

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARETECH, LLC,
Petitioner,
v.

BIONESS INC.,
Patent Owner.

IPR2023-00428

U.S. Patent No. 10,668,316

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,668,316

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EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 10,668,316 (“316 Patent”)
1002	U.S. Patent Application No. 15/896,731 (“731 Application”)
1003	U.S. Provisional Application No. 62/458,648 (“648 Application”)
1004	Prosecution File History for the 316 Patent (“316 File History”)
1005	August 9, 2019 Non-Final Office Action and appended Written Opinion of the International Searching Authority (“NFOA”)
1006	December 6, 2019 Amendment and Response to the 2019 Office Action (“Response”)
1007	January 10, 2020 Notice of Allowance (“NOA”)
1008	Declaration of Dr. David Reinkensmeyer (“Reinkensmeyer Decl.”)
1009	U.S. Publication No. 2014/0201906A1 (“Erturk”)
1010	2013 Bioness Vector Elite Clinician’s Guide, Revision B (“Vector”)
1011	U.S. Publication No. 2016/0256346A1 (“Stockmaster”)
1012	PCT Publication No. WO 2016/042498A1 (“Raanan”)
1013	U.S. Publication No. 2004/0143198 (“West”)
1014	U.S. Publication No. 2014/0206503A1 (“Gorbel”)
1015	Internet Archive Declaration-Part 1
1016	U.S. Patent No. 7,883,450 (“Hidler Patent”)
1017	A Novel Mechatronic Body Weight Support System (“Frey”)
1018	U.S. Pat. No. 7,462,138 (“Shetty”)
1019	Automatic Fall Monitoring (“Pannurat”)
1020	2014 Masters Thesis Citing Vector Clinician's Guide Noting Date of Access in 2014 (“Getahun”)
1021	ZeroG: Overground gait and balance training system (“Hidler Article”)
1022	Declaration of Keith McBride to the Trademark Office (“McBride Declaration”)
1023	Specimen submitted for Vector Gait And Safety System (Reg No. 85822129) Trademark
1024	Wayback Machine Web Capture of Google Search of “Body Weight Support System,” February 14, 2014.
1025	Example Pathway to Download Vector on Patent Owner’s Website.
1026	Wayback Machine Web Capture of Pannurat, dated September 21, 2015

Exhibit No.	Description
1027	Wayback Machine Web Capture of Vector Elite Clinician's Guide, dated June 6, 2015
1028	European Patent Specification No. 1,296,595 ("Livewaves")
1029	Getahun Web Capture
1030	Exhibit U to Bioness Complaint
1031	[Reserved]
1032	[Reserved]
1033	[Reserved]
1034	[Reserved]
1035	US 20120018249A1 ("Mehr")
1036	U.S. Patent Publication No. 2015/0320632 ("Vallery")
1037	Vector YouTube Upload Screenshot
1038	Internet Archive Declaration-Part 2

Petitioner Aretech, LLC (“Petitioner”) respectfully requests that the Board institute *inter partes* review and cancel claims 1-5 and 7-11 (“the Challenged Claims”) of U.S. Patent No. 10,668,316 (“the ’316 Patent”).

I. BACKGROUND

A. Overview of the ’316 Patent

The ’316 Patent relates to alleged improvements to body weight support systems (“BWS systems”) used during gait therapy for patients suffering from walking deficiencies (e.g., as a result of a stroke, spinal cord injury, etc.). Ex-1001, Abstract; Ex-1008, ¶¶19-20. In general, BWS systems provide upward force (sometimes referred to as “unloading” force) to a tether connected to a harness worn by a patient, thus allowing a patient to perform gait training exercises without bearing his/her full body weight. Ex-1001, 1:25-2:61; Ex-1008, ¶¶20-21.

Figure 1 of the ’316 Patent is a block diagram showing components of an exemplary BWS system:

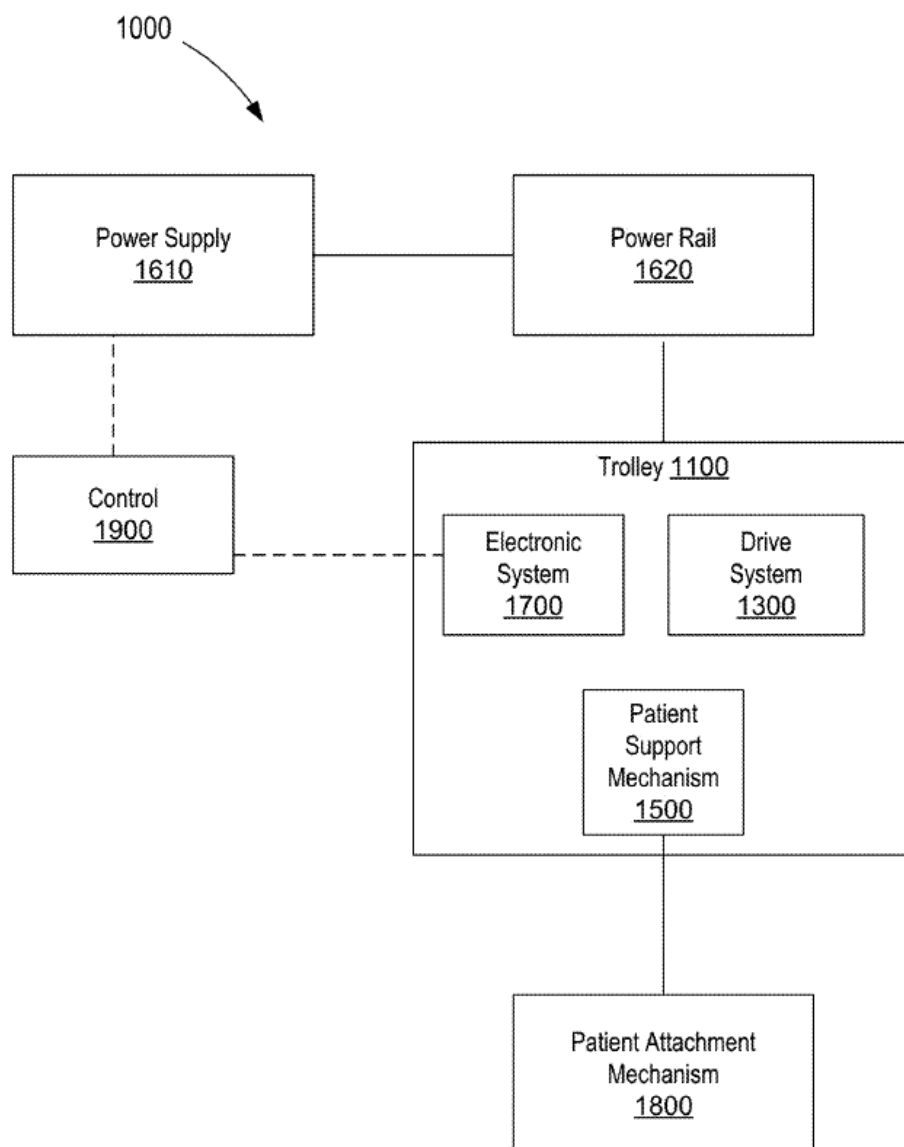


FIG. 1

Ex-1001, 3:22-23, 10:11-12; Ex-1008, ¶¶22-23.

The BWS system of FIG. 1 includes a “trolley 1100, a patient attachment mechanism 1800... , a power supply 1610, a powered conductor or rail 1620, and a

control 1900.” Ex-1001, 10:12-17; Ex-1008, ¶¶22-23. The trolley of the alleged invention “can perform any suitable function associated with, for example, supporting at least a portion of the body weight of a patient.” Ex-1001, 10:33-35; Ex-1008, ¶¶25-29. The trolley may be attached to (or “hang” from) an overhead support track. Ex-1001, 10:37-51; Ex-1008, ¶¶25-29. The trolley may also include a “drive system” that moves the trolley along the support track. *Id.*

The ’316 Patent explains that a patient may be “temporarily coupl[ed]” to the trolley using a “patient support mechanism 1500” (e.g., a “tether”) that connects to a patient attachment mechanism 1800 that is coupled to a harness worn by the patient. Ex-1001, 11:49-62; *see also id.*, 11:63-12:10; Ex-1008, ¶¶23-24. Thereby, the trolley can support a portion of the patient’s body weight. Ex-1001, 11:59-62; Ex-1008, ¶¶23-24.

The ’316 Patent states that its BWS system can employ a “tracking” feature to automatically maintain a body weight supporting trolley in a “substantially overhead” position as the patient moves about during training. Ex-1001, 34:64-35:44; *see also id.*, 72:56-64, 73:33-35, 74:30-36; Ex-1008, ¶¶27-29. The ’316 Patent states that this tracking feature enables a patient to train without having to “physically drag[] the trolley along the overhead rail during gait therapy.” *Id.*

The ’316 Patent also states that its BWS system can employ a “fall prevention” mechanism that detects when a patient is falling and provides

additional support in response. Ex-1001, 35:35-36:26; Ex-1008, ¶¶30-31. For example, a BWS system may be set to actively “unload” a portion of a patient’s body weight during normal operation (e.g., 10% of patient’s bodyweight, 8 kilograms, etc.). Ex. 1001, 70:17-23, 71:14-33; Ex-1008, ¶¶30-31. When a change in the system indicates that a change in the length of the tether exceeds a preset threshold, the system determines that the patient is falling and increases the amount of body weight that the system unloads (e.g., to 50% or more of the patient’s body weight, 40 kilograms or more, etc.) to assist the patient in regaining control. Ex-1001, 57:12-58:9; 62:66-63:10; Ex-1008, ¶¶30-31.

B. Prosecution History

The ’316 Patent issued from U.S. Patent Application No. 15/896,731 (the “’731 Application”), which was filed on February 14, 2018 and claims priority to U.S. Provisional Patent Application No. 62/458,648, filed on February 14, 2017.¹ See Ex-1001; Ex-1003.

On August 8, 2019, the Examiner issued the first (and only) Office Action concerning the ’731 Application. Ex-1005. The Examiner allowed application

¹ For purposes of this proceeding only, Petitioner adopts February 14, 2017 as the applicable priority date of the ’316 Patent (hereafter, the “Critical Date”).

claims 14-20 (claims 14-20 of the '316 Patent).² The Examiner rejected application claims 1-4 and 6-13, finding that claims 1-4 and 6-7 were obvious over Mehr (Ex. 1035) in view of Lifewaves (Ex. 1041), and that claims 8-13 were anticipated by Vallery (Ex. 1042). *Id.* The Examiner noted, however, that application claim 1 would be allowable if re-written to include the “substantially overhead” trolley tracking feature found in application claim 5. Ex-1005, 4-5. In response, Applicants amended application independent claims 1 and 8 (application claim 8 later renumbered as patent claim 7) to include this feature. *See* Ex-1006, 2, 3-4.

Following the amendments, the Examiner issued a Notice of Allowance on January 10, 2020. Ex-1007; Ex-1008, ¶¶49-52.

II. IDENTIFICATION OF CHALLENGE

A. Statutory Grounds

Petitioner requests *inter partes* review and cancelation of the Challenged Claims on the following grounds:

Ground	References	Statutory Basis	Claims
1	<u>Erturk</u> in view of <u>Vector</u>	Obviousness (§103)	1-5
2	<u>Erturk</u> in view of <u>Vector</u> and <u>Stockmaster</u>	Obviousness (§103)	7-8
2	<u>Erturk</u> in view of <u>Vector</u> ,	Obviousness	9-11

² Claims 14-20 of the '316 patent are not among the Challenged Claims.

	<u>Stockmaster and Ranaan</u>	(§103)	
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Grounds 1-3 render the Challenged Claims obvious because any differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a POSITA to which the subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007); *see* Ex-1008, ¶¶109-248.

