

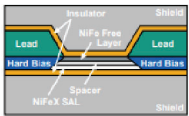
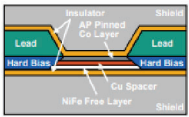
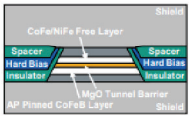
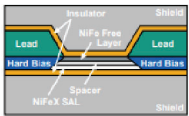
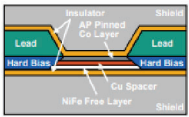
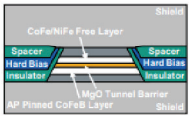
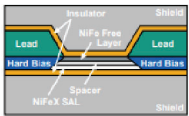
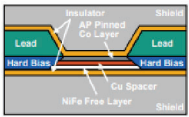
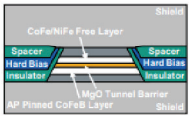
Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

On information and belief, Western Digital Corporation and Western Digital Technologies, Inc. (collectively, “Western Digital” or “WD”) Accused Products, including their hard disk drives (“HDDs”), infringe U.S. Patent No. 11,968,909.

US 11,968,909	Exemplary Western Digital Infringement
1. A magnetoresistive device comprising a magnetic tunnel junction structure comprising a multi-layer material stack including:	If the preamble is limiting, each of WD’s hard disk drives (the “WD Accused Products”) includes a tunneling magnetoresistive (Tunneling MR) reading head, which is a magnetoresistive (MR) device comprising a magnetic tunnel junction (MTJ) structure as claimed. The WD Accused Products are magnetoresistive devices. <i>See, e.g., Terris presentation (Western Digital presentation):</i>¹

¹ Bruce D Terris, “Magnetic Recording and Magnetic Memory,” presentation at IEEE Magnetism Society Summer School, Virginia Commonwealth University, June 5, 2019, (Copy accessible at <https://egr.vcu.edu/media/engineering/documents/mne/TerrisSummerSchool2019fordistribution.pdf>)

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US 11,968,909	Exemplary Western Digital Infringement																																				
	Read Head Sensor Technologies <table><tr><th>Year</th><th>1st Density (Gb/in²)</th><th>Sensor Technology</th><th>Structure</th><th>MR Effect</th><th>Sense Current Geometry</th></tr><tr><td>1979</td><td>0.01 Gb/in²</td><td>Thin-film Inductive</td><td></td><td>N/A</td><td>N/A</td></tr><tr><td>1991</td><td>0.1 Gb/in²</td><td>MR Sensor</td><td></td><td>Anisotropic MR</td><td>CIP</td></tr><tr><td>1997</td><td>2 Gb/in²</td><td>Spin Valve</td><td></td><td>Giant MR</td><td>CIP</td></tr><tr><td>2006</td><td>100 Gb/in²</td><td>Tunnel Valve</td><td></td><td>Tunneling MR</td><td>CPP</td></tr><tr><td>?</td><td>>1Tb/in²</td><td>?</td><td>?</td><td>?</td><td>?</td></tr></table> Western Digital. ©2016 Western Digital Corporation or affiliates. All rights reserved. WD designs and manufactures “substantially all of the recording heads [] required for our products,” according to WD’s most recent 10-K.² A WD patent filed in 2020 and issued in 2022 (U.S. Patent No. 11,283,006, the “’006 Patent”) also describes a “magnetoresistive device [that] includes a read head,” “[t]he read head is a tunneling magnetoresistive reader.” ’006 Patent, Abstract. The ’006 Patent lists Zheng Gao as an inventor,	Year	1 st Density (Gb/in ²)	Sensor Technology	Structure	MR Effect	Sense Current Geometry	1979	0.01 Gb/in ²	Thin-film Inductive		N/A	N/A	1991	0.1 Gb/in ²	MR Sensor		Anisotropic MR	CIP	1997	2 Gb/in ²	Spin Valve		Giant MR	CIP	2006	100 Gb/in ²	Tunnel Valve		Tunneling MR	CPP	?	>1Tb/in ²	?	?	?	?
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² 2023 10-K, available at <https://investor.wdc.com/static-files/9468af6f-967f-4709-bcaf-c0e9510264dd>, at 8.

