UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

SOUTHERN DIVISION AT SANTA ANA

HONORABLE JAMES V. SELNA, JUDGE PRESIDING

CERTIFIED TRANSCRIPT

MR TECHNOLOGIES, GMBH, Plaintiff and Counterclaim Defendant, vs. WESTERN DIGITAL TECHNOLOGIES, INC., Defendant and Counterclaim Plaintiff.	SACV NO. 8:22-cv-01599-JVS-DVM DAY 3, VOLUME II

REPORTER'S TRANSCRIPT OF PROCEEDINGS

JURY TRIAL

SANTA ANA, CALIFORNIA

THURSDAY, JULY 18, 2024

1:29 P.M.

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are reasonable?
A I felt Mr. Bergman's groupings are reasonable and correspond to Western Digital's product lines and market segments that include consumer, which are the external client, the color, and cloud storage, the Ultrastar products.
Q So let's talk about benefits of the invention to Western Digital.
What is the main benefit that Western Digital obtains from its infringement of the patents?
A So the main benefit was the ability to increase areal density in the product.
Q What is areal density?
A So yes, it's a funny word. Areal refers to an area. And usually we refer to it in inches squared.
And then the density part refers to the number of bits that can fit within that given inch. And its measured in, you know, typically, for the products we're talking about, billions of bits per square inch or trillions of bits per square inch.
Q Why is areal density important?
A Areal density is important because it determines the capacity of the hard drive. So the disk has a given area on it, and how much bits you can fit on the disk will determine the capacity. Typically, people look at hard drives by how

much data they store, so the capacity of the drive.
Q So higher areal density equals higher storage capacity?
A Correct.
Q Did Western Digital have anything to say to support your analysis?
A Yes. Dr. Srinivasan, as you saw in the video testimony, said the holy grail of magnetic storage has always been to try to pack more and more storage into that given platter size.
Q And in your 25-plus years of experience in the industry, is that consistent?
A That's very accurate. You can call it the holy grail, the north star, the first thing you think about in morning, whatever superlatives you would like to add to that.
Q Did Dr. Ikeda provide testimony supporting that?
A Yes. Dr. Ikeda also said that increasing areal density is the most important objective.
Q So earlier, you were talking about the trilemma and how the invention helps to reduce bit size.
Can you just kind of give an example to illustrate how decreasing bit size helps increase areal density?
A Sure. So what I'm showing here is on a very small portion of the disk, a section that would hold 8 bits. So this would be -- this given area, whatever small dimension that is, there would be 8 bits there.

01:57:50 So if we made the bits smaller, we could fit more bits into that given small area, and this then would increase the areal density, in this case going from 8 bits to 18 bits per unit area.

01:58:11 Q And does -- what does Dr. Seuss' invention have to do with what we just saw?

A Dr. Seuss' invention is what enabled this by breaking through the superparamagnetic limit, separating the stability from the right field in the trilemma.

01:58:33 Q Are there Western Digital documents that support what you just said, that -- attributing these areal density increases and therefore storage capacity gains, to Dr. Seuss?

A Yes, there are.

01:58:51 Q So here, we have JX 2030.

Dr. Re, did you rely on -- and you can turn to that in your binder.

Did you rely on this presentation in your analysis?

01:59:03 A I did.

MR. CHANG: Your Honor, we move in JX 2030.

MR. LUMISH: No objection, Your Honor.

THE COURT: 2030 will be received.

(Plaintiff's Exhibit 2030 received in evidence.)

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01:59:14 BY MR. CHANG:

Q Can you explain what we see here on this slide?

A Yes. This was a presentation that, again, Dr. Srinivasan gave and referred to in his video testimony.
01:59:25 And it says "The Media 'Trilemma'," which again we've talked to a great deal, reducing the size of the bits, losing stability so you have to increase anisotropy and then not being able to write the media.

And he asks the question how to overcome this.

01:59:44 Q What do we see on the very next slide?

A So on the very next slide, he states:

"Enter the 'Exchange-Spring'."

Q And that figure on the right, that says "Exchange-Spring Media," what is that?