B. Relied-Upon Prior Art

1. Erturk (Ex-1009)

Erturk is a U.S. Patent Application Publication entitled “Methods and Apparatus for Body Weight Support System.” Ex-1001. Erturk was assigned to Patent Owner (Bioness, Inc.) and names at least two inventors that overlap with the ’316 Patent—Keith McBride and Arkady Glukhovsky. *Compare* Ex-1001 (fields 72, 73) *with* Ex-1009 (fields 72, 73). Despite the overlapping inventors and a common assignee, Erturk qualifies as prior art to the ’316 Patent under 35 U.S.C. §102(a)(1) because Erturk was published on July 24, 2014, more than one year before the Critical Date (February 14, 2017). *See* Ex-1009 (field 22); Ex-1008, ¶¶53-55.

Erturk is analogous prior art to the ’316 Patent because Erturk is directed to BWS systems used during gait therapy training. Ex-1008, ¶¶56. Indeed, large swaths of Erturk’s disclosures are identical—*verbatim*—to disclosures in the ’316

Patent. Erturk is thus from the same field of endeavor as the '316 Patent (gait therapy systems). Ex-1008, ¶¶56-59. Erturk is also reasonably pertinent to the problems addressed by the alleged invention, including the trolley tracking and fall prevention features reflected in the Challenged Claims. Ex-1008, ¶¶60-62, 64. For example, Erturk teaches a “tracking system” that maintains the trolley “substantially over-head of the patient.” *Compare* Ex-1009, [0149] (“configured to remain substantially over-head of the patient”) *with* Ex-1001, Claim 1 (“configured to... maintain the body weight support system in a substantially overhead position relative to the user...”) and Claim 7 (same); *see also* Ex-1009, [0051], [0181]-[0185]. Additionally, Erturk teaches fall detection to “actively reduce the amount a patient falls after stumbling.” Ex-1009, [0071], [0072], [0152]; Ex-1008, ¶63.

Erturk, which ultimately issued as U.S. Patent No. 9,855,177, was listed among more than 120 references on an IDS. The Examiner did not cite or apply Erturk against the claims or discuss Erturk in any office action. Ex-1008, ¶54. As demonstrated in Part V, below, to the extent the Examiner considered Erturk and dismissed the reference without substantively addressing its disclosures, that was an error. Ex-1008, ¶64.

2. Vector (Ex-1010)

Vector is a manual prepared and distributed by Patent Owner to instruct clinicians how to use Patent Owner’s “Vector Elite” gait and safety system. Ex-

1010; *see also* Ex-1022, Ex-1023. As set forth below, Vector is prior art to the '316 Patent and analogous art. Ex-1008, ¶¶67-91.

a. Vector was publicly available

Vector is prior art to the '316 Patent under 35 U.S.C. §102(a)(1) because it was publicly available more than one year before the Critical Date. Ex-1008, ¶¶ 67.

“A reference will be considered publicly accessible if it was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence[] can locate it.”

Medtronic, Inc. v. Barry, 891 F.3d 1368 (Fed. Cir. 2018). “[E]ven relatively obscure documents qualify as prior art so long as the relevant public has a means of accessing them.” *Gopro, Inc. v. Contour IP Holding LLC*, 898 F.3d 1170, 1174 (Fed. Cir. 2018). A POSITA exercising reasonable diligence could have located Vector more than a year before the Critical Date in several ways. *See, e.g.*, Ex-1008, ¶¶67.

First, Vector was prepared by Patent Owner and disseminated, without restrictions, to those who purchased the Vector Elite BWS system from Patent Owner at least as early as 2014. Ex-1008, ¶¶ 68. Indeed, Keith McBride (a named inventor of the '316 Patent) submitted a declaration to the USPTO swearing as of at least April 10, 2014 Vector was “delivered with Applicant’s product.” Ex-1022, 2. Mr. McBride submitted the declaration, together with “select pages” from

Vector, as a specimen to prove that Patent Owner’s VECTOR GAIT AND SAFETY SYSTEM trademark (Ser. No. 85822129) was being used in commerce. *Id.* The “select pages” Mr. McBride submitted included, *inter alia*, the first page, the table of contents, and the last page of Vector. *See* Ex-1023; *compare* Ex-1010 *with* Ex-1023. Notably, the “select pages” include the same content: they bear the same Document ID Number (612-00624-001), same Table of Contents and pagination, same revision number (Rev. B), and same date (09/2013). Ex-1008, ¶¶ 68.

Second, the Federal Circuit has held that a user manual is “publicly accessible” under 35 U.S.C. §102 when it is made available to purchasers (or even dealers) of a system without restrictions on its distribution. *See Centripetal Networks, Inc. v. Cisco Sys.*, 847 Fed. Appx. 869 (Fed. Cir. 2021); *see also* *Gopro, Inc. v. Contour IP Holding LLC*, 898 F.3d 1170, 1174-1176 (Fed. Cir. 2018). The Federal Circuit has further held that a software manual “constituted publically-available prior art under §102(a)(1)” in view of (1) the “manual’s inscription date” before the Critical Date (2) the CEO’s “declaration with the PTO averring that the version of the manual before the examiner was available [before the Critical Date],” and (3) evidence of advertisements of the company’s software published prior to the Critical Date. *See In re Enhanced Sec. Research, LLC*, 739 F.3d 1347 (Fed. Cir. 2014).

Here, the same substantial evidence exists as to Vector. As to item (1), Vector is inscribed with the date 09/2013. Ex-1008, ¶¶69-70. As to item (2), Mr. McBride's declaration to the USPTO confirms that Vector was disseminated to purchasers of the Vector Elite BWS system prior to April 10, 2014. *Id.* As to item (3), there is substantial evidence that Bioness advertised and sold the Vector Elite system prior to the Critical Date. See <https://www.youtube.com/watch?v=1OWXwpag9U4> (showing that on September 14, 2015—more than one year before the Critical Date—the Patent Owner uploaded a video describing the Vector Elite product to YouTube and directing viewers to visit www.bioness.com and <http://bionessvector.com/>). Ex-1008, ¶¶69-70.

Third, Vector was available for download by the public, without charge, via Patent Owner's website at least as early as June 6, 2015. See Ex-1025, Ex-1027, Ex-1040; Ex-1008, ¶¶69-70. A POSITA exercising reasonable diligence would have been able to locate Vector on Patent Owner's website because a POSITA would have known that Patent Owner was one of a small number of companies that manufactured overhead BWS systems. Ex-1008, ¶70. As such, a POSITA would have known that Patent Owner's website (www.bioness.com) was a likely location to obtain materials concerning such systems. *Id.* Once at the website, a POSITA could easily navigate to Vector in just three clicks (selecting "For Healthcare Professionals" then "Resources," then "Vector Elite Clinician Guide").

See, e.g., Ex-1025 (example navigation path); Ex-1008, ¶70; Ex-1015; Ex-1038, 1, 18-74. Again, the Federal Circuit has held that materials available for download from a public website are “publicly available” where, as here, a POSITA could locate the website with reasonable diligence. *Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1381 (Fed. Cir. 2012) (upholding district court finding that an interested person of ordinary skill “would have been independently aware of the [Company’s offering]... And upon accessing the [Company’s] website, such an interested researcher would have found the [prior art] article... applying reasonable diligence....”); *Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1369 (Fed. Cir. 2019) (availability on a website is sufficient when there is “evidence that a [POSITA] could have reasonably found the website and then found the reference on that website”); *see also* MPEP §2128 (“Prior art obtained via the Wayback Machine® sets forth a *prima facie* case that the art was publicly accessible at the date and time provided in the time stamp.”).

Fourth, a POSITA also would have been able to locate Vector on Bioness’s website via a search engine, such as Google, using basic search terms. Ex-1008, ¶71. For example, in February 2014, entering “body weight support system” (the commonly used term for these systems) into a Google search field resulted in an auto-populated list of suggestions, including the “vector body weight support system.” *See* Ex-1024; *see also* Ex-1008, ¶71. Moreover, as noted above, a

POSITA also would have been led to Vector by searching – at any point after September 14, 2015 – BWS systems on YouTube using YouTube’s well-known searching functionality. Ex-1039; *see also* <https://www.youtube.com/watch?v=1OWXwpaq9U4> (showing Patent Owner’s advertisement video directing viewers to visit <http://bionessvector.com/>); Ex-1008, ¶¶71-72. Once at the Patent Owner’s website, the POSITA could have located Vector using reasonable diligence. Ex-1008, ¶¶71-72.

Fifth, ordinary artisans did, in fact, locate and cite Vector more than one year before the Critical Date. *See, e.g.*, Ex-1020 (dated August 18, 2014), at 6 (copying Figure); 54 (citation: [13]. “Vector elite, Clinician’s guide”, [Online]. Available: [http://www.bioness.com/Documents/Clinicians%20EliteMp612-00624-001_RevB \[e-file\].pdf](http://www.bioness.com/Documents/Clinicians%20EliteMp612-00624-001_RevB[e-file].pdf). [Accessed: Mar 02, 2014]). Thus, a POSITA interested in the subject matter and exercising reasonable diligence, could have, would have and did locate the Vector. *See* Ex-1008, ¶¶67-73.

In view of the foregoing, Vector was available to the public as required under §102(a)(1). Ex-1008, ¶74.

b. Vector is analogous art

Vector is also analogous art to the ’316 Patent. Ex-1008, ¶¶74, 84. Vector instructs clinicians on how to use Patent Owner’s Vector Elite “body weight support system,” shown in part below. Ex-1010, pp.1-2; Ex-1008, ¶75.

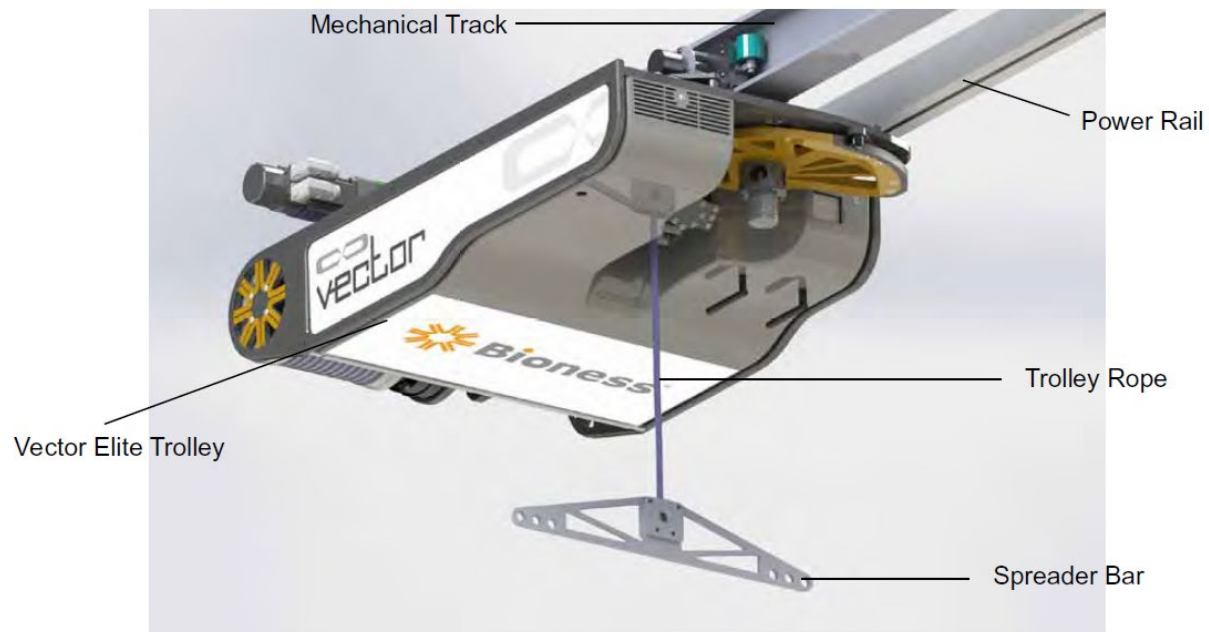


Figure 1-1: Vector Elite Trolley

Vector states that its BWS system “consists of a mechanical track, power rail, power station, motorized trolley with rope, spreader bar, PC computer with proprietary software and an optional remote control.” Ex-1010, p.1; Ex-1008, ¶76. It also provides a patient harness designed to support all or a portion of the

patient's weight during gait training. Ex-1010, p.6; Ex-1008, ¶76.

