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Paper 32
Date: October 24, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EDEN PARK ILLUMINATION, INC.,
LARSON ELECTRONICS LLC, and FAR UV TECHNOLOGIES, INC.,
Petitioner,

v.

S. EDWARD NEISTER,
Patent Owner.

IPR2022-00682
Patent 8,975,605 B2

Before, JEFFREY W. ABRAHAM, ELIZABETH M. ROESEL, and JULIA HEANEY, *Administrative Patent Judges*.

ROESEL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background and Summary

Eden Park Illumination, Inc., Larson Electronics LLC, and Far UV Technologies, Inc. (collectively, "Petitioner") filed a Petition (Paper 4, "Pet.") requesting an *inter partes* review of claims 1, 2, 5, and 6 ("the challenged claims") of U.S. Patent No. 8,975,605 B2 (Ex. 1001, "the '605 patent"). S. Edward Neister ("Patent Owner") filed a Preliminary Response. Paper 9 ("Prelim. Resp."). We instituted an *inter partes* review. Paper 10 ("Institution Decision" or "Inst. Dec.").

After institution, Patent Owner filed a Patent Owner Response (Paper 20, "PO Resp."), Petitioner filed a Reply (Paper 21, "Pet. Reply"), Patent Owner filed a Sur-reply (Paper 22, "PO Sur-reply"), and Petitioner filed a Sur-sur-reply (Paper 28, "PET Sur-sur-reply").[1] We held an oral hearing on August 9, 2023, and a transcript is in the record. Paper 31 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). We determine that Petitioner has shown by a preponderance of the evidence that the challenged claims of the '605 Patent are unpatentable.

B. Related Proceedings

The parties identify the following as related proceedings: (1) *Healthe, Inc. v. High Energy Ozone LLC*, No. 6:20-cv-02233 (M.D. Fla.); (2) *High Energy Ozone LLC v. Larson Electronics LLC*, No. 3:21-cv-01166 (N.D.

[1] Petitioner's unopposed motion for leave to file a Sur-sur-reply and Exhibit 1042 as supplemental information pursuant to 37 C.F.R. § 42.123(b) is granted for the reasons given by Petitioner. Paper 27.

Tex.); (3) *High Energy Ozone LLC v Eden Park Illumination, Inc.*, No. 1:21-cv-02753 (N.D. Ill.) (administratively closed); (4) *High Energy Ozone LLC v Eden Park Illumination, Inc.*, No. 3:22-cv-00425 (N.D. Tex.); (5) *High Energy Ozone LLC v. Far UV Technologies*, No. 4:21-cv-00345 (W.D. Miss) (administratively closed); and (6) *High Energy Ozone LLC v. Far UV Technologies*, No. 3:22-cv-00280 (N.D. Tex.). Pet. 44–45; Paper 7, 1.

The parties also identify as a related matter (because of common parties, inventor, and assignee) IPR2022-00381 (U.S. Patent No. 9,700,642). Pet. 45; Paper 7, 1.

C. The '605 patent

The '605 patent, titled "Method and Apparatus for Producing a High Level of Disinfection in Air and Surfaces," issued on March 10, 2015. Ex. 1001, codes (45), (54). The '605 patent issued from a continuation of an application filed January 29, 2009. *Id.* code (63).

The '605 patent explains that in the past, a method of "sterilizing and disinfecting air has been based predominately on using commercially available germicidal ultra-violet (GUV) lamps" and that "[t]hese lamps are either pulsed or continuously excited." Ex. 1001, 1:24–27. Lamps that are continuously excited are mercury based and emit principally at 254 nm. *Id.* at 1:27–28. According to the '605 patent, though such a treatment method "is effective for treating the room air of individual rooms, it is not practical for treating large flowing volumes of air that pass quickly down large ducts." *Id.* at 1:36–39. This is because of the long treatment time that is required. *Id.* at 1:39–40. The '605 patent also explains that "[c]laims have been made that germicidal UV-C (GUV) radiation is used to deactivate DNA

[deoxyribonucleic acid]" because "the mercury lamp emission at 254 nm is close to a good DNA absorption band." *Id.* at 1:55–58. However, "[n]o claims are made that combine different wavelength UV photons to produce a higher level of deactivation of microorganisms" and "no claims are made that combine FUV [(Far UV)] photons with UV-C photons to produce a higher level of deactivation of microorganisms." *Id.* at 1:58–62. The '605 patent discloses that recently, new UV emitting lamps based on the excitation of excimers are becoming commercially available in which the emitters produce single line or narrow spectral emission at a wavelength determined by the gas composition of the lamp. *Id.* at 2:4–8. However, "[n]o patent has been found that teaches the use of FUV sources coupled with UV-C sources with supporting equipment that can effectively and efficiently disinfect and sterilize large volumes of air, large and small surfaces, and food stuffs in various stages of preparation." *Id.* at 2:11–17.

The '605 patent discloses that researchers understand that GUV photons produce strong covalent bonds such as those in dimers. Ex. 1001, 2:33–40. According to the '605 patent, "GUV light is known to produce [t]hymine, cytosine-thymine, and cytosine dimers" and "[a]fter the formation of the dimer, further replication of the DNA stops." *Id.* at 2:40–43. The '605 patent further discloses that:

> It has been fairly well established that the peptide bonds in all proteins are responsible for the peak absorption at two different wavelength regions; namely at 200 nm and at 280 nm. The peak absorption at either 200 nm and/or near 280 nm is also exhibited by all nitrogenous bases in the DNA as well as the proteins that form the outer cellular membrane of bacteria, spores and viruses. This occurs as well for nucleoproteins, diglycine, triglycine, and bovine albumin . . . . Amino acids have a peak absorption band near 260 nm. A UV lamp emitting at 222 nm

> and/or 282 nm will produce the greatest photon absorption by the nitrogenous bases and proteins. A UV-C lamp emitting at 260 nm will produce the greatest photon absorption by the amino acids in the DNA. Consequently these three wavelengths are primary absorption bands that permit destruction of microorganisms.

Id. at 3:58–4:8.

The '605 patent describes a method that uses "a dual-single lined lamp that emits at least two narrow wavelength bands of ultra-violet photons that match closely to the maximum absorption bands for DNA chromophores of nitrogenous bases, proteins, amino acids and other component bonds of microorganisms" with a preference of "a multi-wavelength narrow line source emitting at least two different wavelengths." Ex. 1001, 4:57–64. Three tests were conducted in regard to microorganisms' exposure to certain wavelengths: (1) with a combination of 222 nm and 254 nm photons or with only 282 nm photons on *Serratia marcescens*; (2) with only 282 nm photons or with a combination of 282 nm and 254 nm photons on *Aspergillus Niger*; and (3) with a combination of 222 nm and 254 nm photons or with a combination of 282 nm and 254 nm photons on *Escherichia coli*. *Id.* at 4:15–31. The '605 patent discloses that the results of these tests "showed significant reduction in living organisms when multi-wavelength narrow line photons were used compared to single wavelength photons" and that "[t]hese tests also demonstrated that the correct combination of dual-single line photons were significant and dependant on each organism." *Id.* at 4:43–48.

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