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Case 1:24-cv-00342-RGA Document 21-4 Filed 07/08/24 Page 79 of 153 PageID #: 1406

US 11,968,909	Exemplary Western Digital Infringement
	who according to LinkedIn is presently Global Director for a “joint Dev and MFG team thin film sensor wafer process” at HGST, a WD company. Zheng Gao · 2nd Director at HGST, a Western Digital company San Jose, California, United States · Contact info Experience  HGST, a Western Digital brand 15 yrs 2 mos Global Director Jan 2016 - Present · 8 yrs 2 mos San Jose, CA Joint Dev and MFG Team Thin Film Sensor Wafer Process The MTJ structure in WD Accused Products comprises a stack that includes multiple materials and multiple layers, which is a multi-layer material stack. For example, a 2022 report published by Seagate and Western Digital describes “CoFeB/MgO/CoFeB-based stack,” “[c]ontinued optimization of MgO MTJ stack,” “improved low RA FeCo/MgO stack” in the context of “future reader designs, challenges, and []potential solution paths.” Ex. J at 1, 6, 7. The same report also describes the stack as including layers such as “free layer (FL),” “pinned layer (PL).” Id. at 4.

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	TABLE VI READER ROADMAP TECHNOLOGY CHALLENGES <table><tr><th>Reader Challenges</th><th>Key Issues</th><th>Possible Solutions</th><th>Important Research Projects</th></tr><tr><td>Signal</td><td>MR ~ 100% is required near RA 0.2 ohm.um² for 2.4 Tbpsi. (assumes 3dB from TDMR) MR >> 100% is required near RA 0.1 ohm.um² for 4.0 Tbpsi. (assumes 3dB from TDMR)</td><td>- Continued optimization of MgO MTJ stack. - Improved/new electrode-barrier/spacer materials and process for increased spin polarization, filtering</td><td>- Understand Low RA/ high MR limits for practical MgO MTJ. - Optimized materials/ process for improved low RA FeCo/MgO stack. - What's after MgO to meet requirements for RA ~ 0.1, high MR? - Improved/new spacer materials for TMR, GMR with oxide/ metal/ semiconductor spacers and high spin polarization FM (e.g. Heusler) electrodes. - Demo high MR and good uniformity of nano-oxide spacer at 10nm scale.</td></tr><tr><td>Noise</td><td>Thermal magnetic noise increases rapidly with shrinking Freelay (FL) volume Shot Noise and Johnson Noise increase for smaller TMR devices. Preamp noise can be dominant near 1k Ohms</td><td>- Reduce Freelay damping constant - Maximize Freelay saturation magnetization with good anisotropy and low magnetostriction - Improved tunnel barrier quality for reduced Shot noise, lower RA for reduced Johnson noise (TMR). - Low RA, Lower preamp noise.</td><td>- engineered Freelay and cap materials/ interfaces for reduced damping - engineer magnetically soft Freelay materials near 2.4T - see above</td></tr><tr><td>SNR</td><td>In thermal magnetic noise limit, Spin Valve SNR scales as FL Ms x Utilization / damping</td><td>Improved FL materials engineering for high Ms, optimized utilization and low damping. - New device concepts for 4+ Tbpsi with high SNR</td><td>- develop lower noise preamp for high impedance, high frequency reader (e.g. 1k Ohm, 3 GHz) - engineer Freelay with very high Ms, low damping and soft magnetics. - Fundametel modeling and experimental validation scaling behavior and SNR for NLSV, STO and other promising reader concepts. - Demonstrate stable STO operation at 10 nm scale. Develop/ verify high SNR detection method. Scale design for high linear densities. - Model and characterize scaling of signal/ noise in NLSV to 10nm scale with <10nm thick channel. Develop very high impedance, high freq detector preamp. Evaluate feasibility of Graphene based NLSV.