

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TENNANT COMPANY,
Petitioner,

v.

OXYGENATOR WATER TECHNOLOGIES, INC.,
Patent Owner.

IPR2021-00625
Patent RE45,415 E

Before KRISTINA M. KALAN, CHRISTOPHER M. KAISER, and
WESLEY B. DERRICK, *Administrative Patent Judges*.

KALAN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Tennant Company (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 13, 14, and 17–27 of U.S. Patent No. RE45,415 E (Ex. 1001, “the ’415 patent”). Oxygenator Water Technologies, Inc. (“Patent Owner”) filed a Preliminary Response to the Petition (Paper 8, “Prelim. Resp.”).

To institute *inter partes* review, we must determine that the information presented in the Petition shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). For the reasons discussed below, after considering the parties’ submissions and the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the ’415 patent. Thus, we institute an *inter partes* review.

A. Related Proceedings

The parties identify *Oxygenator Water Technologies, Inc. v. Tennant Company*, No. 0:20-cv-00358-ECT-HB (D. Minn.) (“the District Court litigation”) as a related matter. Pet. 86–87; Paper 5, 1. Patent Owner also identifies IPR2021-00602 as another proceeding filed by Petitioner against the ’415 patent. Paper 5, 1.

B. Real Parties-In-Interest

The parties identify themselves as real parties-in-interest. Pet. 86; Paper 5, 1.

C. The ’415 Patent

The ’415 patent is a reissue of U.S. Patent No. 7,670,495 and is titled “Flow-Through Oxygenator.” Ex. 1101, codes (54), (64). The ’415 patent “relates to the electrolytic generation of microbubbles of oxygen for

increasing the oxygen content of flowing water,” and “also relates to the use of superoxygenated water to enhance the growth and yield of plants;” its flow-through model “is useful for oxygenating water for hydroponic plant culture, drip irrigation and waste water treatment.” *Id.* at 1:24–30.

The ’415 patent explains that the “production of oxygen and hydrogen by the electrolysis of water is well known,” in which hydrogen gas and basic water are produced at the cathode during electrolysis, and oxygen gas and acidic water are produced at the anode. *Id.* at 2:5–6, 2:9–11, 2:21–23.

The ’415 patent explains that pumps to supply oxygen have high power requirements and produce acidic and basic water, which can be detrimental to live animals. *Id.* at 2:47–50. In view of this, the ’415 patent expresses a need for “quiet, portable, low voltage means to oxygenate water” and for oxygenator models suitable for in-line water distribution and for hydroponic culture. *Id.* at 2:52–54, 2:60–62.

The ’415 patent describes “an oxygen emitter which is an electrolytic cell which generates very small microbubbles and nanobubbles of oxygen in an aqueous medium, which bubbles are too small to break the surface tension of the medium, resulting in a medium supersaturated with oxygen.” *Id.* at 2:66–3:3. Figure 1B of the ’415 patent is reproduced below.

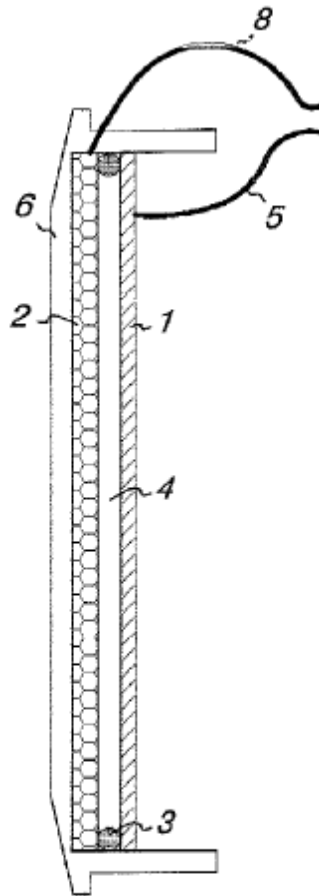


Fig. 1B

Figure 1B depicts oxygen emitter 6 that includes anode 1, cathode 2, and non-conducting spacer 3 having gap 4 for the passage of gas and the mixing of anodic and cathodic water. *Id.* at 3:46, 4:60–67, 5:2.

The '415 patent states that “[i]n order to form microbubbles and nanobubbles, the anode and cathode are separated by a critical distance.” *Id.* at 3:13–14. The '415 patent defines “critical distance” as “the distance separating the anode and cathode at which evolved oxygen forms microbubbles and nanobubbles.” *Id.* at 4:1–3. The '415 patent describes the critical distance as ranging “from 0.005 inches to 0.140 inches” and that the

“preferred critical distance is from 0.045 to 0.060 inches.” *Id.* at 3:14–16.

With regard to Figure 1B’s embodiment, the ’415 patent states:

The spacer thickness is critical as it sets the critical distance. It must be of sufficient thickness to prevent arcing of the current, but thin enough to separate the electrodes by no more than 0.140 inches. Above that thickness, the power needs are higher and the oxygen bubbles formed at higher voltage will coalesce and escape the fluid. Preferably, the spacer is from 0.005 to 0.075 inches thick. At the lower limits, the emitter tends to foul more quickly. Most preferably, the spacer is about 0.050 inches thick.

Id. at 5:4–13.

D. Illustrative Claim

Claim 13 is the sole independent claim of the challenged claims.

Claim 13 is representative and is reproduced below:

13. A method for producing an oxygenated aqueous composition comprising:

 flowing water at a flow rate no greater than 12 gallons per minute through an electrolysis emitter comprising an electrical power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing,

 causing electricity to flow from the power source to the electrodes, and,

 producing the composition comprising a suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of less than 50 microns, wherein:

 the anode electrode is separated at a critical distance from the cathode such that the critical distance is from 0.005 inches to 0.140 inches;

 the power source produces a voltage no greater than about 28.3 volts and an amperage no greater than about 13 amps,

 the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;

 the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, and the water flowing into

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