01:59:59 A So that is actually a figure from one of Dr. Seuss' papers that was based on this invention. What you see on the top of the figure here is, again, a graded anisotropy structure going from soft to moderate to high. Remember, I said that disks have magnetic material on both sides. So in
02:00:29 this case, the right field would be coming from the bottom of the depth structure.

Q So here, the substrate -- throughout your entire presentation, we have the substrate on the bottom, right?

A Correct.

02:00:42 Q But here, the substrate is on the top?

02:00:44 A Yes.
Q Okay. And so if you were to flip it so that the substrate was on the bottom, where would the hard storage layer be?
02:00:50 A It would be on the bottom.
Q And what would be on top of the hard storage layer?
A The moderate and soft anisotropy layers.
Q Which is called?
A The nucleation host.
02:01:07 Q And is this from the same presentation?
A Yes, correct. This is the summary slide.

MR. CHANG: Okay. Can we blow up what's there in the red box.

(The document was published in open court.)

02:01:20 BY MR. CHANG:
Q And, Dr. Re, can you speak to that, please?
A Yes. So what's stated here is:

"The 'exchange-spring' principle has guided most of the advances in PMR media 02:01:35 since inception."

Q And what is the figure right next to that statement?
A That's a figure from Dr. Seuss' paper.
Q And in your experience in this field, do you agree with that statement?
02:01:49 A Yes, I do agree with that statement.

Q Now, do you recall yesterday, in opening statements, Western Digital said that the changes are small and incremental over time.
Do you remember that?
A Yes.
Q Do you agree that some changes are, in fact, small and incremental over time?
A No. Some changes are actually groundbreaking. And as I said, this one broke the superparamagnetic limit, which many researchers in the field have been trying to figure out, but it was just assumed that this was not separatable, the stability from the rightability. But Dr. Seuss' invention -- again, to my surprise -- showed a way to do that.
Q Fair to say that his invention is the foundation on which modern PMR media is built?
A Yes, I think that's fair to say.
Q Now, we talked about areal density and capacity.
Are there other benefits of the invention related to that?
A Yes. There's a number of other benefits. We've kind of talked about the top three, which relate to the trilemma. The invention, though, also improved the writeability of the disk and something called overwrite.
Q What is "overwrite"?

02:03:29 A "Overwrite" is the ability to write over previously written data on the disk.
Q The next bullet: "Better Grain Segregation."
Can you explain how the invention helps with that?
02:03:40 A Yes. Dr. Seuss' invention allowed the alloys to be optimized for better grain segregation. And also --
Q How about the signal-to-noise ratio, or SNR?
A So the SNR, again the signal-to-noise ratio, was improved by Dr. Seuss' invention, as I'll show you.
02:04:04 Q So how does it do that?
A Basically, it improves the writeability so that you're writing cleaner, more well-defined transitions, and also allows you to use alloys that will allow that to happen.
Q Harder alloy?
02:04:23 A Harder alloys.
Q What about adjacent track interference? Can you just explain what that is?
A Sure. So a track -- you know, if you have your little disk, the circumferential data, it's called the track. And 02:04:37 there will be lots of tracks packed next to each other. So if you're trying to write on one track, the fields from the write head could interfere with data that's next to that track, the adjacent track.
And what Dr. Seuss' invention did related a bit 02:04:53 even to the item below it, but it confined the fields better

so there was less adjacent track erasure.
Q Does that relate to your garden hose analogy from before?
A Yes, that was like the garden hose.
Q And have you seen evidence from Western Digital that it achieves these benefits from its use of the invention?
A I have.
Q Did you see that testimony from Dr. Ikeda?
A Yes. Dr. Ikeda stated:

> "So to reduce grain size required the use of multiple ECC [sic] structures."

