patent Owner does not contend in the Patent Owner Response that secondary considerations are present, which would render the reviewed claims patentable over US’717 and US’546, alone or in combination with US’779, US’047, or WO’882.

skill in the art. Dec. on Inst. 21 (citing *Litton Indust. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163–64 (Fed. Cir. 1985)). Although Patent Owner contends that Petitioner’s arguments are deficient because Petitioner fails to specify the level of ordinary skill in the art (PO Resp. 12–14), Patent Owner’s declarant, Dr. Tucker, suggests that the level of ordinary skill in the art is not relevant to the determination whether the teachings of US’717 and US’546 would have been combined.⁴ *E.g.*, Ex. 2005, 112:20–22 (“Q. So you would have the same opinion regardless of what the level of skill in the art was? A. Correct.”); *see* Pet. Reply 4 n.3.

Petitioner’s declarant, Mr. Odell, meets or exceeds the qualifications set forth in Patent Owner’s definition of a person of ordinary skill in the art. *See* Ex. 1113 ¶¶ 5, 7; Ex. 2005, 205:22–206:9; Pet. Reply 14–15; *but see* Tr. 86:11–25 (Patent Owner’s counsel argues that Mr. Odell is not a person of more than ordinary skill in the art.). Further, Mr. Odell, as a person of equal or greater skill in the art, may testify as to what a person of ordinary skill in the art would know or understand. *See* Ex. 2005, 107:21–108:10. Therefore, to the extent that it is necessary, for purposes of this Decision, we adopt Patent Owner’s definition of a person of ordinary skill in the art.

3. *Obviousness over US’717 and US’546, Alone or in Combination with US’779, US’047, or WO’882*

a. *Claim 17*

Petitioner argues that claim 17 is rendered obvious over US’717 and US’546. Pet. 39–42. According to Petitioner, US’717 “recognizes substantially the same problem that is recognized in the ’527 patent — the possible formation of

⁴ Dr. Tucker does not address the level of ordinary skill in the art with respect to the combination of teachings of US’717 and US’546, with those of the other applied references. *See* Ex. 2002 ¶¶ 26–35.

a vapor layer between the electrodes and tissue that would cause a premature spike in impedance and would prevent sufficient current from reaching the tissue to obtain the desired therapeutic effect.” *Id.* at 39 (citing Ex. 1105, col. 3, ll. 9–30; col.7, ll. 42–51). Petitioner contends that US’717 discloses a radio frequency generator used in an ablation procedure. *Id.*; Pet. Reply 12. Petitioner further contends that the generator includes a bipolar output connection which is capable of being connected to bipolar forceps. Pet. 39 (citing Ex. 1105, col. 6, ll. 31–35). According to Petitioner, “US’717 discloses a three-phase process for avoiding the premature creation of a vapor layer.” *Id.* (citing Ex. 1105, col. 3, ll. 31–51). Petitioner argues that, in phases 2 and 3, the operation of the generator corresponds to the recited means for automatically increasing power of claim 17. *Id.* (citing Ex. 1105, col.7, ll. 10–28; col. 7, l. 52–col. 8, l. 2). Power is increased at a predetermined rate (*id.* at 40 (citing Ex. 1105, col. 5, ll. 9–30; col. 8, ll. 13–18)), and this information is used to determine a maximum power level for phase 3 (*id.* (citing Ex. 1105, col.8, ll. 29–36)). However, Petitioner acknowledges that “US’717 does not expressly describe the particular algorithm used to increase power from an initial level to the new set point level.” *Id.*

Referring to Figure 11 of US’546, Petitioner argues that US’546 teaches a microprocessor-controlled, radio frequency generator which increases power over time at a predetermined rate in accordance with a Power Control Parameter Schedule. *Id.* at 34. Moreover, referring to Figures 12 and 15A of US’546, Petitioner argues that US’546 teaches algorithms used to increase the power. *Id.* at 35–37 (citing Ex. 1104, col. 15, ll. 1–26); *see* Pet. Reply 11, 13–14.