</td></tr></table> See Ex. J at 6 (annotations added)	Reader Challenges	Key Issues	Possible Solutions	Important Research Projects	Signal	MR ~ 100% is required near RA 0.2 ohm.um ² for 2.4 Tbpsi. (assumes 3dB from TDMR) MR >> 100% is required near RA 0.1 ohm.um ² for 4.0 Tbpsi. (assumes 3dB from TDMR)	- Continued optimization of MgO MTJ stack. - Improved/new electrode-barrier/spacer materials and process for increased spin polarization, filtering	- Understand Low RA/ high MR limits for practical MgO MTJ. - Optimized materials/ process for improved low RA FeCo/MgO stack. - What's after MgO to meet requirements for RA ~ 0.1, high MR? - Improved/new spacer materials for TMR, GMR with oxide/ metal/ semiconductor spacers and high spin polarization FM (e.g. Heusler) electrodes. - Demo high MR and good uniformity of nano-oxide spacer at 10nm scale.	Noise	Thermal magnetic noise increases rapidly with shrinking Freelay (FL) volume Shot Noise and Johnson Noise increase for smaller TMR devices. Preamp noise can be dominant near 1k Ohms	- Reduce Freelay damping constant - Maximize Freelay saturation magnetization with good anisotropy and low magnetostriction - Improved tunnel barrier quality for reduced Shot noise, lower RA for reduced Johnson noise (TMR). - Low RA, Lower preamp noise.	- engineered Freelay and cap materials/ interfaces for reduced damping - engineer magnetically soft Freelay materials near 2.4T - see above	SNR	In thermal magnetic noise limit, Spin Valve SNR scales as FL Ms x Utilization / damping	Improved FL materials engineering for high Ms, optimized utilization and low damping. - New device concepts for 4+ Tbpsi with high SNR	- develop lower noise preamp for high impedance, high frequency reader (e.g. 1k Ohm, 3 GHz) - engineer Freelay with very high Ms, low damping and soft magnetics. - Fundametel modeling and experimental validation scaling behavior and SNR for NLSV, STO and other promising reader concepts. - Demonstrate stable STO operation at 10 nm scale. Develop/ verify high SNR detection method. Scale design for high linear densities. - Model and characterize scaling of signal/ noise in NLSV to 10nm scale with <10nm thick channel. Develop very high impedance, high freq detector preamp. Evaluate feasibility of Graphene based NLSV.
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first and second ferromagnetic material layer; and	The WD Accused Products comprise first and second ferromagnetic material layer. For example, the 2022 report published by Seagate and Western Digital describes “CoFeB/MgO/CoFeB-based stack,” “[c]ontinued optimization of MgO MTJ stack,” “improved low RA FeCo/MgO stack” and “improved tunnel barrier quality” in the context of “future reader designs, challenges, and []potential solution paths.” See Ex. J at 1, 6, 7.																

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³ See supra, footnote 1 at 22.

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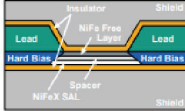
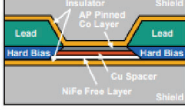
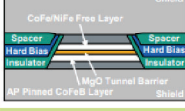
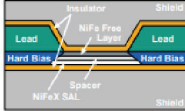
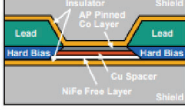
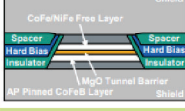
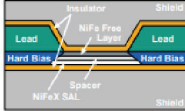
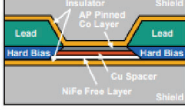
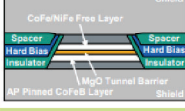
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US 11,968,909	Exemplary Western Digital Infringement
	WD's '006 Patent describes a magnetoresistive device 401 that includes a CoFe ferromagnetic nanolayer 413 in the “first free layer 410,” and CoFe ferromagnetic nanolayer 431 in the “second free layer 430.” '006 Patent, FIG. 4B.

