UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Case IPR2015-01277

U.S. Patent No. 8,309,943

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ASML NETHERLANDS B.V., EXCELITAS TECHNOLOGIES CORP., AND QIOPTIQ PHOTONICS GMBH & CO. KG,

Petitioners,

V.

ENERGETIQ TECHNOLOGY, INC.,

Patent Owner.

- x

VIDEOTAPED DEPOSITION OF J. GARY EDEN, Ph.D.

WilmerHale, LLP

60 State Street

Boston, Massachusetts

Reported by:

MARYJO O'CONNOR, RMR, CSR

JOB NO. 102208

Wednesday, January 27, 2015
9:09 a.m.

VIDEOTAPED DEPOSITION of J. GARY EDEN, Ph.D., at the offices of WilmerHale, LLP 60 State Street, Boston, Massachusetts, before MaryJo O'Connor, a Registered Merit Reporter, Certified Shorthand Reporter and Notary Public in and for the Commonwealth of Massachusetts.

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J.G. Eden

P R O C E E D I N G S

VIDEO TECHNICIAN: This is the start of DVD labeled one of the videotaped deposition of Dr. J. Gary Eden, Ph.D. in the matter of ASML Netherlands B.V., et al, versus Energetiq Technology in the United States Patent and Trademark Office before the Patent and Trial Appeal Board, Action No. IPR2015-01277, U.S. Patent No. 8,309,943.

This deposition is being held at the offices of Wilmer Hale, 60 State Street, Boston, Massachusetts, on January 27, 2016, at 9:09 a.m..

My name is Peter Crowley. I'm the legal video specialist from TSG Reporting, Inc., headquartered at 747 Third Avenue, New York, New York. The court reporter is MaryJo O'Connor in association with TSG Reporting.

Will counsel please introduce yourself.

MR. GOLDENBERG: My name is Richard Goldenberg representing the petitioner ASML and the witness Dr. Eden.

With me here today are Kevin Prussia and Michael Smith, both also of Wilmer Hale.

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portion of the light at a given wavelength is transmitted by a given thickness of the material. In other words, in the normal conventional sense.

Q. Dr. Eden, in the context of the '000 patent, what is your understanding of the word "sustain"?

A. Can you tell me where you're looking, Ms. Reed? Are you still in the '000 patent, or are you looking at a particular occurrence of the term?

Q. Dr. Eden, I'm still looking at Claim 1.

A. Okay, thank you.

Q. You're welcome.

A. So the word "sustain" to me I interpret as extending the life; maintaining the plasma. So perhaps a synonym for "sustain" would be to maintain the existence of.

Q. Is there a duration of time that the plasma would need to be maintained to meet the claim element "sustained" in your opinion?

A. Well, Ms. Reed, let me suggest this. I don't have my declaration before me. You've read, I presume my declaration. And all of the

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issues that you're pursuing now are addressed in my declaration. So it would be very helpful if I were able to review my declaration.

Q. Dr. Eden, are you referring to the '000 declaration or the -- because I believe you have that one in front of you.

A. Oh, I do. That's true. Very good. I do. I forgot that I had it. Thank you, Ms. Reed.

Q. You're welcome.

A. So would you be so kind as to repeat your question?

Q. Sure. Is there a duration of time that the plasma would need to be maintained to meet the claim element "sustained" in your opinion?

A. Ms. Reed, the claim as it's written is very vague. So that issue is left unresolved.

Q. Well, what's your understanding of "maintain"?

A. Well, the broader -- let me mention that the broader context of the language that you're mentioning is it says "to maintain a plasma."

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So it's very difficult to answer your question because the plasma can range over an extraordinary degree in electron density, for example. So I don't know how to answer your question.

Q. If I direct your attention to Exhibit 2 in the '000 patent Column 21.

A. Column 21?

Q. Lines 12 through 15. This reads, "The laser source 704 then provides laser energy to the ionized medium to sustain the plasma 732 which generates the high brightness light 736."

In that context of the '000 patent, could you tell me how a person of ordinary skill in the art would understand the phrase "sustain the plasma"?

A. Well, to use a vernacular expression, Ms. Reed, I would assume they would interpret it as to keep it alive. In other words, that the plasma would continue to exist.

Q. How long does "continue to exist" mean?

A. Oh, that's a function of the plasma itself and the electron lifetime.

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Q. How long does "continue to exist" mean in the context of the '000 patent?

A. I don't know because it's not clear, Ms. Reed. It doesn't tell me under what conditions. I cannot do a calculation based on what is given here.

Q. Dr. Eden, directing your attention back to Exhibit 2 of the '000 patent, Claim 1. In the context of the '000 patent, can you tell me what is meant by "plasma-generated light"?

A. Sure. I take that just to mean that the radiation that is generated by the plasma. The word "light" is used in a somewhat loose sense, but it's explained to some extent by what follows the word "light."

Q. Would you agree that plasma-generated light in the '000 context would be brighter than an arc lamp?

MR. GOLDENBERG: Objection, form.

A. I think that's a conclusion that I can't confirm. Or that's an assertion I can't confirm.

Q. Dr. Eden, if I could direct your attention to Exhibit 1, your '000 declaration,

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innovative?

MR. GOLDENBERG: Objection.

A. Well, you're making a qualitative statement in connecting a number of things, Ms. Reed. The passage that you just read from this document indicates that the improvement is the result of a combination of factors. And it's impossible from this document to say just what the source contributed to the improvement of performance. And you're implying, but you're not saying, that this improvement was due to one of your client's lamps.

Q. Do you know if in the industry there was a need for a brighter light?

A. I don't know that there was in the industry, but I would assume that there is; that improvements in all aspects of the optical system are always welcome.