Petitioner presents arguments supporting a conclusion of obviousness of claim 17 over US’717 and US’546 (Pet. 39–42), and Petitioner’s declarant, Mr. Odell, provides a claim chart comparing the limitations of claim 17 to the

teachings of US'717 and US'546 (Ex. 1113, 35–43). According to Mr. Odell's claim chart, US'717 teaches all of the limitations of claim 17, except for the algorithm that is included in the corresponding structure of the means-plus-function limitation. *See supra* Sec. II.A.

Petitioner further argues that it would have been obvious to combine the teachings of US'546 to use a digital controller programmed to implement the disclosed power output function of the radio frequency generator described in US'717. Pet. 41; Ex 1113, 41. First, Petitioner argues that one of ordinary skill would have considered combining the teachings of US'717 and US'546 because both US'717 and US'546 “deal with the same problem (how to increase power at a predetermined rate) in the same field of technology (electrosurgery).” Pet. 38, 41. Second, Petitioner argues that US'546 shows an algorithm for increasing power at a predetermined rate as disclosed in US'717, and one skilled in the art would have been motivated to use such an algorithm to achieve the disclosed power increase. *Id.*

Patent Owner contends that Petitioner fails to justify combining the teachings of US'717 and US'546 to achieve the radio frequency generators recited in independent claim 17. PO Resp. 14–21. In particular, Patent Owner contends that US'717 teaches away from the use of an algorithm that functions to provide power in a way that avoids formation of a vapor layer. *Id.* at 14–19. Further, Patent Owner contends that Petitioner provides no reason to combine the teachings of US'717 and US'546. *Id.* at 19–21. Finally, Patent Owner contends that the proposed combination of US'717 and US'546 does not teach all of the limitations of claim 17. *Id.* at 21–22. For the reasons that follow, we are not persuaded by Patent Owner's contentions.

First, Patent Owner contends that US'717 teaches away from the use of an algorithm that functions to provide power in a way that avoids formation of a vapor layer. *Id.* at 14–19. In particular, Patent Owner contends that US'717 teaches that power is raised until a vapor layer is formed then reduced. *Id.* at 15–16. Thus, Patent Owner contends that US'717 teaches away from using an algorithm that *avoids* vapor layer formation. *Id.* at 14–19.

A reference may teach away from its modification (1) when a person of ordinary skill would be discouraged from deviating from the path set out in the reference; (2) when a person of ordinary skill would be led in a direction divergent from the path that was taken by the patentee; or (3) when the modification would render the resulting apparatus or method inoperable or unsuitable for the intended purpose of the modified reference. *See In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Here, Patent Owner contends that Petitioner's proposed modification of US'717 would render its apparatus inoperable or unsuitable for its intended purpose. PO Resp. 18–19; *see Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 Fed. Appx. 755, 758 (Fed. Cir. 2015) (“[C]ombinations that change the ‘basic principles under which the [prior art] was designed to operate,’ *In re Ratti*, . . . 270 F.2d 810, 813 ([CCPA] 1959), or that render the prior art ‘inoperable for its intended purpose,’ *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984), may fail to support a conclusion of obviousness.”).

In particular, Patent Owner contends that, based on Dr. Tucker's testimony, modifying US'717, such that power is delivered to its apparatus to avoid formation of the vapor layer, would alter a basic principle of operation of US'717. PO Resp. 18. Specifically, Patent Owner contends that the US'717 apparatus is intended to operate without regard to the formation of a vapor layer, and is “predicated on the principle that impedance levels consistent with the existence of

a vapor layer are to be used as upper bounds on the power delivered to the electrosurgical device.” *Id.* Nevertheless, Patent Owner acknowledges that US’717 teaches that

impedance increases during the heating of tissue in a desiccation procedure are associated with the formation of a vapor layer at or near the electrode-tissue interface. The described vapor layer spreads from the nucleation site to cover the electrodes within a short period of time, causing impedance increases and attendant problems with the delivery of energy to the target tissue.