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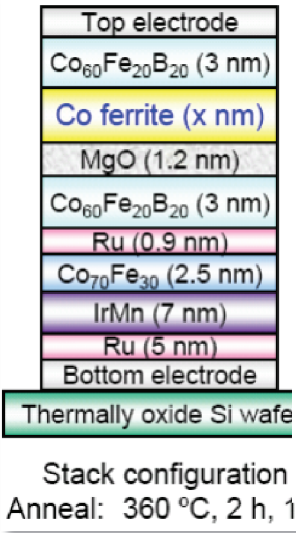
US 11,968,909	Exemplary Western Digital Infringement
	401 SHIELD (S2) CAPPING LAYER 440 LAYER 435 INSERTION LAYER 434 BORON LAYER 432 Co INSERTION LAYER 445 CoFe INSERTION LAYER 444 CoFe NANOLAYER 431 BARRIER LAYER 420 CoFe NANOLAYER 413 Co INSERTION LAYER 443 CoFe INSERTION LAYER 442 BORON LAYER 412 INSERTION LAYER 414 LAYER 405 BUFFER LAYER 404 SEED LAYER 402 SHIELD (S1) SECOND FREE LAYER 430 FIRST FREE LAYER 410 FIG. 4B <i>See also '006 Patent, claim 14.</i>

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US 11,968,909	Exemplary Western Digital Infringement
	14. A magnetic sensor, comprising: a seed layer; a barrier layer above the seed layer; a free layer above the barrier layer, the free layer comprising: a ferromagnetic nanolayer on the barrier layer, the ferromagnetic nanolayer comprising a crystalline structure that is BCC; an amorphous layer above the ferromagnetic nanolayer, one or more layers between the ferromagnetic nanolayer and the amorphous layer, the one or more layers comprising a crystalline structure that is FCC, wherein the one or more layers between the ferromagnetic nanolayer and the amorphous layer comprise: a first layer comprising CoFe; and a second layer comprising Co; and a non-ferromagnetic capping layer above the free layer. Further, a 2013 presentation by a member of HGST's Read Head Development team describes a "Thin Film Read Magnetic Sensor" with the following structure comprising a MgO layer between ferromagnetic layers including two Co₆₀Fe₂₀B₂₀ (namely, "CoFeB") layers.⁴ The CoFeB layers are ferromagnetic material layers.

⁴ https://nccavs-usergroups.avs.org/wp-content/uploads/PAG2013/2013_4gao.pdf at 12.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	 Stack configuration Anneal: 360 °C, 2 h, 1
a tunnel barrier layer between the first and second ferromagnetic material layers such that the tunnel barrier layer is above the first ferromagnetic material layer and below the second ferromagnetic material layer,	The WD Accused Products comprise a tunnel barrier layer between the first ferromagnetic material layer and the second ferromagnetic material layer such that the tunnel barrier layer is above the first ferromagnetic material layer and below the second ferromagnetic material layer. For example, the sensor structure illustrated in the Terris presentation which includes a MgO tunnel barrier above a CoFeB layer and below a CoFe/NiFe free layer.⁵

⁵ See *supra*, footnote 1 at 22.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	Further, the 2013 presentation by a member of HGST's Read Head Development team describes a "Thin Film Read Magnetic Sensor" with the following structure comprising a MgO layer above a 3 nm Co₆₀Fe₂₀B₂₀ layer and below a 3 nm Co₆₀Fe₂₀B₂₀ layer.⁶