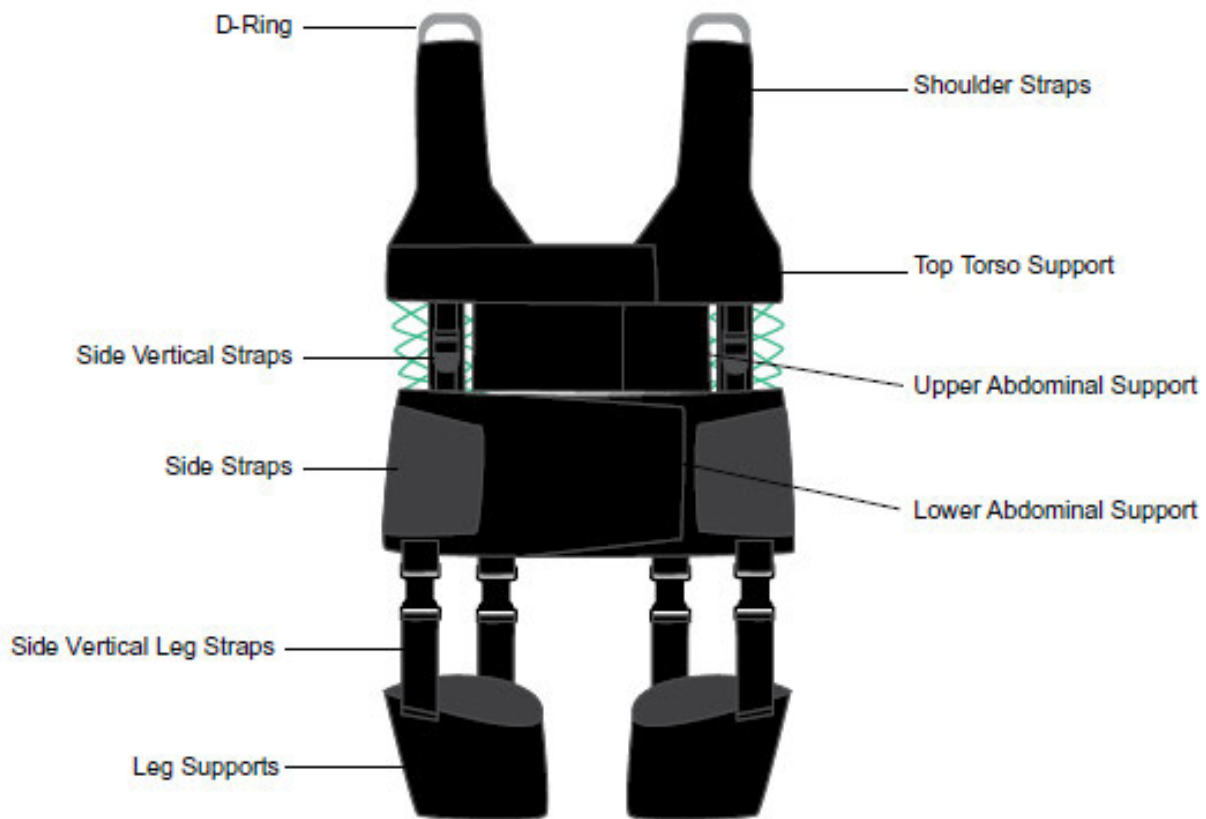


Figure 3-1: Maine Anti-Gravity Systems Patient Harness Features.

Ex-1010, p.6.

Vector further discloses a number of “Training Controls” of particular relevance to the ’316 Patent, including as reflected in the Figures below (*see also* Ex-1008, ¶¶77-82).

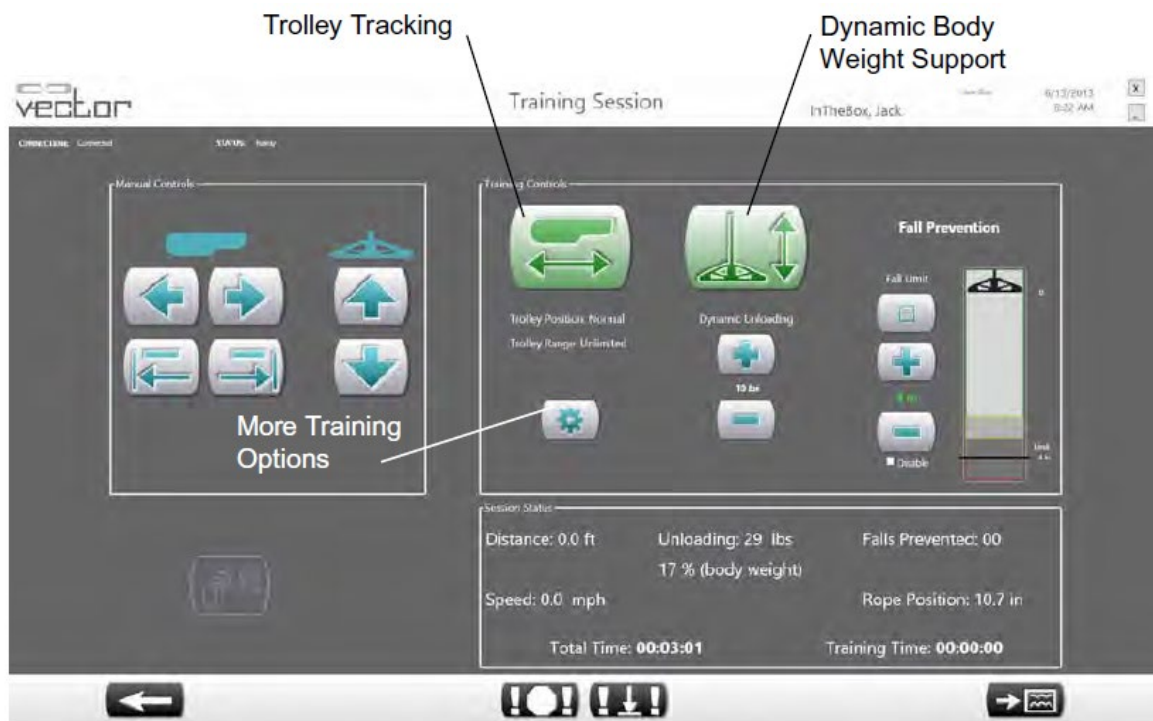


Figure 5-6: Training Session Screen with Training Controls Section Activated

Ex-1010, Fig. 5-6 (identifying overhead trolley tracking, dynamic body weight support, and fall prevention controls); *compare* Ex-1001, Figs. 59-61, 64-67.

Note: The Trolley Tracking feature and DBWS feature can be enabled one at a time or both together.



Figure 5-8: Trolley Tracking and DBWS Active

Ex-1010, Fig. 5-8; *compare* Ex-1001, Figs. 59-61, 64-67.



Figure 5-11: Session Summary Screen with Current Session Screen Active

Ex-1010, Fig. 5-11 (depicting a screenshot of “Session Summary” associated with a given gait therapy session).

Vector is thus from the same field of endeavor as the ’316 Patent (gait therapy systems). *See* Ex-1008, ¶83. It is also reasonably pertinent to the problems addressed by the alleged invention, including the trolley tracking and fall prevention features reflected in the Challenged Claims. *Id.* For example, Vector teaches a trolley tracking feature that keeps the trolley “directly above the patient during a training session.” Ex-1010, 16; Ex-1008, ¶¶83. Vector further teaches a “fall limit” feature— “a safety feature that prevents the patient from falling”— that

detects when a patient is falling based on the length of the rope tether and adjusts the body weight support accordingly. Ex-1010, p.18; Ex-1008, ¶¶83-84.

Vector was not submitted or cited during examination of the '316 Patent. Ex-1008, ¶¶85.

3. Stockmaster (Ex-1011)

Stockmaster is a U.S. Patent Publication entitled “Medical Rehab Body Weight Support System and Method With Horizontal and Vertical Force Sensing and Motion Control.” Ex-1011 (field 54). Stockmaster qualifies as prior art to the '316 Patent under 35 U.S.C. §102(a)(1)-(2) because Stockmaster was filed on February 3, 2016 (more than one year before the Critical Date), and published on September 8, 2016 (more than five months before the Critical Date). *See* Ex-1011 (field 22, field 43) ; Ex-1008, ¶¶86-88.

Stockmaster is analogous to the '316 Patent because it is directed to BWS systems used during gait therapy training. *See* Ex-1011, [0002]-[0004], [0010], [0316], [0329]-[0331]; Ex-1008, ¶89. Stockmaster is also reasonably pertinent to the problems addressed by the alleged invention, including the trolley tracking and fall prevention features reflected in the Challenged Claims. *Id.* For example, Stockmaster teaches how to “reliably control the horizontal position of the support along the track” in order to “mov[e] the moveable support unit horizontally along the track to follow the person, thus minimizing the effect on the person.” Ex-1011,

[0008]-[0009], [0301]-[0303], [0318]; Ex-1008, ¶¶89-90. Figure 1 illustrates Stockmaster's movable support (trolley) maintained in a substantially over-head position relative to the patient:

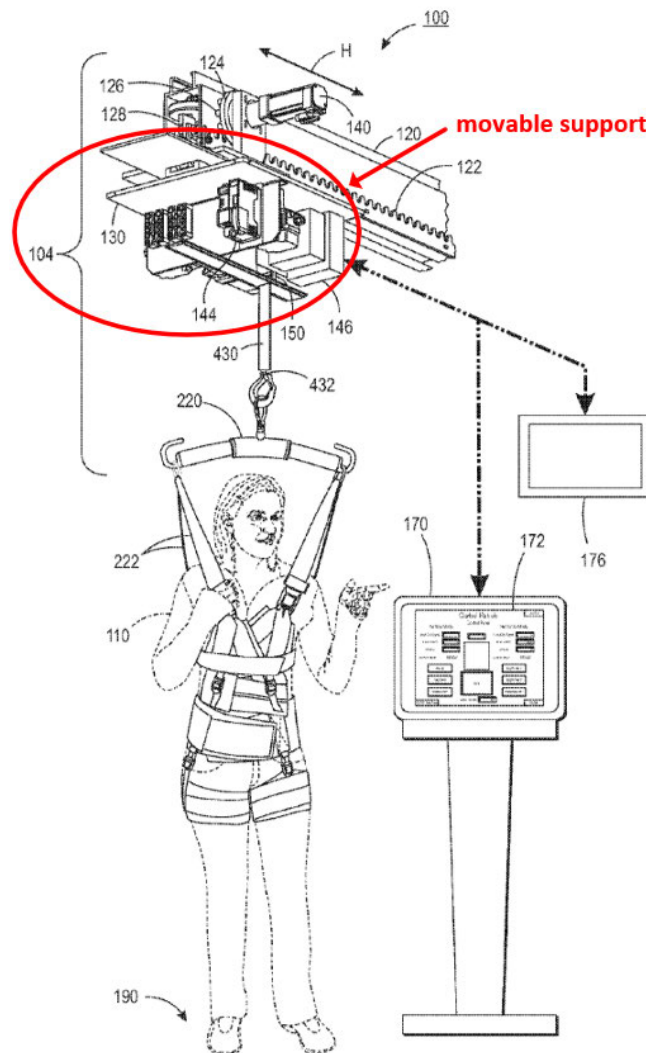


FIG. 1

Ex-1011, Fig. 1 (annotations added); Ex-1008, ¶90

Additionally, Stockmaster teaches a “Dynamic Fall Protection” feature for detecting when a patient falls too far (beyond a preset “[d]escent [l]imit”) and/or

too fast (faster than a preset “speed... threshold”). Ex-1011, [0338]; *see also id.*, [0339]-[0341]; Ex-1008, ¶¶91-92. Its system is configured to react by “inhibit[ing]” any “further vertical movement in the downward direction” when a fall is detected. *Id.* Stockmaster’s Figure 44 (shown below) depicts example controls for its Dynamic Fall Protection feature.