Id. at 15 (citing Ex. 1105, col. 3, ll. 9–30); *see* Ex. 2002 ¶¶ 18–23, 28, 29. Further, as Dr. Tucker testified, US’717 teaches determining a maximum power level at which a vapor layer forms and then operating its apparatus at a fraction of the maximum power level, e.g., preferably 70–80 percent of the maximum power level, *to avoid formation of the vapor layer*. Ex. 2005, 148:18–24, 149:20–150:11, 151:25–152:13; *see* Pet. Reply 7–8; Tr. 67:21–68:18. Thus, we are not persuaded that the proposed modification of US’717 in view of the teachings of US’546 to employ an algorithm to avoid formation of the vapor layer, once the power level at which a vapor layer forms is determined, would render the modified apparatus inoperable or unsuitable for the intended purpose of US’717.

Second, Patent Owner contends that neither Petitioner nor Mr. Odell provides a reason to combine the teachings of US’717 and US’546 to achieve the radio frequency generator recited in claim 17. PO Resp. 19–21. In particular, Patent Owner contends that, even if Mr. Odell is correct that US’717 and US’546 address the “same problem” and are in the “same field of technology,” these similarities do not provide an adequate basis for a finding that one of ordinary skill in the art would have a reason to combine these references to achieve the recited generator. *Id.* at 20–21. Moreover, because of the allegedly different approaches

to the formation of a vapor layer between US'717 and the '527 patent, Patent Owner contends that Petitioner fails to show a sufficient reason to combine the teachings of US'717 and US'546. *Id.* at 21. We disagree.

Petitioner argues that US'717 provides a sufficient reason to combine its teachings with those of US'546. Pet. Reply 10–11. In particular, Petitioner argues that US'717 teaches increasing power from an initial power level to a power level that is a fraction of a previously determined, maximum power level. Pet. 39 (citing Ex. 1105, col. 3, ll. 39–44); Pet. Reply 12; *see* Ex. 1105, col. 3, ll. 44–51; Ex. 2005, 162:23–164:17, 44:11–46:6, 59:2–13, 96:13–98:3. Petitioner argues that US'717 also teaches that the power delivery can be under the control of a controller to increase power delivered to bipolar forceps automatically from an initial level at a predetermined rate. Pet. 39–40; Pet. Reply 12–14; *see* Pet. Reply 5 n.4 (citing Ex. 1105, col. 5, ll. 5–31; col. 10, ll. 45–59). Petitioner acknowledges that US'717 does not teach a specific program for increasing power (Pet. 40–41; Pet. Reply 11–12), but asserts that US'546 teaches such a program for increasing power at a predetermined rate from an initial level (*see* Pet. 34–37, 41 n.12; Ex. 1104, col. 14, l. 43–col. 15, l. 64; col. 18, ll. 3–8, 18–38; Figs. 12 and 15A). “[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*, 550 U.S. at 417 (citation omitted); *see* Pet. 38, 41 n.12. In view of the foregoing analysis, a preponderance of the evidence supports Petitioner’s arguments. *See also* Ex. 1113, 41–43 (discussing the teachings of US'717 and US'546); Ex. 2005, 103:1–106:21 (discussing the teachings of US'546). Thus, we are persuaded that the teachings of US'717 and US'546 provide sufficient reason for their combination, as argued by Petitioner.

Third, Patent Owner contends that the proposed combination of US'717 and US'546 does not teach all of the limitations of claim 17. PO Resp. 21–22. As with Patent Owner's first contention, Patent Owner contends that the proposed modification of the teachings of US'717 in view of those of US'546 would render the resulting generator inoperable or unsuitable for US'717's intended purpose. *Id.* Consequently, Patent Owner contends that the proposed combination cannot teach all of the limitations of independent claim 17. *Id.* For the reasons set forth above, we are not persuaded by Patent Owner's contention. *See* Pet. Reply 12–14.