Q What is the "multiple ECL structure" he's referring to?
A ECL, I'm sorry.
So the ECL structure is basically how many break layers, also how many mag layers are in the structure.
Q So throughout your infringement analysis, we've been looking at a lot of products. Are those all multiple ECL structures?
A Yes, they are.
Q And what did Dr. Ikeda have to say about as you increase the number of G-layers and ECL layers, what effect that does on areal density?
A So he states:

> "Going from two to three to four to five to six, all contribute to increasing

04:12:47
Q Do you want me to zoom in on something else?
A No, I've got it. It's a consistent growth. But yes.
Q Fair enough. Let me show you that.
MR. LUMISH: So can you pull up, please,
04:12:55
Mr. Schmoller --
BY MR. LUMISH:
Q You're talking about the colored dots across the top, right?
A Yes.
04:13:01
Q When you say "consistent growth"?
A Well, the -- this area before is a consistent growth of 50-some percent.
Q Okay. So -- and then it actually starts to decline in growth after 2004.
04:13:17
A Correct.
Q Areal density?
A Yes. Since we've reached the superparamagnetic limit.
(Court Reporter requests clarification for the record.)
04:13:24
THE WITNESS: The superparamagnetic limit. Starting to have issues with that.
BY MR. LUMISH:
Q The entry there at 2024 -- I'm sorry, excuse me -- 2004 is two years before Dr. Seuss filed his patent application,
04:13:36
right?

A   That's correct.
MR. LUMISH: And Mr. Schmoller, will you bring up all of that -- the latter half of the timeline, so from 2004 to the end so we can see all of the entries for those years, please. And the dates. Thank you.
(The document was published in open court.)
BY MR. LUMISH:
Q   Okay. This is your list of innovations driving areal density in your presentation in 2015, right?
A   Yes.
Q   And each of one of the entries has a bullet before it. The first one says "PMR," second one says "TMR head," and so forth, right?
A   Right.
Q   There's 13 of them that you list.
A   Okay.
Q   Now, let's go back to that superparamagnetic limit. You told the jury today that the inventions in the two patents in this case solved this trilemma underneath the superparamagnetic limit, right?
A   Which it did.
Q   You said it solved it.
A   Yes.
Q   And you said it was something you thought or people in the field thought was unsolvable before that.

04:14:42
A   Yes.
Q   You thought it was crazy when you first heard it. That was your testimony.
A   It was.
04:14:47
Q   And it was this decoupling of the coercive field from thermostability.
A   That's what it did.
Q   Okay. Take your time and look, sir. In all of your entries of innovations driving areal density growth, you
04:15:03
don't mention decoupling the course of the field from thermostability.
A   So the audience -- this is true. The audience for this talk, though, is a general tech talk. So basically, what I'm doing with this talk is giving at-a-boys and pats on the
04:15:20
back to the various -- since all of the departments reported to me. So I'm saying thank you to the head team. Thank you to the channel team. Thank you to the -- you know, all the various teams, the drive team, et cetera. And I have PMR listed there as a thanks to the media team as they were
04:15:37
moving forward.
        So this is not meant to be necessarily a technical paper that's going to be reviewed. This is a cheering, a rally call for the employees that worked for me.
Q   Can you answer my question, though, please?
04:15:53
A   Did I say "yes" to it before --

Q So it's true that in all your entries from 2004 on, you don't mention anything about decoupling the coercive filed from ^thermostability in order to solve the superparamagnetic limit?

04:15:55

A As I mentioned, the media team was already -- had many pats on the back, so I didn't mention that. I mentioned this for the other teams.

04:16:11

Q Are you suggesting here that Seagate innovated PMR? They're the inventors of PMR?

A No, they aren't the inventors. That was 1971, I think. Iwasaki Shun.

04:16:26

Q You don't mention Dr. Seuss, of course, in this list?

A I don't mention anyone in this list.

Q Right. You don't mention nucleation hosts?

A No. That would be way in the weeds for a general talk like this was.

04:16:42

Q Well, so this talk is 2015, right?

A Sure.

Q And you have testified in this case that Seagate uses Dr. Seuss' inventions in the patents in this case.

04:16:57

A That's correct.

Q And that they'd done so since 2010.

A That's probably the right date. I don't remember exactly.