⁶ See *supra*, footnote 4.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

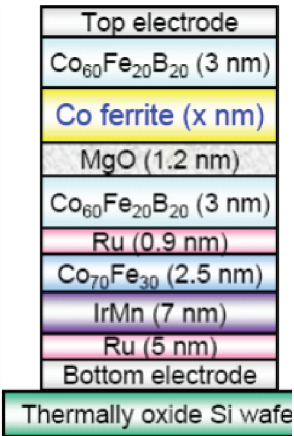
US 11,968,909	Exemplary Western Digital Infringement
	 Stack configuration Anneal: 360 °C, 2 h, 1 Also, WD's '006 Patent describes a magnetoresistive device 401 that includes a barrier layer 420 that is above CoFe nanolayer 413 (i.e. first ferromagnetic layer) and below CoFe nanolayer 431 (i.e. second ferromagnetic layer). '006 Patent, FIG. 4B.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	FIG. 4B
wherein said tunnel barrier layer comprises crystalline MgOx (001) with oxygen vacancy defects and (0<x<1).	On information and belief, the tunnel barrier layer in the WD Accused Products comprise crystalline MgOx (001) with oxygen vacancy defects and (0<x<1). For example, WD uses MgO as a tunnel barrier in the TMR read heads of its hard disk drives, located between said first ferromagnetic material layer and said second ferromagnetic material layer.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement																
	For instance, a 2022 report published by Seagate and Western Digital describes “CoFeB/MgO/CoFeB-based stack,” “[c]ontinued optimization of MgO MTJ stack,” “improved low RA FeCo/MgO stack” and “improved tunnel barrier quality” in the context of “future reader designs, challenges, and []potential solution paths.” Ex. J at 1, 6, 7. TABLE VI READER ROADMAP TECHNOLOGY CHALLENGES <table><tr><th>Reader Challenges</th><th>Key Issues</th><th>Possible Solutions</th><th>Important Research Projects</th></tr><tr><td>Signal</td><td>MR ~ 100% is required near RA 0.2 ohm.um² for 2.4 Tbpsl. (assumes 3dB from TDMR) MR >> 100% is required near RA 0.1 ohm.um² for 4.0 Tbpsl. (assumes 3dB from TDMR)</td><td>- Continued optimization of MgO MTJ stack. - Improved/new electrode-barrier/spacer materials and process for increased spin polarization, filtering.</td><td>- Understand Low RA/ high MR limits for practical MgO MTJ. - Optimized materials/ process for improved low RA FeCo/MgO stack. - What's after MgO to meet requirements for RA ~ 0.1, high MR? - Improved/new spacer materials for TMR, GMR with oxide/ metal/ semiconductor spacers and high spin polarization FM (e.g. Heusler) electrodes. - Demo high MR and good uniformity of nano-oxide spacer at 10nm scale.</td></tr><tr><td>Noise</td><td>Thermal magnetic noise increases rapidly with shrinking Freelay (FL) volume Shot Noise and Johnson Noise increase for smaller TMR devices. Preamp noise can be dominant near 1k Ohms</td><td>- Reduce Freelay damping constant - Maximize Freelay saturation magnetization with good anisotropy and low magnetostriction - Improved tunnel barrier quality for reduced Shot noise, lower RA for reduced Johnson noise (TMR). - Low RA, Lower preamp noise.</td><td>- engineered Freelay and cap materials/ interfaces for reduced damping - engineer magnetically soft Freelay materials near 2.4T - see above</td></tr><tr><td>SNR</td><td>In thermal magnetic noise limit, Spin Valve SNR scales as FL Ms x Utilization / damping</td><td>Improved FL materials engineering for high Ms, optimized utilization and low damping. - New device concepts for 4+ Tbpsl with high SNR</td><td>- develop lower noise preamp for high impedance, high frequency reader (e.g. 1k Ohm, 3 GHz) - engineer Freelay with very high Ms, low damping and soft magnetics. - Fundametl modeling and experimental validation scaling behavior and SNR for NLSV, STO and other promising reader concepts. - Demonstrate stable STO operation at 10 nm scale. Develop/ verify high SNR detection method. Scale design for high linear densities. - Model and characterize scaling of signal/ noise in NLSV to 10nm scale with <10nm thick channel. Develop very high impedance, high freq detector preamp. Evaluate feasibility of Graphene based NLSV.