Despite Patent Owner's arguments to the contrary (PO Resp. 16–17), we agree with Petitioner that independent claim 17 does not prohibit the determination of the power level at which a vapor layer forms *before* the radio frequency generator's means for automatically increasing power increases power at a predetermined rate from an initial level to a level less than that at which a vapor layer forms, thereby “avoiding formation of a vapor layer while permitting an impedance increase to occur as a result of complete tissue dessication” (Pet. Reply 8–10). *See* Tr. 61:23–62:2, 65:4–12, 65:17–66:13. We are persuaded by Petitioner that a person of ordinary skill in the art would have had reason to use the controller of US'717 to implement the power increase by an algorithm, such as that taught by US'546. Consequently, we are persuaded that Petitioner demonstrates by a preponderance of the evidence that claim 17 would have been rendered obvious over US'717 and US'546.

b. Claims 29 and 30

Claims 29 and 30 depend directly from claim 17. Claim 29 recites “[a] radio frequency generator as in claim 17, wherein the increasing means comprises a programmable digital controller,” and claim 30 recites “[a] radio frequency

generator as in claim 17, wherein the increasing means comprises a control program embodied in a tangible medium.” US’717 discloses

[i]n still another aspect of the present invention, *computer programs embodied in a tangible medium*, such as a floppy disk, compact disk, tape, flash memory, hard disk memory, or the like, which set forth any of the methods described above, in computer-readable code. *Such computer programs are useful with digital controllers* which may be built into a radio frequency power supply or other electro-surgical power supply according to the present invention.

Ex. 1105, col. 4, ll. 59–66 (emphases added).

Patent Owner relies only on its arguments and evidence, discussed above, contesting the combination of the teachings of US’717 and US’546 with respect to independent claim 17 to overcome Petitioner’s arguments and evidence with respect to these claims.⁵ PO Resp. 10; Pet. Reply 1. We are persuaded that US’717 teaches or suggests the additional limitations of claims 29 and 30 and that a person of ordinary skill in the art would have had reason to combine the teachings of US’717 and US’546 to achieve the generator of the ’527 patent, as recited in claims 29 and 30. Pet. 59–60; Ex. 1113 ¶ 49; *see KSR*, 550 U.S. at 417. Therefore, in view of the foregoing discussion of the combination of the teachings of US’717 and US’546 with respect to claim 17, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that US’717 and US’546 would have rendered obvious claims 29 and 30 of the ’527 patent.

⁵ In the Scheduling Order (Paper 16, 2–3), we cautioned Patent Owner that any arguments for patentability not raised in the Patent Owner Response will be deemed waived.

c. Claims 18, 21, and 22

Petitioner also argues that dependent claims 18, 21, and 22 are unpatentable under 35 U.S.C. § 103(a) as rendered obvious over US'717 and US'546. Claim 18 recites

[a] radio frequency generator as in claim 17, wherein the increasing means initiates a cycle where it measures an impedance of tissue, compares the measured impedance to an impedance limit, and increases the power level based on the predetermined rate if the measured impedance does not exceed the impedance limit.

Petitioner argues that “US'546 discloses using impedance monitoring to determine whether to continue or halt the increase of power to the bipolar connection.” Pet. 48–49 (citing Ex. 1104, col. 15, ll. 36–54; Fig. 12 (showing impedance monitoring at steps 1214, 1218, 1222, 1226, 1230, and 1234)). Claim 21 recites “[a] radio frequency generator as in claim 18, wherein the increasing means repeats the cycle.” Petitioner argues that “US'546 repeats the cycle of the corresponding algorithm for increasing power using impedance monitoring.” Pet. 52 (citing Ex. 1104, col. 14, ll. 43–col. 15, l. 35; col. 17, ll. 3–44). Claim 22 recites “[a] radio frequency generator as in claim 18, wherein the increasing means is activated only once for continual cycling.” Petitioner argues that “US'546 is activated only once for continual recycling.” Pet. 53 (citing Ex. 1104, col. 14, ll. 43–col. 15, l. 35; col. 17, ll. 3–44).