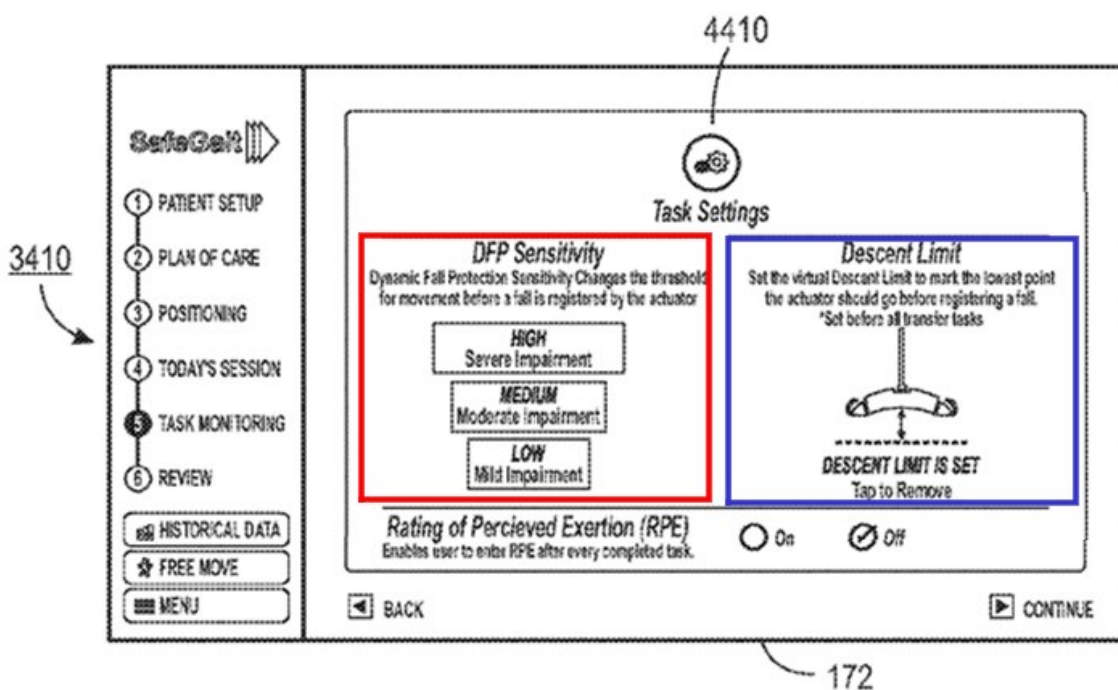


FIG. 44

Ex-1011, Fig. 44 (annotations added).

The “DFP Sensitivity” and “Descent Limit” features depicted in FIG. 44 of Stockmaster (depicted above) are substantially similar to the fall prevention “Assistance” and “Fall Limit” features, respectively, shown in FIGS. 60 and 61 of the ’316 Patent:

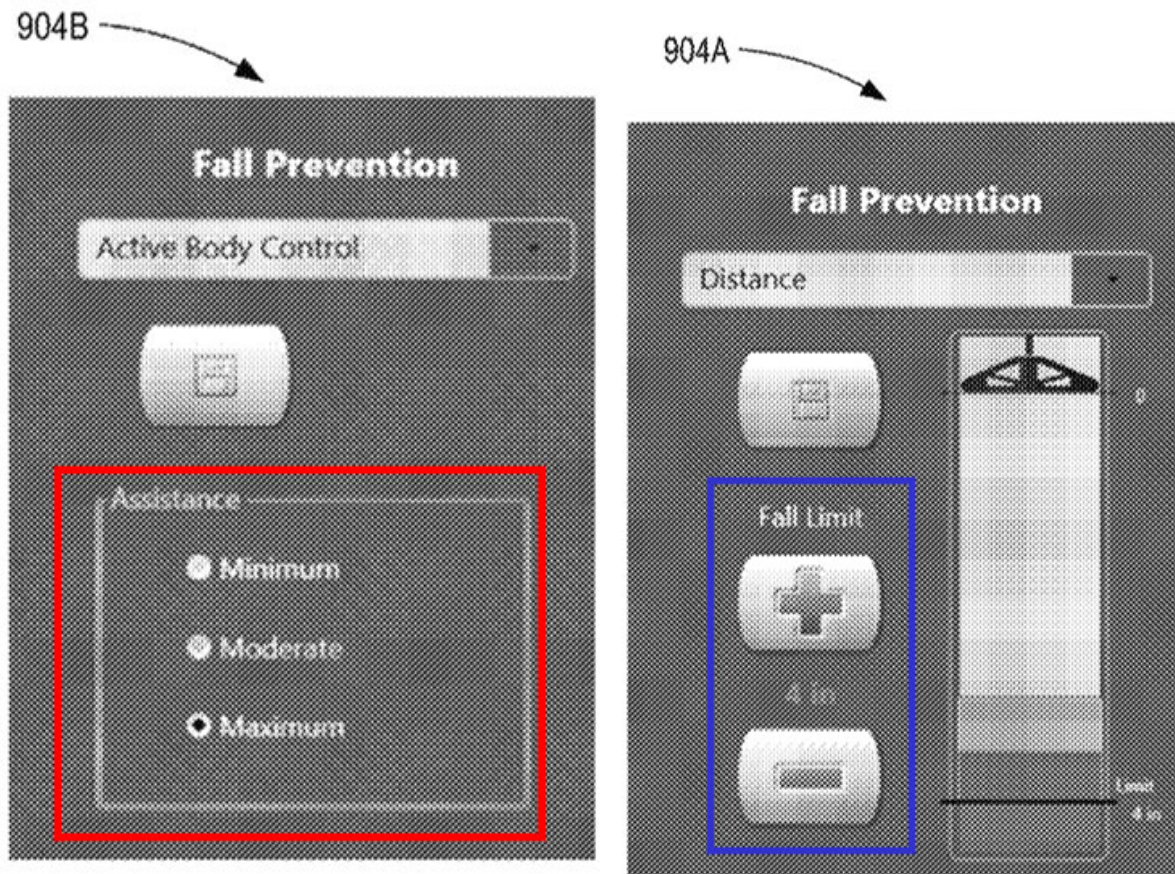


FIG. 61

FIG. 60

Ex-1001, Figs. 60-61 (annotations added); Ex-1008, ¶93.

Stockmaster was returned in the Examiner's search for relevant prior art and listed on form PTO-892. Ex-1004, 220. But the Examiner did not otherwise cite or apply Stockmaster against the claims or discuss Stockmaster in any office action. As discussed in Part II.D.2, below, to the extent the Examiner considered Stockmaster and dismissed the reference without substantively addressing its disclosures, that was an error. Ex-1008, ¶94.

4. Raanan (Ex-1012)

Raanan is an international patent publication entitled “Fall Detection Device and Method.” Ex-1012. Raanan qualifies as prior art under 35 U.S.C. §102(a)(1)-(2) because it was filed on September 16, 2015 and published on March 24, 2016, and both of those dates are before the Critical Date of the ’316 Patent (February 14, 2017). *Id.* Raanan was not disclosed to or considered by the USPTO during prosecution of the ’316 Patent. Ex-1008, ¶¶95-97.

Raanan is analogous prior art to the ’316 Patent because it teaches a method of detecting and preventing falls that is reasonably pertinent to the problem addressed by the alleged invention of the ’316 Patent. Ex-1008, ¶¶ 98--. For example, Raanan teaches the use of electronic devices (e.g. sensors) to measure, *inter alia*, a person’s velocity and distance relative to the floor for the purpose of detecting when a person falls while performing exercises or other activities. Ex-1012, Abstract; Ex-1008, ¶¶102-103. Raanan teaches that “a rapid” or “significant decrease in... height [of the user above the ground]” (e.g., “a decrease greater than 20%... over time period of 200 milliseconds or less”) signals the “[i]nitiation of a potential fall event.” Ex-1012, 2:13-20, 3:9-4:24, 11:20-21, 13:7-13; Ex-1008, ¶¶102-103. Then, to “verif[y]” whether there is “a real fall event,” Raanan teaches that additional criteria should be observed to “eliminate false positive[s].” Ex-1012, 6:23-4:2; Ex-1008, ¶¶102-104. One of these validating criteria is

“[c]ontinuity of velocity towards ground V_z ” for a duration that makes the event “compar[able] to actual fall scenarios.” Ex-1012, 12:7-17. If the “rapid” velocity lasts long enough that the user’s activity is unlikely to just be an exercise movement, then the “fall event” is confirmed. *Id.* By looking at two or more criteria, Ranaan teaches that falls can be identified with greater reliability and that “false positive detection rates and unnecessary activation of protective means” may be reduced. Ex-1012, 6:6-7:2; Ex-1008, ¶¶102-104.

C. Standing

Petitioner certifies that (i) Petitioner is not barred or estopped from requesting *inter partes* review; and (ii) the ’316 Patent is eligible for *inter partes* review.

D. Discretionary Analysis for Review

1. Institution Should Not Be Denied under *Fintiv*

Consistent with *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential), Petitioner stipulates that if this IPR proceeding is instituted, Petitioner will not pursue in the district court litigation any grounds it brought or could have brought here.³ *See* 35 U.S.C. §315(e)(2). This

³ This stipulation is not intended, and should not be construed, to limit Petitioner’s ability to assert invalidity of the Challenged Claims in the district court litigation on any other ground that could not have been brought here.

stipulation is dispositive of the *Fintiv* analysis. See *USPTO Interim Procedure for Discretionary Denials in AIA Post-Grant Proceeding with Parallel District Court Litigation*, at 3 (June 21, 2022) (“the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petition presents a [*Sotera*-style] stipulation”).

2. Institution should not be Denied under *Becton Dickinson*

Denial of institution under §325(d) would not be appropriate here because the grounds and arguments relied on in this Petition—based on a combination of Erturk and Vector with one or both of Stockmaster and Raanan—were not previously presented to the Patent Office. Every ground in this petition relies upon Vector, which has never been cited, submitted to, or considered by the USPTO.

Moreover, while an IDS submitted during prosecution listed Erturk as one of more than 120 references, and while the Examiner listed Stockmaster as one of many references on form PTO-892, the Examiner did not apply either of those references (or any substantially similar references) against the claims in any office action. As such, the factors set forth in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (Dec. 15, 2017), and the analysis articulated in *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 (Feb. 13, 2020), both support institution.

While Erturk and Stockmaster were identified as line items on PTO forms during prosecution (factor (a)), there is no evidence that either Erturk or Stockmaster was applied against the claims during examination (*Becton, Dickinson* factors (b) and (c)) and there is no overlap between the arguments in this Petition and any arguments raised in examination (*Becton, Dickinson* factor (d)). Moreover, to the extent the Examiner may have considered and dismissed Erturk and Stockmaster without any explanation, that decision would have been in error and should be reconsidered. *See Advanced Bionics* at 10 (“[I]f the record of the Office’s previous consideration of the art is not well developed or silent, then a petitioner may show the Office erred by overlooking something persuasive under factors (e) and (f).”).

As is set forth in detail herein, the combination of Erturk and Vector (Ground 1) in view of Stockmaster (Ground 2) and further in view of Ranaan (Ground 3) persuasively show that the Challenged Claims were obvious prior to the Critical Date. Indeed, for many limitations—including the limitations that resulted in allowance of the Challenged Claims—the teachings in Erturk and Vector are nearly identical (often verbatim) to embodiments of the ’316 Patent. The Examiner issued a Notice of Allowance after Applicant added limitations to the independent claims requiring maintaining a body weight support system in an overhead position with respect to a patient. *See Ex-1006, 2, 3; Ex-1007 passim.*

Both Erturk and Vector teach this precise feature. Ex-1009, [0149]; Ex-1010, pp.16-17.