</td></tr></table> See Ex. J at 6 (annotations added) Furthermore, the Findings of Fact, Conclusions of law, and Decision in the American Arbitration Association Case No. 651600012907 dated November 18, 2011 (“Arbitration Decision”),⁷ state that WD, through wrongful conduct, introduced an MgO TMR head product into the market. The Arbitrator found that:	Reader Challenges	Key Issues	Possible Solutions	Important Research Projects	Signal	MR ~ 100% is required near RA 0.2 ohm.um ² for 2.4 Tbpsl. (assumes 3dB from TDMR) MR >> 100% is required near RA 0.1 ohm.um ² for 4.0 Tbpsl. (assumes 3dB from TDMR)	- Continued optimization of MgO MTJ stack. - Improved/new electrode-barrier/spacer materials and process for increased spin polarization, filtering.	- Understand Low RA/ high MR limits for practical MgO MTJ. - Optimized materials/ process for improved low RA FeCo/MgO stack. - What's after MgO to meet requirements for RA ~ 0.1, high MR? - Improved/new spacer materials for TMR, GMR with oxide/ metal/ semiconductor spacers and high spin polarization FM (e.g. Heusler) electrodes. - Demo high MR and good uniformity of nano-oxide spacer at 10nm scale.	Noise	Thermal magnetic noise increases rapidly with shrinking Freelay (FL) volume Shot Noise and Johnson Noise increase for smaller TMR devices. 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Develop/ verify high SNR detection method. Scale design for high linear densities. - Model and characterize scaling of signal/ noise in NLSV to 10nm scale with <10nm thick channel. Develop very high impedance, high freq detector preamp. Evaluate feasibility of Graphene based NLSV.
Reader Challenges	Key Issues	Possible Solutions	Important Research Projects														
Signal	MR ~ 100% is required near RA 0.2 ohm.um ² for 2.4 Tbpsl. (assumes 3dB from TDMR) MR >> 100% is required near RA 0.1 ohm.um ² for 4.0 Tbpsl. (assumes 3dB from TDMR)	- Continued optimization of MgO MTJ stack. - Improved/new electrode-barrier/spacer materials and process for increased spin polarization, filtering.	- Understand Low RA/ high MR limits for practical MgO MTJ. - Optimized materials/ process for improved low RA FeCo/MgO stack. - What's after MgO to meet requirements for RA ~ 0.1, high MR? - Improved/new spacer materials for TMR, GMR with oxide/ metal/ semiconductor spacers and high spin polarization FM (e.g. Heusler) electrodes. - Demo high MR and good uniformity of nano-oxide spacer at 10nm scale.														
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SNR	In thermal magnetic noise limit, Spin Valve SNR scales as FL Ms x Utilization / damping	Improved FL materials engineering for high Ms, optimized utilization and low damping. - New device concepts for 4+ Tbpsl with high SNR	- develop lower noise preamp for high impedance, high frequency reader (e.g. 1k Ohm, 3 GHz) - engineer Freelay with very high Ms, low damping and soft magnetics. - Fundametl modeling and experimental validation scaling behavior and SNR for NLSV, STO and other promising reader concepts. - Demonstrate stable STO operation at 10 nm scale. Develop/ verify high SNR detection method. Scale design for high linear densities. - Model and characterize scaling of signal/ noise in NLSV to 10nm scale with <10nm thick channel. Develop very high impedance, high freq detector preamp. Evaluate feasibility of Graphene based NLSV.														