Patent Owner relies only on its arguments and evidence, discussed above, contesting the combination of the teachings of US'717 and US'546 with respect to independent claim 17 to overcome Petitioner's arguments and evidence with respect to these claims. PO Resp. 10–11; Pet. Reply 1. We are persuaded that US'546 teaches or suggests the additional limitations of claims 18, 21, and 22 and that a person of ordinary skill in the art would have had reason to combine the

teachings of US'717 and US'546 to achieve the generator of the '527 patent, as recited in claims 18, 21, and 22. Pet. 47–53; *see KSR*, 550 U.S. at 417. Therefore, in view of the foregoing discussion of the combination of the teachings of US'717 and US'546 with respect to claim 17, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that US'717 and US'546 would have rendered obvious claims 18, 21, and 22 of the '527 patent.

d. Claims 19, 20, 23, and 26

Claim 19 recites “[a] radio frequency generator as in claim 18, wherein the impedance limit is selected to indicate the impedance increase due to complete tissue desiccation.” Petitioner argues that the additional limitations of claim 19 are taught by US'779. In particular, Petitioner argues that US'779 teaches that one should select an impedance limit that corresponds to “complete tissue seal.” Pet. 51 (citing Ex. 1108, col.13, ll. 19–21). Further, Petitioner argues that US'779 shows a technique used to improve another device and that it would be obvious to use it to complement the primary references, US'717 and US '546. *See* Pet. 50 (citing *KSR*, 550 U.S. at 417).

Claim 20 recites “[a] radio frequency generator as claim 18 wherein the impedance limit is in the range from 50 ohms to 1000 ohms.” Petitioner argues that claim 20 is rendered obvious over US'717, US'546, and US'047. Pet. 51–52. In particular, Petitioner argues that US '047 shows the identical range of impedance limits (“from about 50 to about 1000 ohms”) in the context of a bipolar surgical generator. *See* Ex. 1110, col. 4, ll. 50–53. Further, Petitioner argues that “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.” Pet. 50 (quoting *KSR*, 550 U.S. at 417).

Claim 23 recites “[a] radio frequency generator as in claim 17, further comprising a user interface for inputting the rate of power increase, the initial power level, and an impedance limit.” Petitioner argues that each of the additional limitations of claim 23 is taught by WO’882. Pet. 53–54. In particular, Petitioner argues that WO’882 teaches inputting values from which the rate of power increase, the initial power level, and an impedance limit are determined. *Id.* (citing Ex. 1111, 20:11–19; 22: 12–19; 23:26–33). Petitioner argues that a person skilled in the art would have reason to combine the teachings of US’717 and US’546 with those of WO’882, because, as Petitioner’s declarant testifies (Ex. 1113 ¶¶ 44, 49), the use of user interfaces in radio frequency generators was standard in the industry as of the filing date of the ’527 patent and the use of the interface shown in WO’882 “results in a combination of familiar elements according to known methods [which] . . . does no more than yield predictable results.” Pet. 54 (quoting *KSR*, 550 U.S. at 416).

Claim 26 recites “[a] radio frequency generator as in claim 17, wherein the predetermined rate of power increase is in the range from 1 W/sec to 100 W /sec.” Petitioner argues here that US’047 teaches raising the power at a predetermined rate of about 2 W/sec to 3 W/sec. Pet. 56–57 (citing Ex. 1110, col. 3, ll. 46–56; col. 4, ll. 15–18 (teaching an increase from 0 W to 25–35 W over a period of 8 to 15 seconds)). Petitioner, thus, argues that the range for the rate taught by US’047 falls within the range recited in claim 26. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (“In cases involving overlapping ranges, we and our predecessor court have consistently held that even a slight overlap in range establishes a *prima facie* case of obviousness.”). Further, Petitioner argues that combining the teachings of US’047 with the teachings of US’717 and US’546 would have been obvious to a person of ordinary skill in the art “since it is merely using a known

technique 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.’” Pet. 57 (quoting *KSR*, 550 U.S. at 417).