Q Can we agree that it's roughly around 2010, or at least

04:17:08

04:17:12 by 2010, that you believe Seagate was using the patents in this case?
A Yes.
Q And they were continuing to use it, in your testimony
04:17:21 in this case, up until you left in 2018.
A Correct.
Q And you don't list any innovations of Seagate using those technologies to improve areal density growth.
A As I said, this talk is not meant -- this talk is meant
04:17:38 to be a pat on the back to the other groups. It's not meant for that.
Q But the other groups would be the ones who would implement these claimed inventions if they were in Seagate's products, right?
04:17:50 A At this point, the media team had a new building and lots of money, and I didn't think I needed to do that.
Q Didn't need to mention it?
A It's a talk for my employees.
Q So you do show PMR as the first entry when you have
04:18:06 this 52-percent growth in areal density, correct?
A Correct.
Q And TMR is listed there. That's tunneling magnetoresistance?
A That's correct.
04:18:18 Q Can we agree that Dr. Seuss didn't invent either of

04:18:20 those two things?
A No. Seagate was the first to use that.
Q And I won't go through all 13. But can we agree that Dr. Seuss didn't invent any of the entries that you have
04:18:30 from 2004 to the end of your timeline in JX 1295?
A That's fair.
Q And you've testified in the past that TMR was a revolutionary technology, right?
A Using a specific definition of revolutionary, but I
04:18:55 would say TMR is a revolutionary technology with any definition.
Q And you told the jury before that -- that Dr. Seuss' two patents in this case are the foundation on which modern PMR media is built.
04:19:09 A It is exemplified in all the data we've looked at, yes.
Q If Dr. Seuss' two patents in this case were the foundation on which modern PMR were built and you were using it at Seagate for the eight years you were there, surely, sir, you would have credited Dr. Seuss, at some point, for
04:19:37 having contributed all of that value to Seagate, right?
A I wouldn't do that in a talk like this, no.
Q I don't even mean in this talk. I mean ever, in any form. Surely, you would have done that.
A I'm sure my employees did. I would not give talks like
04:19:52 that in my role.

Q You never, as the CTO of Seagate, credited Dr. Seuss with having improved areal density at Seagate?
A Some of the 4,000 people who worked for me did, though.
Q You never did that, did you, sir?
A I did not personally.
Q And you know that in his deposition -- you said you read all the depositions -- Dr. Seuss testified in this case that nobody from MR Technologies has even talked to Seagate?
A If that's what he said, then I believe that.
Q You've not shown the jury any documents in this case where you personally credit Dr. Seuss and say that his patents in this case -- not his body of work, but the two patents in this case were a revolutionary breakthrough in areal density and PMR media; is that true?
A Could you repeat that, that I didn't --
Q Sure. You have not shown to the jury a single document where you ever said -- separated from being in this courtroom as a hired expert -- that Dr. Seuss' two patents in this case were a revolutionary foundational breakthrough that improved areal density in PMR media?
A As I said, I might not have personally, but many people within my team did.
Q In fact, sir, the truth is you had never even seen the two patents in this case before you were hired to be an expert against Western Digital again.

A I retired in 2018. So I was gone from Seagate by the time the patents issued, as you said.
Q Can you answer my question, please?
A No, I have not seen those patents until after they issued.
Q And you were hired in this case?
A Was hired in this case many years after they issued. But yes.
Q I just want to make sure my question is answered.
You never saw the patents in this case until you were hired as an expert in this case?
A That's true. Because I wasn't looking at patents after I retired.
MR. LUMISH: Your Honor, I pass the witness.
THE COURT: Do you know how much time you'll have?
MR. CHANG: Probably about 20 minutes, half hour. I can get started for 10 minutes.
THE COURT: That's fine. We'll stop at 4:30, though.

REDIRECT EXAMINATION

BY MR. CHANG:
Q Dr. Re, Mr. Lumish asked you some questions about whether the G1 hard storage layers in the accused products, whether they can, on their own, store data. Do you remember that?

CERTIFICATE

I hereby certify that pursuant to Section 753, Title 28, United States Code, the foregoing is a true and correct transcript of the stenographically reported proceedings held in the above-entitled matter and that the transcript page format is in conformance with the regulations of the Judicial Conference of the United States.

Date: July 19, 2024

/s/DEBORAH D. PARKER
DEBORAH D. PARKER, OFFICIAL REPORTER