If the Examiner, in fact, considered but failed to address the disclosures of Erturk and Stockmaster, the Examiner erred in the evaluation of the '316 Patent (*Becton, Dickinson* factor (e)). The error is amply shown by the additional evidence and facts presented in this Petition and the accompanying declaration (*Becton, Dickinson* factor (f)). In cases such as this, where prior art was listed on an IDS but not applied against the challenged claims, the Board has consistently granted institution. *See, e.g., Microsoft Corp. v. Parallel Networks Licensing LLC*, IPR2015-00486, Paper 10 at 14-15 (July 15, 2015); *Vizio, Inc. v. Nichia Corp.*, IPR2017-00551, Paper 9 at 7– 8 (July 7, 2017); *Digital Check Corp. d/b/a ST Imaging v. E-Imagedata Corp.*, IPR2017-00178, Paper 6 at 12-13 (PTAB April 25, 2017).

III. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) as of February 14, 2017 would have a bachelor’s degree in biomedical engineering, electrical engineering, mechanical engineering, or similar field with at least two years of experience in research in, development of, or practice providing therapy using robotic medical devices/systems. Ex-1008, ¶¶105-106. A person with less formal education but more relevant practical experience, and vice versa, may also meet this standard. *Id.*

IV. CLAIM CONSTRUCTION

Petitioner has applied the plain and ordinary meaning of the terms of the Challenged Claims throughout this Petition. Petitioner does not believe any of the terms require construction to address the grounds of invalidity raised in this Petition.⁴

V. CHALLENGED CLAIMS

A. Ground 1: Obviousness over Erturk and Vector

Claims 1-5 of the '316 Patent are invalid because they are obvious over Erturk in view of Vector. Ex-1008, ¶¶109-110, 111-112.

1. Motivation to Combine Erturk and Vector

As is set forth in the declaration of Dr. Reinkensmeyer, a POSITA would have been motivated to combine the BWS system of Erturk with the fall detection and prevention feature of Vector. Ex-1008, ¶¶113-120.

First, Erturk includes an express teaching and suggestion that it would be desirable to include a fall detection and prevention feature such as the feature taught in Vector. For example, Erturk states that, “[i]n some embodiments, audible

⁴ Petitioner’s application of prior art to the Challenged Claims is not a waiver of any argument in parallel litigation that any claim term in the '316 patent is indefinite or otherwise invalid on other grounds. Nor does Petitioner waive its rights to raise additional issues of claim construction in any parallel litigation.

feedback can be provided when the patient begins to fall.” Ex-1009, [0082]. Erturk further states that the BWS system may be “actively controlled” so that “the support system 2000 can actively reduce the amount a patient falls after stumbling or falling for other reasons.” Ex-1009, [0152]. Based on these express teachings/suggestions, a POSITA would have been motivated to combine Vector’s fall detection and prevention methods into Erturk’s BWS system. *See Bos. Sci. SciMed, Inc. v. Iancu*, 811 F. App’x 618, 623 (Fed. Cir. 2020) (motivation to combine “may be found explicitly or implicitly in... the interrelated teachings of multiple patents... .”); Ex-1008, ¶114.

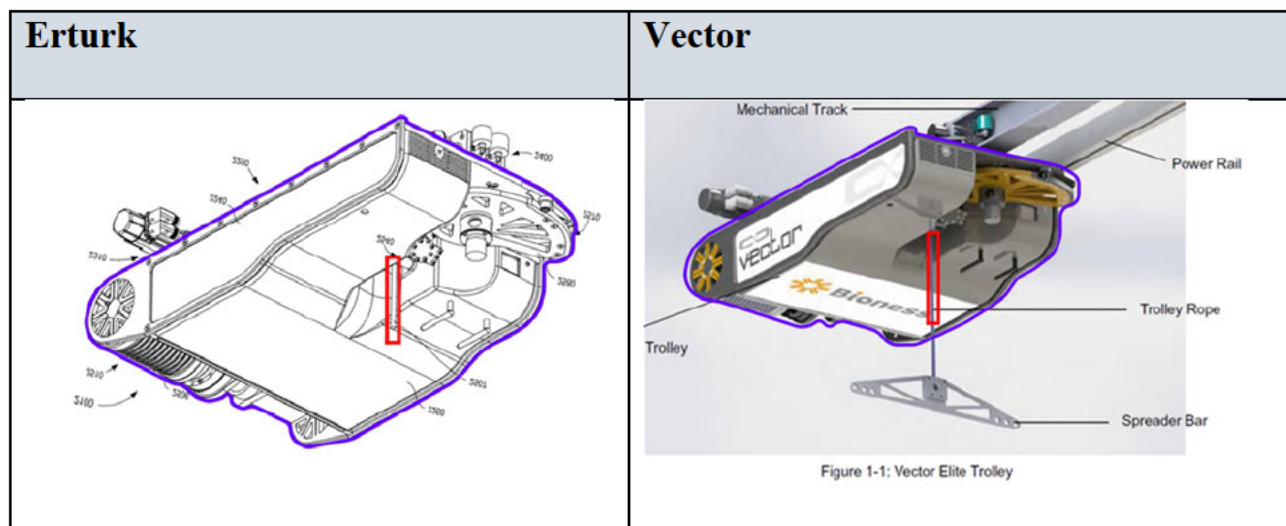
Second, a POSITA would have understood that combining the teachings of Erturk and Vector would have amounted to use of a known technique to improve a similar device in the same way. *KSR*, 550 U.S. at 417; Ex-1008, ¶115. Here, Erturk and Vector undeniably teach similar devices. *Id.* Both references are from the same field of endeavor: overhead gait therapy. Ex-1009, [0002]-[0003], [0011], [0071], [0122], [0147], [0150]-[0152]; Ex-1010, pp.1-2, 16-18; Ex-1008, ¶115. Both references are directed to the same objectives: providing a body weight support system for gait therapy in a safe and controlled environment. *See, e.g.*, Ex-1009, [0008]-[0010], [0053], [0070]-[0071], [0082], [0149], [0152]; Ex-1010, pp.18-21 (same); Ex-1008, ¶115. Both references teach that changes in the system can be monitored to detect when a patient is falling, and then attempt to prevent the fall to

avoid injury. *See, e.g.*, Ex-1009, [0070]-[0071], [0082], [0152]; Ex-1010, pp.18-21; Ex-1008, ¶115. Both references teach a system that provides “dynamic” or “active” body weight support to a patient (as opposed to “static” support). *See, e.g.*, Ex-1009, [0071], [0122], [0147], [0150]-[0152]; Ex-1010, p.1, 17-18 (same); Ex-1008, ¶115. Both references teach a system that provides an overhead trolley suspended from a track, and is driven to remain directly over the patient as they move. Ex-1009, [0008]-[0010], [0053], [0071], [0149]; Ex-1010, pp.16-17 (same); Ex-1008, ¶115.

The proposed combination would also apply the fall detection and prevention feature of Vector “in the same way” to the BWS system of Erturk. Erturk’s BWS is already configured to detect changes in system components (including its tether) in order to detect a fall, and then to “compensate for th[ose] changes during the... fall.” Ex-1009, [0062], [0070], [0121]-[0130], [0134], *see also* [0092], [0149]-[0152], [0180]-[0185]; Ex-1008, ¶116. The fall protection feature of Vector is provided in Vector’s BWS in the very same way. Ex-1008, ¶116. That is, Vector BWS is configured to detect changes in system components (e.g., the “location of the [tether]”) to detect the fall, e.g., by correlating a patient’s descent past a “fall limit value” (e.g., “4.0 inches” of decent from an initial position) with a fall event. Ex-1010, pp.18-20; Ex-1008, ¶116.

Third, the combination of the fall detection feature of Vector with the BWS system of Erturk is a combination of known elements to achieve predictable results. *See KSR*, 550 U.S. at 416. Ex-1008, ¶117. Vector detects falls through a feedback system that monitors changes in the system corresponding to a fall. Ex-1010, pp.18-20. Erturk observes the well-known understanding that “[e]lectronic devices often implement feedback systems to actively control the kinematics of mechanical systems in order to achieve and/or maintain a desired system state.” Ex-1009, [0062]; Ex-1008, ¶117.

As Dr. Reinkensmeyer explains, a POSITA also would have reasonably expected success in applying the teachings of Vector to the BWS system of Erturk. Ex-1008, ¶118. A POSITA would have recognized that Erturk and Vector teach nearly identical structural designs, as can be seen by comparing FIG. 6 of Erturk with FIG. 1-1 of Vector:



Ex-1009, Fig. 6. (annotations added); Ex-1010, Figure 1-1 (annotations added).

Given the similar structural designs and disclosed functions, a POSITA would have had a high expectation of success in implementing features from Vector into Erturk's BWS system. Ex-1008, ¶119. Porting features between the two references would have required very little modification and would have used known techniques. *Id.* In particular, a POSITA would have understood that the only change necessary to implement Vector's fall prevention feature in Erturk's BWS system would have been adding basic computer code into the software of Erturk system. *Id.* Erturk's BWS is already configured to generate signals concerning changes in system components (including position, velocity, acceleration, and feed rate of the tether), and then communicate those signals to a processor to "execute [the] set of instructions" to control the system to "actively reduce the amount a patient falls." Ex-1009, [0152], *see also id.*, [0149]-[0151]. *Id.*

Accordingly, a POSITA would have been motivated to combine the BWS system of Erturk with the fall prevention feature of Vector, and would have expected success in doing so. Ex-1008, ¶120.

2. Claim 1

a. Element 1[pre]

1[pre]	See parts 1[pre(i)] - 1[pre(iii)], below
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Erturk teaches 1[pre]. Due to its length, Petitioner addresses the preamble in three parts, below. Ex-1008, ¶¶121-141.

1[pre(i)]	<i>A method of using a body weight support system to provide body weight support during gait training,</i>
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Erturk teaches 1[pre(i)] because Erturk teaches “methods for supporting the body weight of a patient during gait therapy.” Ex-1009, [0001]-[0002]; *see also id.*, [0085] (teaching body weight support system to be used during gait training). Ex-1008, ¶¶123-127.

1[pre(ii)]	<i>the body weight support system including a drive assembly configured to movably suspend the body weight support system from a support track and</i>
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Erturk teaches 1[pre(ii)] because Erturk teaches a BWS system that includes two drive assemblies that move a trolley that is suspended from a support track. Ex-1009, FIGS. 2-4, [0052], [0086], [0094]-[0095]; Ex-1008, ¶¶128-135.

Figure 2 of Erturk depicts a “first drive assembly 2310” (green) and a “second drive assembly 2400” (yellow) that move a trolley 2100 suspended from support beam 2050 (purple):

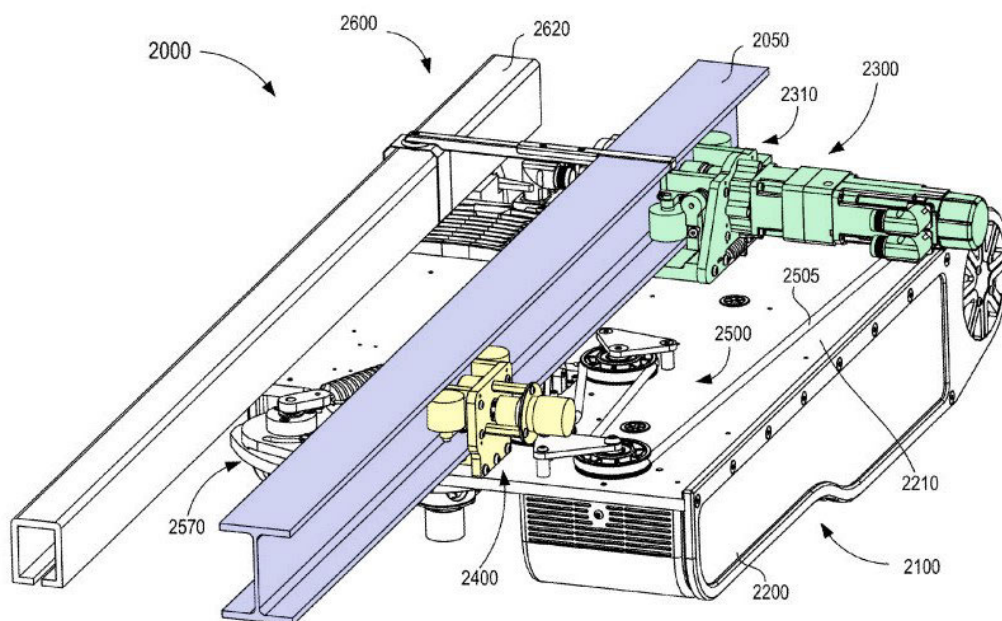


FIG. 2

Ex-1009, Fig. 2 (annotations added); Ex-1008, ¶131.