With respect to each of claims 19, 20, 23, and 26, Patent Owner relies only on its arguments and evidence, discussed above, contesting the combination of the teachings of US’717 and US’546 with respect to independent claim 17 to overcome Petitioner’s arguments and evidence with respect to these claims. PO Resp. 10–11; Pet. Reply 1. We have reviewed Petitioner’s evidence and are persuaded that the applied additional references teach or suggest all of the additional limitations of claims 19, 20, 23, and 26. Pet. 50–54, 56–57; *see* Dec. on Inst. 23–25, 26–28. We also are persuaded that a person of ordinary skill in the art at the time of the invention would have had a reason to combine the teachings of each of US’779, US’047, and WO’882 with the combination of the teachings of US’717 and US’546. Therefore, in view of the foregoing discussion of the combination of the teachings of US’717 and US’546 with respect to claim 17, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that US’717 and US’546, in combination with US’779, US’047, or WO’882, would have rendered obvious claims 19, 20, 23, and 26 of the ’527 patent.

For the reasons set forth above, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claims 17–23, 26, 29, and 30 of the ’527 patent are rendered obvious over US’717 and US’546, alone or in combination with US’779, US’047, or WO’882.

C. Patent Owner’s Motion to Exclude Evidence

Patent Owner filed a Motion to Exclude Evidence (Paper 40 (“PO Mot.”)); Petitioner filed an Opposition to Patent Owner’s Motion to Exclude Evidence

(Paper 43 (“Pet. Opp.”)); and Patent Owner filed a Reply to Petitioner’s Opposition to the Motion to Exclude Evidence (Paper 44 (“PO Reply to Opp.”)). As an initial matter, Petitioner argues that Patent Owner’s Motion to Exclude Evidence, filed on January 20, 2015, was untimely filed. Pet. Opp. 1. For the reasons set forth below, we agree and deny Patent Owner’s Motion to Exclude Evidence as untimely filed.

In our Scheduling Order, we set DUE DATE 4, the deadline for either party to file any motion to exclude evidence, as January 20, 2015. Paper 16, 5. This date was selected by us for DUE DATE 4 because January 19, 2015, was the date of the 2015 Martin Luther King, Jr. Day Federal Holiday. The Scheduling Order further stated that

This order sets due dates for the parties to take action after institution of the proceeding. *The parties may stipulate to different dates for DUE DATES 1 through 5 (earlier or later, but no later than DUE DATE 6).* A notice of the stipulation, specifically identifying the changed due dates, must be promptly filed. The parties may not stipulate to an extension of DUE DATES 6 and 7.

Id. at 1 (emphasis added). On August 21, 2014, the parties filed a Notice of Stipulation to Adjust Schedule Due Dates 1–4, which among other dates changed DUE DATE 4 from January 20, 2015, to January 19, 2015. Paper 27, 3. Counsel for each party signed the Notice of Stipulation. *Id.* at 4.

Patent Owner contends that, despite the parties’ stipulation changing DUE DATE 4 to January 19, 2015, the DUE DATE for filing Patent Owner’s Motion to Exclude Evidence *remained* January 20, 2015, because January 19, 2015, was a Federal holiday. PO Reply to Opp. 1. Under 35 U.S.C. § 21(b),

[w]hen the day, or the last day, for taking any action or paying any fee in the United States Patent and Trademark Office falls on Saturday, Sunday, or a Federal holiday within the District of Columbia, the

action may be taken, or the fee paid, on the next succeeding secular or business day.

We understand that the statute applies to deadlines set by statute, rule or order; not to *different* dates stipulated to by the parties. Similarly, under 37 C.F.R. § 1.7(a), when a deadline falls on a Federal holiday, action may be taken “on the next succeeding business day.” Section 1.7, however, applies to deadlines “fixed by statute or by or under this part” of this chapter.⁶ See 37 C.F.R. § 42.1(a) (“[Section 1.7] of this chapter also appl[ies] to proceedings before the Board, as do other sections of part 1 of this chapter that are incorporated by reference into this part.”). Although the Scheduling Order is an order made pursuant to 37 C.F.R. § 42.5(c), the Scheduling Order permits the parties to change DUE DATES 1–5 set therein to “*different*” dates by stipulation. Paper 16, 1 (emphasis added). Moreover, given that filings with the Board may be made electronically (*see* 37 C.F.R. § 42.6(b)(1)) and the Patent Review Processing System accepts filings twenty-four hours a day and seven days a week, we only require that stipulated DUE DATES 1–5 may be “earlier or later [than the date set in the Scheduling Order], but no later than DUE DATE 6.” Paper 16, 1. Within these limits, the Board observes stipulated dates, and stipulated dates are binding on the parties by their agreement.

