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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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marianne.fox@philips.com
katelyn.mulroy@philips.com
STATEMENT OF THE CASE


We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

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1 According to Appellants, the real party in interest is Koninklijke Philips Electronics N.V. Appeal Br. 1.
SUMMARY OF THE DECISION

We AFFIRM.

CLAIMED SUBJECT MATTER

Appellants’ invention relates to “interference reduction in ultrasound cardiac ablation applications.” Spec. 1 (Field of the Invention). Claims 1 and 6 are independent. Appeal Br. (Claims Appendix). Claim 1 is illustrative and reproduced below, with emphases added to limitations discussed in this Decision.

An apparatus for interference reduction in radiofrequency (RF) ablation applications using real-time ultrasound based monitoring, said apparatus comprising:

- an ablation device adapted (i) to be coupled to an ablation electrode and (ii) to generate RF ablation signals to be supplied to the ablation electrode in real-time during an RF ablation treatment; and

- an ultrasound device adapted to be coupled to an ultrasound transducer that is embedded and physically connected in direct proximity to the ablation electrode,

wherein said ultrasound device includes a pulse generating unit adapted to generate at least two ultrasound excitation pulses in order to excite said ultrasound transducer to monitor real-time progress of the RF ablation treatment of one or more of a lesion boundary, lesion development, and lesion depth as the RF ablation signals are supplied to the ablation electrode, wherein responsive to the at least two ultrasound excitation pulses, said ultrasound transducer (i) performs an ultrasound scan for each ultrasound excitation pulse, each ultrasound scan producing ultrasound echo signals, and (ii) receives at least two combined ultrasound echo signals, wherein the received at least two combined ultrasound signals each include (i) an ultrasound echo signal in response to an ultrasound excitation pulse, and (ii) an interference signal that comprises high frequency harmonics of said RF ablation
signals in a MHz range which interfere with a respective ultrasound echo signal, and
wherein said ultrasound device further includes a signal processing unit adapted to process at least one received combined ultrasound signal with at least another one received combined ultrasound signal to reduce a negative effect on ultrasound based monitoring caused by each respective interference signal.

Id. (emphases added).

THE REJECTIONS

The Examiner rejected:


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2 In the Final Office Action, the Examiner rejected claim 15 under 35 U.S.C. § 101. Final Act 2. The Examiner subsequently withdrew the rejection, however, and that rejection is no longer pending in this appeal. Ans. 2.
ANALYSIS

I. Claims 1, 2, and 6 Rejected as Unpatentable Over Suorsa, Kleen, and Daigle

A. Examiner’s Rejection

The Examiner relies on Suorsa for disclosing an apparatus with several of the claimed limitations. See Final Act. 4. To illustrate Suorsa’s apparatus, we reproduce its Figure 1, below:

According to the Examiner, and as shown above in Figure 1, Suorsa discloses “an apparatus with an ablation device/ultrasound device (23).” Id. (citing Suorsa, col. 2, ll. 54–56). The Examiner further cites to Suorsa’s Figure 5A, which we also reproduce, below:
According to the Examiner, and as shown in the above Figure 5A, Suorsa’s ablation device/ultrasound device is connected to electrodes 24 that generate an RF signal and generate pulses for exciting transducers 28. *Id.* (citing Suorsa, col. 5, ll. 36–53; col. 8, ll. 47–54). The Examiner finds that transducers 28 are embedded and physically connected in direct proximity to ablation electrodes 24, as required by the claims. *See id.* The Examiner explains that “[a]ll ultrasound imaging systems operate by sending and receiving pulses, and where RF energy is being used, the received pulse will include RF noise.” *Id.*

The Examiner acknowledges, however, that “Suorsa does not specifically disclose ultrasonic imaging simultaneously [or in *real-time*] with RF ablation to monitor the procedure or any particular mechanism [for] reducing interference.” *Id.*

To satisfy the missing “real-time” limitation, the Examiner relies on Kleen. *See id.* at 4–5. In particular, the Examiner finds that Kleen “discloses a medical device . . . with an ablation electrode (13) and ultrasound transducer . . . and teaches that the imaging and ablation are done simultaneously to monitor the depth and boundaries of created lesions.”
Id. at 4 (citing Kleen ¶¶ 15, 17) (emphasis added). The Examiner reasons that it would have been obvious to modify Suorsa “to further include simultaneous sensing so that the resulting combination can both sense tissue before and during an ablation procedure.” Ans. 3; see also Final Act. 4–5.

Regarding the claimed “reduce a negative effect on ultrasound based monitoring caused by each respective interference signal,” the Examiner acknowledges that “Kleen does not disclose any particular mechanism for reducing interference.” See Final Act. 4–5. To satisfy the claimed limitation, the Examiner relies on Daigle for disclosing “an ultrasound imaging system that collects a plurality of echoes . . . and teaches that averaging some number of the echoes reduces noise.” Id. at 5 (citing Daigle ¶¶ 55, 79) (emphasis added). The Examiner further reasons that it would have been obvious to “include signal averaging as taught by Daigle to improve the image quality produced while treating tissue with RF energy by reducing the effects of RF interference.” Id.

B. Analysis

In contesting this rejection, Appellants present multiple arguments, which we address separately, below.