The drive assemblies are also depicted in Figure 4 of Erturk, forming a part of trolley 2100:

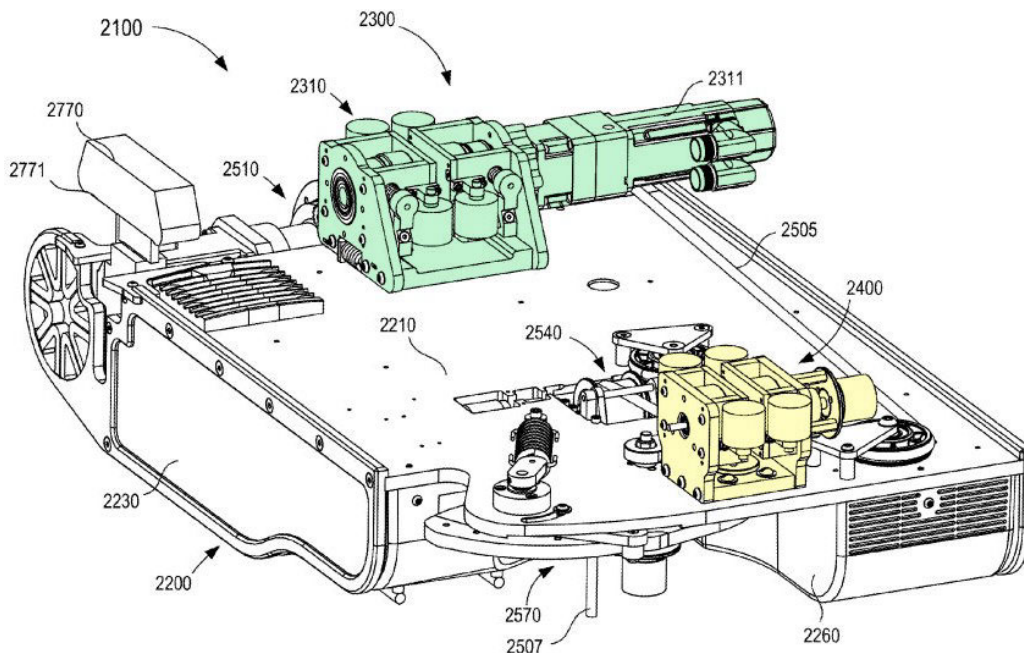
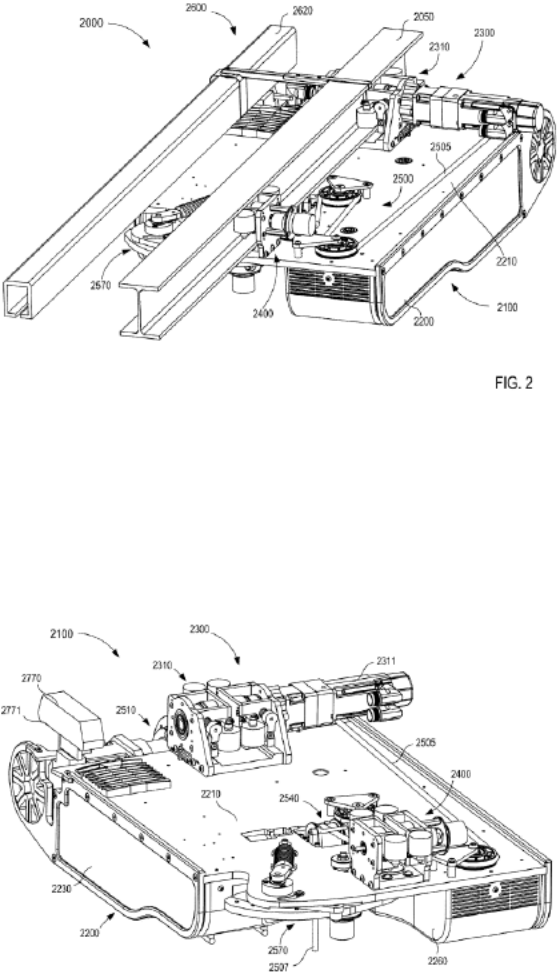
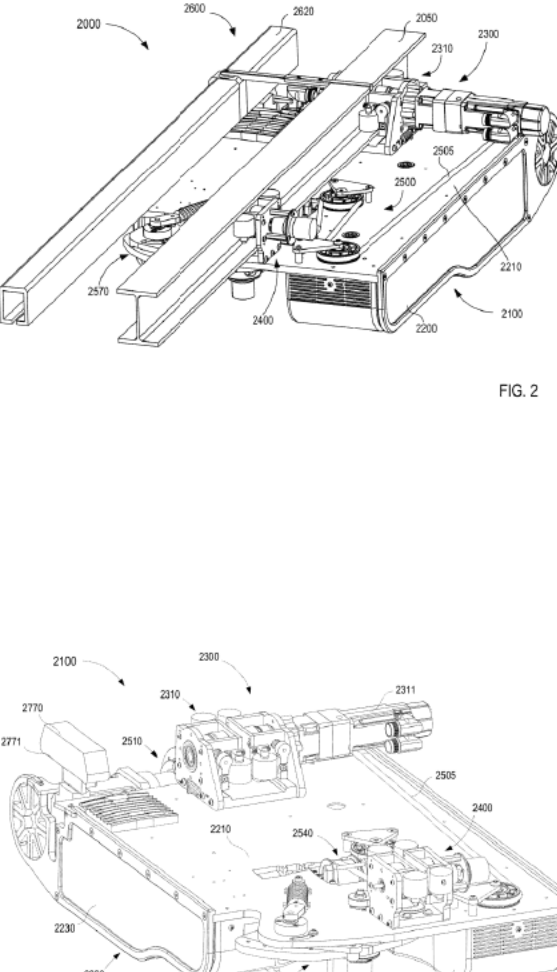


FIG. 4

Ex-1009, Fig. 4 (annotations added); Ex-1008, ¶131.

The drive assemblies work together to movably suspend the “trolley 2100” from the “support track 2050.” Ex-1009, [0094]-[0095]; Ex-1008, ¶¶130-132. As a result, the “body weight support system 2000” can move along the “support track 2050” while supporting a patient via the “tether 2505.” Ex-1009, [0085]-[0086]; *see also id.*, [0064]-[0065] (“The drive system 1300 of the trolley 1100 can include one or more wheels configured to roll along a surface of the support track such that the weight of the trolley 1100 and a portion of the weight of a patient utilizing the support system 1000... are supported by the support track.”), [0052]; Ex-1008, ¶¶130-132.

Notably, the figures and teachings of Erturk in this respect are nearly identical to the embodiments of the '316 Patent (*see* Ex-1008, ¶¶133-135):

Erturk, FIGS. 2, 4	'316 Patent, FIGS. 2, 4
 FIG. 2 is a perspective view of a mechanical assembly 2000. It includes a base 2100 with a front panel 2200 and a rear panel 2210. A central component 2300 is mounted on the base, featuring a top surface 2310 and a side surface 2330. A vertical support 2400 is positioned near the front. A horizontal member 2500 is connected to the base and the central component. A wheel 2570 is attached to the side of the base. A rear panel 2600 is shown in a partially exploded view, revealing internal components like a motor 2620 and a drive shaft 2650. A bracket 2510 is also visible. FIG. 4 is a perspective view of the same assembly from a different angle. It shows the base 2100 with the front panel 2200 and rear panel 2210. The central component 2300 is shown with its top surface 2310 and side surface 2311. The vertical support 2400 and horizontal member 2500 are clearly visible. The wheel 2570 is on the left side. The rear panel 2600 is shown in a partially exploded view, revealing internal components like a motor 2620 and a drive shaft 2650. A bracket 2510 is also visible.	 FIG. 2 is a perspective view of a mechanical assembly 2000. It includes a base 2100 with a front panel 2200 and a rear panel 2210. A central component 2300 is mounted on the base, featuring a top surface 2310 and a side surface 2330. A vertical support 2400 is positioned near the front. A horizontal member 2500 is connected to the base and the central component. A wheel 2570 is attached to the side of the base. A rear panel 2600 is shown in a partially exploded view, revealing internal components like a motor 2620 and a drive shaft 2650. A bracket 2510 is also visible. FIG. 4 is a perspective view of the same assembly from a different angle. It shows the base 2100 with the front panel 2200 and rear panel 2210. The central component 2300 is shown with its top surface 2310 and side surface 2311. The vertical support 2400 and horizontal member 2500 are clearly visible. The wheel 2570 is on the left side. The rear panel 2600 is shown in a partially exploded view, revealing internal components like a motor 2620 and a drive shaft 2650. A bracket 2510 is also visible.

Ex-1009, Figs. 2, 4.

Ex-1001, Figs. 2, 4.

Thus, Erturk teaches a ***body weight support system*** (trolley 2100) that includes ***a drive assembly*** (drive assemblies 2310 and 2400) that is ***configured to movably suspend the body weight support system from a support track*** (support track 2050) just like the '316 Patent. Ex-1008, ¶¶133-135.

1[pre (iii)]	<i>a tether configured to be coupled to an attachment device worn by a user to couple the user to the body weight support system, the method comprising:</i>
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Erturk teaches 1[pre(iii)] because Erturk teaches a tether (“tether 2505”) that is coupled to a “harness” worn by a patient in order to couple the patient to the trolley. Ex-1009, [0140]-[0143]; *see also id.*, [0068], [0085], [0157], Figs. 28, 34; Ex-1008, ¶¶136. The “tether 2505” (red) is depicted in Figure 28 of Erturk:

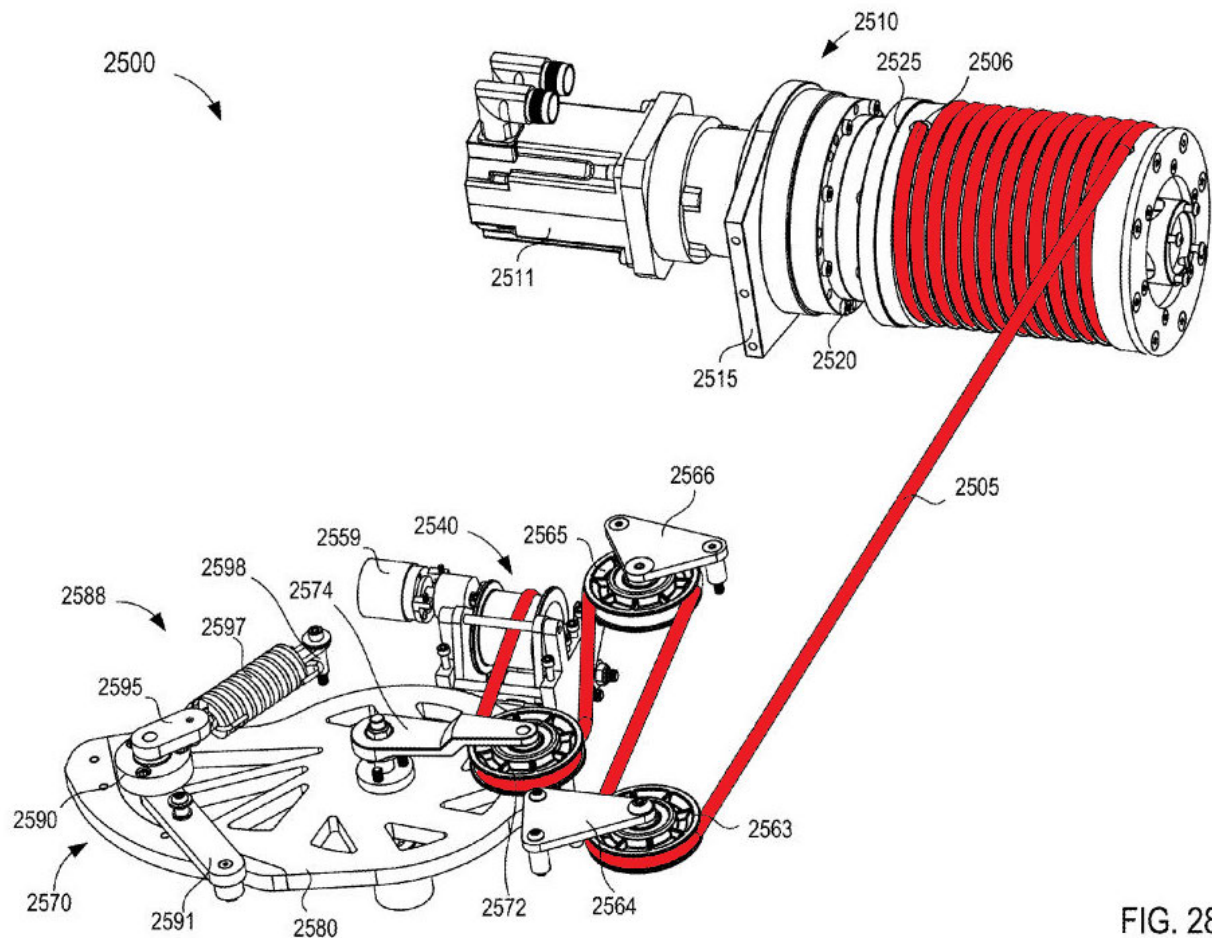


FIG. 28

Ex-1009, Fig. 28 (annotations added).

The “tether 2505” is coupled to the “trolley 2100” in order to “couple the patient to the support system 2000.” Ex-1009, [0122]-[0125], [0140]; Ex-1008, ¶137. Figure 4 of Erturk depicts an “end portion 2507 of the tether 2505” (red) exiting from the trolley 2100:

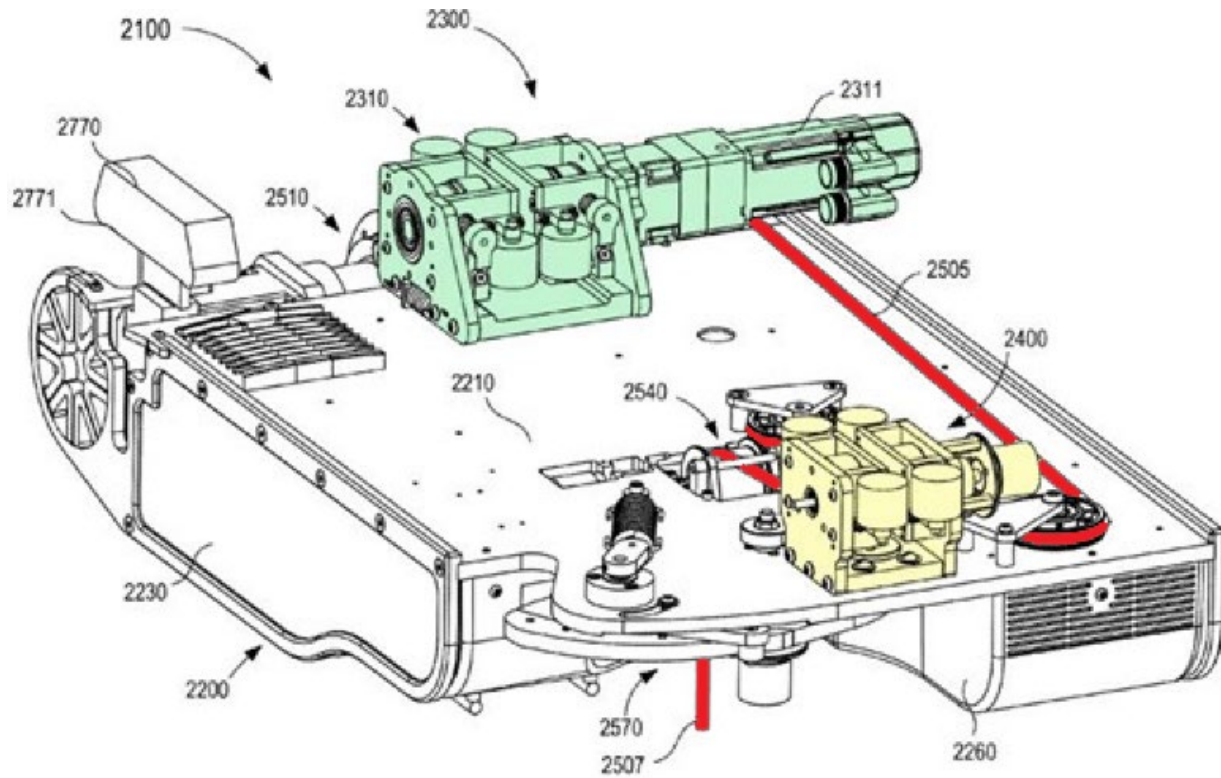


FIG. 4

Ex-1009, [0140], Fig. 4 (annotations added).

The tether 2505 exits from the trolley 2100 so that it can “couple to the patient attachment mechanism 2800,” shown in Figure 34, which is then attached to the “harness” worn by the patient (*see* Ex-1008, ¶138):

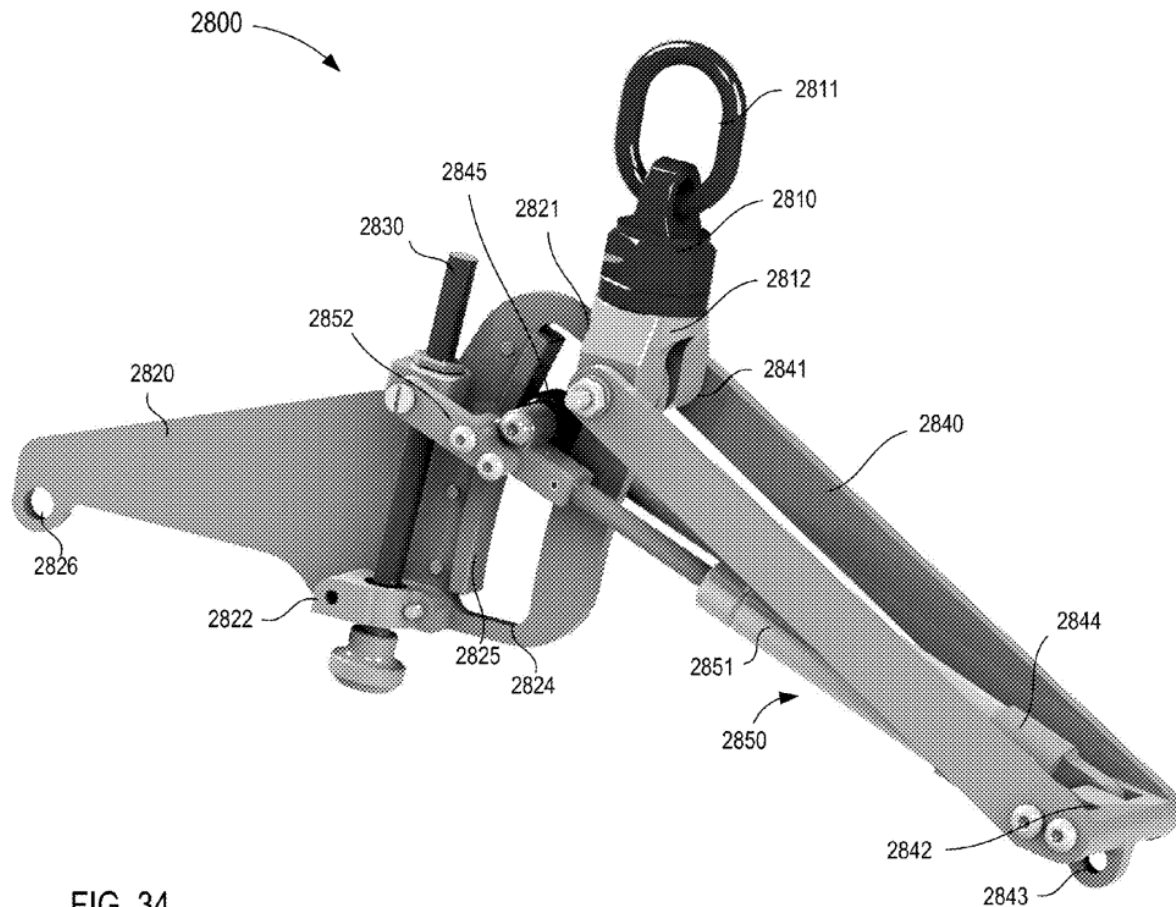


FIG. 34

Ex-1009, [0089], Fig. 34.

Erturk teaches that “a harness, or the like, worn by the patient” is “coupled to the patient attachment mechanism 2800 which, in turn, is coupled to the... tether 2505.” Ex-1009, [0140]-[0147]; *see also* [0068], [0085], [0157]; Ex-1008, ¶¶138-139, 141.

As such, Erturk teaches *a tether* (tether 2505) *configured to be coupled to an attachment device worn by a user* (“a harness, or the like, worn by the patient”) *to couple* (through the “patient attachment mechanism 2800”) *the user to the body*

weight support system (trolley 2100.). Again, Erturk’s teachings are nearly identical to the teachings in the ’316 Patent. *Compare* Ex-1009, [0068], [0085], [0089], [0140]-[0147], [0153]-[0157] *with* Ex-1001, 11:49-62, 16:64-17:21, 18:21-38, 33:23-34:48; 36:27-37:33; *see also* Ex-1008, ¶¶140-142.

b. Element 1[a]

1[a]	<i>defining a reference length of the tether when the attachment device is in an initial position;</i>
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The combination of Erturk and Vector teaches Element 1[a] because Vector teaches setting a “zero point” that defines a reference length of the tether used to measure relative changes in a patient’s position. Ex-1010, pp. 19-20; Ex-1008, ¶143.

As recognized in the ’316 Patent, the starting position of a gait therapy exercise may vary from patient-to-patient (e.g., based on height of the patient), and that the range of positions may vary from exercise-to-exercise. Ex-1001, 2:1-8, 5:44-6:17, 12:11-18, 59:29-31, 68:50-61; Ex-1008, ¶¶144-145. As such, to measure changes in a particular patient’s position as he/she performs an exercise, it is helpful to define a length of the tether that corresponds to a patient’s starting position and acts as a reference point for changes. Ex-1001, 68:50-61; Ex-1008, ¶145. The ’316 Patent refers to defining this reference length of the tether as

“defin[ing] a zero point.” *Id.*; Ex-1008, ¶¶144-145. Changes in position/length can then be measured against this reference. *Id.*, 68:50-69:32; Ex-1008, ¶¶144-145.

Vector teaches defining a reference length of the tether in the same manner as the '316 Patent. Ex-1008, ¶146. Just like the '316 Patent, Vector teaches setting “a zero point” that “represents the location of the rope when DBWS [Dynamic Body Weight Support] is activated.” Ex-1010, p.19-20, 34. The “zero point” can be set at the start of each individual exercise by pressing the “save” button—“[o]nce the save button has been pressed then the zero point of the fall limit will readjust.” Ex-1010, p.19; *see also id.*, p.20 (“It is suggested that at the start of each exercise that... the fall limit value [is] readjusted.”). Setting the “zero point” thus defines the length of the tether at an initial position (e.g., at the start of an exercise) to act as a reference. Ex-1010, p.19; Ex-1008, ¶146.