Here, the parties stipulated to January 19, 2015, as DUE DATE 4. As noted above, Patent Owner’s Motion to Exclude Evidence was not filed on or before stipulated DUE DATE 4, and Patent Owner has provided no reason for its delay in filing its Motion to Exclude Evidence, which warrants our acceptance of its

⁶ S. Rept. No. 82-1979, at 2407 (1952) (With respect to 35 U.S.C. § 21, “[f]ixed by statute’ is omitted from the corresponding section of the existing statute *as unnecessary*. Saturday is added as a day on which action need not be taken.”; emphasis added).

untimely Motion to Exclude Evidence.⁷ Therefore, we *deny* Patent Owner’s untimely Motion to Exclude Evidence.

D. Improper Filing of Demonstrative Exhibits

The panel “may expunge any paper directed to a proceeding . . . that is not authorized under this part or in a Board order or that is filed contrary to a Board order.” 37 C.F.R. § 42.7(a). After reviewing Exhibits 1028 and 1029, we determine that these exhibits are not authorized by this part or in a Board order or are contrary to a Board order.

According to Petitioner, “Exhibit 1128 is a *demonstrative* exhibit in the form of a PowerPoint presentation containing excerpts of case law . . . as well as excerpts of other filed exhibits;” and “Exhibit 1129 is a *demonstrative* exhibit in the form of a PowerPoint presentation containing of a graph depicting the power output of the generator of the ‘717 patent versus time.” Pet. Opp. 3 (Ex. 1128), 5 (Ex. 1129) (emphases added). As indicated in the Board’s Office Trial Practice Guide, demonstrative exhibits may be presented at the oral hearing. 77 Fed. Reg. 48756, 48768 (Aug. 14, 2012). However, the filing of demonstrative exhibits was not authorized by our rules or by any order in this case. Moreover, our order granting the parties’ requests for an oral hearing expressly prohibits the filing of demonstrative exhibits without our prior authorization. Paper 42, 4 (“The parties shall not file any demonstrative exhibits in this case without prior authorization from the Board.”); *see* PO Reply to Opp. 4. Because Petitioner did not request authorization to file and we did not authorize the filing of these demonstrative

⁷ Patent Owner contends that Petitioner is not prejudiced by Patent Owner’s late filing of the Motion to Exclude Evidence. PO Reply to Opp. 3. Nevertheless, as a general matter, if we accepted Patent Owner’s late filing, Petitioner would have one day less to prepare its opposition to Patent Owner’s Motion to Exclude Evidence than is permitted by the parties’ stipulation. Pet. Opp. 2.

exhibits at DUE DATE 3, we expunge Exhibits 1028 and 1029. *See C&D Zodiac, Inc. v. B/E Aerospace, Inc.*, Case IPR2014-00727, slip op. at 3 (PTAB Mar. 3, 2015) (Paper 30).

III. CONCLUSION

After consideration of the Petition and the Patent Owner Response and for the reasons set forth above, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 17–23, 26, 29, and 30 of the '527 patent are rendered obvious over US'717 and US'546, alone or in combination with US'779, US'047, or WO'882.

IV. ORDER

In consideration of the foregoing, it is
ORDERED that Petitioner has shown by a preponderance of the evidence
that

- A. Claims 17, 18, 21, 22, 29, and 30 are rendered obvious over US'717 and US'546;
- B. Claim 19 is rendered obvious over US'717, US'546, and US'779;
- C. Claims 20 and 26 are rendered obvious over US'717, US'546, and US'047; and
- D. Claim 23 is rendered obvious over US'717, US'546, and WO'882;

FURTHER ORDERED that Patent Owner's Motion to Exclude Evidence is *denied* as untimely filed;

FURTHER ORDERED that Exhibits 1028 and 1029 are *expunged*; and

FURTHER ORDERED that, because this is a final decision, parties to the

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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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