Q. And would you agree that ASML identified the increase in the total amount of light as one of the new aspects of their metrology tool?

MR. GOLDENBERG: Objection.

A. Well, it's very difficult to tell

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what ASML intended or how they view the development. It is, in the short passage that you've given me, a document I've never seen before, it appears to be a positive development.

Q. Dr. Eden, in Exhibit 1, which is your declaration regarding the '000 patent, you gave a proposed construction for light, correct?

A. I believe that is correct. Are you referring to a specific page, Ms. Reed?

Q. Yes. Dr. Eden, if I could direct your attention to Paragraph 36. Doctor, are you there? At Paragraph 36?

A. I am indeed.

Q. And you gave some ranges for the meaning of light, correct?

A. I suggested some intervals, if you will, that are -- in wavelength that are associated with different spectral regions.

Q. Now, is this your own understanding of the different spectral regions?

A. It is my understanding, but I, for the purposes of this declaration, adopted the definition given by Bill Silfvast.

Q. Dr. Eden, if I could hand you what's

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going to be marked as Exhibit 5.

(Eden Exhibit 5, Document entitled "Optical Engineering" December 2003, Volume 42 Number 12 ISSN 0091-3286, marked for identification)

Q. Dr. Eden, do you recognize this document?

A. I certainly do.

Q. Could you tell me what it is?

A. Well, it's the -- a copy of the cover of the December 2003 issue of Optical Engineering. It's the first page, front and back. And then you have supplied a copy of an article that I and my colleagues wrote that appeared in that same issue, December of 2003.

Q. If I could direct your attention to that, it says 3612 at the bottom, the first page with your name as the author and your colleague's name as the author in the abstract.

In there in the abstract you write, "A near-infrared 1.315"; is that correct?

A. That's what it says. That's correct.

Q. So in your opinion would near-infrared include -- strike that.

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In your opinion would near-infrared be above 1,000?

A. Yes. I think it's been a long time ago, but my recollection is that the definition that's offered there is slightly longer than the limit that I'm proposing in the '000 declaration.

Q. So, Dr. Eden, in your opinion near-infrared could be above 1,000; is that correct?

A. The more common understanding of the limits of the near-infrared, or any other spectral region, I think are represented in my statement in the '000 declaration.

Q. But we can agree that you have authored a paper where near-infrared was above 1,000, correct?

A. That's correct. It's a little bit beyond the limit that I'm proposing in the '000. But I have to say that in my courses and work for at least the last 20 years, I've told my students that the infrared, by general agreement in the community, ends at about 1,000 nanometers.

Q. Thank you, Dr. Eden.

MS. REED: Let me mark what's going

ultraviolet, you proposed a range of 200 nanometers to 400 nanometers; is that correct?

MR. GOLDENBERG: Objection, form, foundation.

A. That is correct. That is the commonly-accepted boundaries of the ultraviolet.

Q. If I could direct your attention to Exhibit 2, the '000 patent, Column 20, Lines 32 to 35 this reads as "Ultraviolet light is electromagnet energy with a wavelength shorter than that of visible light, for instance between about 50 and 400 nanometers."

Did I read that correctly?

A. You did.

Q. So in your opinion would a person of ordinary skill in the art reading this passage of the '000 patent think that ultraviolet light was lower than your 200 to 400 range?

A. Someone who is skilled in the art knows where the boundaries of the various spectral regions are, Ms. Reed. And they would probably assume, as I did, that the author was referring to the ultraviolet writ large, that the ultraviolet consists of the region between 200 to

400 nanometers, which is the normal range for ultraviolet light, but that at lower wavelengths is the vacuum ultraviolet, and below that is the extreme ultraviolet.

Q. Thank you, Dr. Eden. I think now is a good time to break.

VIDEO TECHNICIAN: The time is now 12:09 p.m.. This concludes DVD number two of today's deposition. We are off the record.

(Proceedings recessed at 12:09 p.m. for the luncheon recess.)

A F T E R N O O N S E S S I O N

VIDEO TECHNICIAN: The time is now 1:07 p.m.. This begins DVD number three of today's deposition. We are back on the record.

By MS. REED:

Q. Dr. Eden, did you discuss any of your testimony this morning with counsel during break?

A. No.

Q. Dr. Eden, would you agree that Gärtner discloses a light source?

A. Yes, he does.

Q. And do you agree that Mourou discloses a light source?

A. Yes.

Q. And would you agree that Kensuke Murai discloses a light source?

A. I don't remember Kensuke in detail; but my recollection is, yes, Kensuke also describes a light source.

Q. Dr. Eden, do you agree that a person of ordinary skill in the art would have known that sufficient absorption of the laser radiation by the plasma is needed to sustain the plasma, correct?

MR. GOLDENBERG: Objection.

A. Are you referring to a particular part of one of my declarations, Ms. Reed?

Q. No. I'm just asking you a question, Dr. Eden.

A. Okay. Could you repeat the question?

Q. Sure. Do you agree that a person of ordinary skill in the art would have known that sufficient absorption of the laser radiation by the plasma is needed to sustain the plasma?

MR. GOLDENBERG: Objection, form.

A. That's a very vague question, Ms. Reed. Can you make it a bit more quantitative?

Q. Would a person of ordinary skill in the art known that the plasma needed to absorb the laser energy?

MR. GOLDENBERG: Objection, form.

A. For the type of -- I presume you're talking to the type of light source that is described in the patents at issue as well as, for example, Gärtner that involves a laser-produced plasma. One of the critical aspects of it is that the plasma absorbs the laser light, that is

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