⁷ Available at https://amlawdaily.typepad.com/01302012western_interim.pdf.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	96. Because of the wrongful conduct by Western Digital and Dr. Mao, Western Digital was able to introduce an MgO TMR head product into the market approximately nine months earlier than they otherwise would have been able to do so. Arbitration Decision at 27. In addition, the Terris presentation contains a slide titled “Read Head Sensor Technologies” which appears to show that since 2006, a Tunneling MR sensor has a structure that includes a MgO tunnel barrier between a CoFeB layer and a CoFe/NiFe layer.⁸ WD’s ’006 Patent also illustrates a barrier layer 420 in FIG. 4B that is described as including “MgO with (001) crystalline texture.” ’006 Patent, 10:7-13.

⁸ See *supra*, footnote 1 at 22.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	The ferromagnetic nanolayers 413, 431 interface with the barrier layer 420 and promote the crystalline texture of the barrier layer 420, such as a barrier layer that includes MgO with (001) crystalline texture. In one embodiment, which <i>See also '006 Patent, claim 8.</i> 8. The magnetic sensor of claim 1, wherein the barrier layer comprises MgO.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	<i>See also id.</i>, 11:54-57: TiOx, or other suitable electrically insulating materials. In certain embodiments, the barrier layer 420 is formed to a thickness of about 10 Å or less. In some embodiments, the barrier layer is MgO due to the promotion of (001) texture from the CoFe ferromagnetic nanolayers 413, 431 and the boron layers 412, 432. Furthermore, the 2013 presentation by HGST describe a MgO layer.⁹ The same presentation cites Dr. Yuasa's 2004 publication in a slide titled "TMR Barrier from Year 2004."¹⁰ Stack configuration Anneal: 360 °C, 2 h, 1

⁹ See *supra*, footnote 4.

¹⁰ See *supra*, footnote 4 at 10.

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	In the WD Accused Products, the MgO layer has oxygen vacancy, and is an MgO_x layer with (0<x<1). For example, WD's '006 Patent describes oxygen vacancies in the MgO barrier due to presence of B in the free layer. '006 Patent, 7:54-63. layer 330. For the highest TMR, amorphous CoFeB is commonly used in the free layer to achieve the proper crystallization of an MgO barrier in the sputtered magnetic tunnel junctions; likewise, amorphous CoB can be used to achieve an appropriate TMR. However, the presence of B in the free layer may cause oxygen vacancies in the MgO barrier, which may result in decreased TMR and increased interlayer coupling. Aspects disclosed herein facilitate increased TMR and decreased interlayer coupling even if B is present in the free layer. In addition, in the arbitration between Seagate and WD, the Seagate products reflecting its alleged Trade Secret 3 had a MgO barrier layer formed from a tri-layer Mg/MgO/Mg structure; forming the final MgO barrier layer uses an anneal process, which would distribute oxygen atoms throughout the tri-layer structure to form a uniform MgO barrier layer; and this results in oxygen vacancy defects in the MgO barrier layer at least because there are fewer O atoms than Mg atoms in the Mg/MgO/Mg tri-layer structure. Arbitration Decision at 10:

Exhibit DD
Claim Chart for U.S. Patent No. 11,968,909 and Western Digital

US 11,968,909	Exemplary Western Digital Infringement
	<i>Trade Secret 3</i> 19. Seagate asserts that its use of a trilayer barrier layer in a TMR reader constructed by depositing a layer of magnesium (Mg), followed by a layer of magnesium oxide (MgO), followed by another layer of magnesium (Mg) is a trade secret. Seagate further asserts that three to four Seagate employees spent almost two years working on this development and that its use of a trilayer barrier layer significantly improved the performance of its reader, resulting in signal-to-noise and yield improvements. 20. In June 2007, Seagate made public its use of an Mg/MgO/Mg barrier layer in a TMR reader. At that time, a patent application Seagate filed with the United States Patent and Trademark Office that disclosed this use was published. In addition, in May 2007, a patent application Headway Technologies, Inc. filed with the United States Patent and Trademark Office that disclosed the use of “a tunnel barrier having a Mg/MgO/Mg configuration” was published. Furthermore, in that arbitration Seagate contended WD had used Seagate’s alleged tri-layer “secret,” indicating that WD’s HDDs copied Seagate’s tri-layer Mg/MgO/Mg structure.¹¹

¹¹ In the Arbitration Decision, the arbitrator did not reach the issue of whether WD misappropriated the alleged tri-layer trade secret (Trade Secret 3) because of a finding that Seagate did not adequately prove alleged Trade Secret 3 qualified for trade secret protection. Arbitration Decision at 10-11. Nothing in the Arbitration Decision indicates that WD proffered any evidence that its design did not use the tri-layer structure, however.