First, Appellants argue that “the combination of Suorsa, Kleen and Daigle fails to teach or suggest” the claim limitations. Appeal Br. 11–12 (emphasis omitted). Appellants contend that “Suorsa teaches and suggests an ablation device/ultrasound device that does not utilize concurrent or simultaneous imaging and ablation, as i[s] required in independent claim 1.” Id. at 15 (emphasis omitted).
Appellants’ first argument is not persuasive because “one cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.” See In re Keller, 642 F.2d 413, 426 (CCPA 1981). In the present case, the Examiner proposes to modify Suorsa to utilize simultaneous ultrasonic imaging “to allow the operator to benefit by monitoring tissue as it is being treated.” Ans. 3. Indeed, Kleen teaches such a modification in its disclosure that “[i]t is particular[ly] expedient for ablation and imaging to be performed simultaneously, so that the doctor can see in situ where and how the ablation is being performed, i.e., he can continuously monitor the result of the treatment.” Kleen ¶ 17 (emphasis added).

Second, Appellants contend that “Suorsa expressly suggests that simultaneous imaging and ablation should be excluded” and that “the ultrasound imaging of Suorsa is not subject to ablation energy interference.” Appeal Br. 16 (emphasis omitted). In support of this argument, Appellants cite to Suorsa’s disclosure that “delivery of ablating energy must be closely governed to avoid incidence of tissue damage and coagulum formation [and] the ablation catheters must be precisely positioned adjacent to and preferably in contact with the tissue to be treated.” Id. at 12 (quoting Suorsa, col. 1, ll. 15–24, 42–44) (emphasis omitted); see also Reply Br. 6–7 (repeating the same).

Appellants’ second argument also fails to apprise us of Examiner error. Appellants’ argument appears to be premised on a contention that Suorsa teaches away from the proposed combination. As explained correctly by the Examiner, however, to establish teaching away, the prior art reference must criticize, discredit, or otherwise discourage the solution
claimed. See Ans. 5–6 (citing In re Fulton, 391 F.3d 1195, 1201 (Fed. Cir. 2004)). Here, Appellants do not cite to anything within Suorsa that criticizes, discredits, or discourages using simultaneous ultrasonic imaging. Suorsa’s disclosure that “delivery of ablating energy must be closely governed to avoid incidence of tissue damage and coagulum formation . . . [and] the ablation catheters must be precisely positioned adjacent to and preferably in contact with the tissue to be treated” (Suorsa, col. 1, ll. 19–24) says nothing about simultaneous ultrasonic monitoring and RF ablation, and Appellants’ reliance on this disclosure does not support its teaching away argument. At best, Suorsa merely discloses an alternative—ultrasonic imaging prior to ablation—which is not, by itself, sufficient to demonstrate a teaching away. See Fulton, 391 F.3d at 1201 (“The prior art’s mere disclosure of more than one alternative does not constitute a teaching away from any of the[] disclosed alternatives”); see also Appeal Br. 15 (emphasis omitted) (“Suorsa teaches . . . that it is only after tissue contact is detected, via ultrasound imaging, that ablation . . . can occur”).

Third, Appellants assert that “the ultrasound imaging of Suorsa is not subject to ablation energy interference,” because “Suorsa does not teach or suggest concurrent or simultaneous imaging and ablation.” Reply Br. 6 (emphasis omitted).

Appellants’ third argument is also unpersuasive, as it ignores the Examiner’s proposed modification to Suorsa in which simultaneous ultrasonic imaging is performed. Final Act. 4–5. Because the apparatus as modified by the Examiner would perform ultrasonic imaging during an RF ablation procedure, a skilled artisan would understand that ablation energy interference would exist, and a skilled artisan would have further modified
the device to reduce such interference, as taught by Daigle. See id.; see also Daigle ¶ 79 (“the use of signal averaging with the new system architecture can improve signal-to-noise and thus dynamic range significantly”).

For the foregoing reasons, Appellants’ arguments do not apprise us of Examiner error. We adopt as our own the Examiner’s findings and reasoning and affirm the rejection of claims 1, 2, and 6 as unpatentable over Suorsa, Kleen, and Daigle.

II. **Claims 3, 7, 10–13, and 15 Rejected as Unpatentable Over Suorsa, Kleen, Daigle, and Dabney**

Appellants rely on the same arguments that we found unpersuasive in connection with the independent claims as the basis for reversal of this ground of rejection. Appeal Br. 18. As such, Appellants do not apprise us of Examiner error and we affirm the rejection of claims 3, 7, 10–13, and 15 as unpatentable over Suorsa, Kleen, Daigle, and Dabney.

III. **Claims 8 and 9 Rejected as Unpatentable Over Suorsa, Kleen, Daigle, Dabney, and Nakaya**

Appellants rely on the same arguments that we found unpersuasive in connection with the independent claims as the basis for reversal of this ground of rejection. Appeal Br. 18. As such, Appellants do not apprise us of Examiner error and we affirm the rejection of claims 8 and 9 as unpatentable over Suorsa, Kleen, Daigle, Dabney, and Nakaya.

**SUMMARY**

We affirm the rejection of claims 1, 2, and 6 under 35 U.S.C. § 103(a) as unpatentable over Suorsa, Kleen, and Daigle.
We affirm the rejection of claims 3, 7, 10–13, and 15 under 35 U.S.C. § 103(a) as unpatentable over Suorsa, Kleen, Daigle, and Dabney.

We affirm the rejection of claims 8 and 9 under 35 U.S.C. § 103(a) as unpatentable over Suorsa, Kleen, Daigle, Dabney, and Nakaya.

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

AFFIRMED