As the patient performs an exercise, the reference length is used to measure changes in the patient’s position—e.g., how far a patient descends during the exercise. *See* Ex-1010, p.18 (discussing calculating the amount of descent); Ex-1008, ¶147. For example, the reference length can be used to determine whether the tether has extended by more than a threshold amount from the zero point (e.g., 36 inches), which may indicate that a patient is falling—“[d]uring a training session the Vector Elite System will detect and prevent a fall when the fall **distance from the zero point** is greater than the set Fall Limit value.” Ex-1010,

p.20; *see also* Ex-1010, p.18 (discussing fall limits between 4.0 inches and 36 inches, which are measurements relative to the “zero point”); Ex-1008, ¶147.⁵

Vector thus teaches *defining a reference length of the tether* (setting a “zero point”) *when the attachment device is in an initial position* (at the beginning of an exercise, when DBWS is activated, etc.). Ex-1008, ¶¶147-149.

Moreover, for the reasons set forth in Part V.A.1, above, a POSITA would have been motivated to modify the BWS system of Erturk to incorporate Vector’s teaching of Element 1[a].

c. Element 1[b]

1[b]	<i>defining a threshold length of the tether;</i>
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The combination of Erturk and Vector teaches Element 1[b] because Vector teaches defining a “fall limit value,” which is *a threshold length of the tether* measured relative to the zero point. Ex-1010, p.18; Ex-1008, ¶150.

Vector teaches setting a “fall limit value,” which acts as a *threshold* for taking action to prevent a patient from falling. In particular, the “fall limit value” is “the amount of descent that the patient can travel before the system locks the rope

⁵ Notably, Patent Owner’s own infringement charts in the parallel litigation contend that functionality similar to Vector’s discloses Element 1[b]. Ex-1030, 10-17.

winch.” Ex-1010, p.18; Ex-1008, ¶152. Vector explains that “[d]uring a training session the Vector Elite System will detect and prevent a fall when the fall distance from the zero point is greater than the set Fall Limit value.” Ex-1010, p.17-20; Ex-1008, ¶152.

Vector teaches that the “fall limit value” is set as a ***length of the tether***. For example, the “fall limit value” threshold may be “adjusted from 4.0 inches (10.1 cm) to 36 inches (91.4 cm).” Ex-1010, p.18; Ex-1008, ¶152. Vector further teaches that it is possible to “adjust the setting, us[ing] the plus and minus buttons to increase the Fall Limit in increments of 1 inch.” *Id.*

Vector thus teaches ***defining a threshold length of the tether*** (setting a “fall value limit” that acts as the threshold for providing additional body weight support to a patient to prevent a fall). Ex-1008, ¶¶152-154.

Again, the ’316 Patent teaches the same method of ***defining a threshold length of the tether*** that is taught in Vector. Ex-1008, ¶151. The ’316 Patent states that a therapist can “define a threshold length of the tether” by setting “a fall limit (e.g., a criterion or threshold) that corresponds to a threshold amount a length of the tether can be increased prior to the support system providing support for the patient.” Ex-1001, 57:27-31; *see also* 57:12-58:67; Ex-1008, ¶151. The ’316 Patent even states that the “fall limit” threshold can be set to “4 inches” as a default, “can be between about 1.0 in. and about 36.0 in,” and can be “adjusted by increments of

about 1.0 in.” Ex-1001, 57:35-63. These exemplary embodiments closely mirror the teachings of Vector. *Compare id. with* Ex-1010, p.18.

For the reasons set forth in Part V.A.3, above, a POSITA would have been motivated to modify the BWS system of Erturk to incorporate Vector’s teaching of Element 1[b].

d. Element 1[c]

1[c]	<i>providing a first amount of body weight support during the gait training as the user moves relative to a surface and the length of the tether is less than the threshold length of the tether;</i>
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The combination of Erturk and Vector teaches Element 1[c] because Vector teaches setting the BWS system to provide a specified amount of body weight support while the length of its tether is below the “fall limit value.” Ex-1008, ¶¶155-156.

Vector teaches providing *a first amount of body weight support* because Vector teaches a “Dynamic Body Weight Support (DBWS)” feature whereby “the trolley will make adjustments to the rope to keep the dynamic unloading at the desired value.” Ex-1010, 17-18. Vector teaches that the “desired value” of “dynamic body weight support” can be set by a clinician and may be stated in terms of a “percent of body weight” or an amount of weight (e.g., “10 lbs (4.5 kg)”). Ex-1010, pp.17-18 (stating that the amount of body weight support provided

may be “adjusted between 10 lbs (4.5 kg) to 200 lbs (90.7 kg)”; Ex-1008, ¶¶157-158.

Vector also teaches *providing* the first amount of body weight support *during the gait training as the user moves relative to a surface*. Vector teaches *providing* the “desired value” of body weight support “[a]s the patient moves.” Ex-1010, p.17. Vector specifies that this movement may be *relative to a surface*—e.g., as “[t]he patient may walk along a predetermined path.” Ex-1010, p.1. This allows “the patient to practice walking with less than full body weight.” Ex-1010, p.3; *see also* Ex-1010, p.1 (the “walking path” is defined by the mechanical track), p. 18 (“practicing over-ground walking”); *see also*); Ex-1008, ¶¶157-158.

Vector further teaches that the first amount of body weight support is provided when *the length of the tether is less than the threshold length of the tether*—i.e., when the length of the tether is less than “fall limit value.” Ex-1008, ¶158. For example, Vector teaches that the “desired value” of the body weight support “will remain on until... a fall is detected,” at which time a different amount of support is provided. Ex-1010 p.17; *see also* Part V.A.2.e, below (discussing what happens when the “fall limit” threshold is exceeded); Ex-1008, ¶158.

Vector thus teaches *providing a first amount of body weight support* (the “desired value” of “unloading” for the DBWS feature) *during the gait training as the user moves relative to a surface* (as the patient walks on a path) *and the length*

of the tether is less than the threshold length of the tether (the length of the tether is below the fall limit). Ex-1008, ¶159.

Erturk also teaches providing *a first amount of body weight support* because it discloses providing “active[]” support as the patient ambulates. Erturk discloses providing a “force such that the tension within the tether is substantially unchanged” as the user ambulates, including “over and across level ground.” Ex-1009, [0071], [0063]; Ex-1008, ¶160. Thus the “tension” provided by Erturk’s BWS as the user ambulates before falling is *a first amount of body weight support* as claimed. *Id.*

It would have been obvious to a POSITA that prior to a fall being detected, Erturk’s BWS system would *provid[e] a first amount of body weight support* – such as the “DBWS” support of Vector or the “active” support of Erturk. Ex-1008, ¶161.

Accordingly, either Vector alone, or Erturk in view of Vector, discloses Element 1[c]. Ex-1008, ¶162.

e. Element 1[d]

1[d]	<i>providing a second amount of body weight support during the gait training as the user moves relative to the surface and the length of the tether is greater than the threshold length of the tether,</i>
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The combination of Erturk and Vector teaches Element 1[d] because Vector teaches locking the tether when the length of the tether exceeds the “fall limit value” threshold as the patient walks along a path. Ex-1008, ¶163.

Vector teaches *providing a second amount of body weight support* because Vector teaches that the BWS system “locks the rope winch” when the system determines that a patient is falling. Ex-1010, p.18. A POSITA would have understood that locking the rope winch provides additional body weight support beyond the “desired value” set by the clinician (the *first amount of body weight support*). Ex-1008, ¶165. A POSITA would have understood that the additional support provided could be up to and including the full weight of the patient plus the harness. Ex-1008, ¶¶165-166. Indeed, the very purpose of locking the winch is to provide such additional support (beyond the “desired value”) to “prevent[] the patient from falling.” Ex-1010, p.18.

As addressed in connection with Element 1[c], above, Vector teaches that the second amount of body weight support is provided *as the user moves relative to the surface*—i.e., as the patient walks along a path. See Part V.A.2.d, above.

Vector thus teaches that the *second amount of body weight support* (locking the rope winch) is provided when *the length of the tether is greater than the threshold length of the tether* (the length of the tether exceeds the fall limit value) *during the gait training as the user moves relative to a surface* (as the patient

walks on a path) because Vector teaches that the rope winch is locked when the length of the tether exceeds the “fall limit value” during training. For example, Vector teaches that “[t]he programmed fall limit value is the amount of descent that the patient can travel before the system locks the rope winch.” Ex-1010, p.18; Ex-1008, ¶¶165-167.

Notably, the ’316 Patent teaches providing a second amount of body weight support in a manner substantially similar (if not identical) to Vector. In particular, the ’316 Patent states that, “[a]fter a length of the tether has been increased beyond the threshold (e.g., after a patient and/or user has descended (fallen) beyond the fall limit), the support system can transition to a support configuration in which the tether can be locked and/or a tracking system or drive system is deactivated (e.g., a support configuration or fall prevention configuration).” Ex-1001, 57:35-58:11; Ex-1008, ¶164

For the reasons set forth in Part V.A.1, above, a POSITA would have been motivated to modify the BWS system of Erturk to incorporate Vector’s teaching of Element 1[d]. Ex-1008, ¶168.

Erturk also teaches providing *a second amount of body weight support* because it teaches that the “active” support (referenced in Element 1[c]) can be adjusted to respond to a patient falling. In particular, when an increased downward force is being imposed on the tether by a user during a fall event, Erturk’s BWS

can “respond to [the] change in force exerted on the tether... to actively limit the magnitude of the fall of the patient.” Ex-1009, [0071]; *see also id.*, [0152]-[0153]; Ex-1008, ¶169. It would have been obvious to a POSITA that, after a fall is detected, that Erturk’s BWS system (as modified by Vector as described above) would *provid[e] a second amount of body weight support* – such as the full body weight support of Vector’s “lock[ing] the rope winch,” or the increased body weight support of Erturk’s “active” support mechanism that changes within a matter of seconds in response to the added downward force present during a fall. *Id.*

Accordingly, either Vector alone, or Erturk in view of Vector, discloses Element 1[d]. Ex-1008, ¶170.

f. Element 1[e]

1[e]	<i>the drive assembly configured to move the body weight support system relative to the support track to maintain the body weight support system in a substantially overhead position relative to the user as the user moves relative to the surface; and</i>
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Erturk teaches Element 1[e] because Erturk teaches a trolley tracking feature that uses drive assemblies that move a trolley suspended from a support track to keep the trolley substantially overhead of the patient. Ex-1008, ¶171.

For the reasons already explained above in connection with 1[pre(ii)], Erturk teaches a *drive assembly configured to move the body weight support system relative to the support track*. See Part V.A.2.a.

Erturk also teaches that the drive assembly is configured to *maintain the body weight support system in a substantially overhead position relative to the user as the user moves relative to the surface*. See, e.g., Ex-1009, [0149]; Ex-1008, ¶173. In particular, Erturk discloses that the “trolley 2100 can be configured to remain substantially over-head of the patient.” *Id.* Erturk explains that this feature can be provided by “controlling the motor 2311 of the drive system 2300” – which includes *the drive assembly* as noted in connection with 1[pre(ii)], *supra* – “based on information received from, for example, the encoder 2470 of the drive system 2300.” *Id.*; Ex-1008, ¶173.

Notably, the trolley tracking feature taught in Erturk is nearly identical to the exemplary embodiment of the trolley tracking feature in the ’316 Patent (*see* Ex-1008, ¶¶174-177):

’316 Patent (Ex-1001), 34:64-35:34	Erturk (Ex-1009), [0149]
In some instances, the trolley 2100 can move along the support structure 2050 (as described above with reference to FIGS. 23 and 26) in response to the	In some instances, the trolley 2100 can move along the support structure 2050 (as described above with reference to FIGS. 23 and 26) in response to the

movement of the patient. Similarly stated, the trolley 2100 can move along the support structure 2050 as the patient walks. In some instances, the <u>trolley 2100 can be configured to remain substantially over-head of the patient...</u>	movement of the patient. Similarly stated, the trolley 2100 can move along the support structure 2050 as the patient walks. In some instances, the <u>trolley 2100 can be configured to remain substantially over-head of the patient...</u>
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g. Element 1[f]

1[f]	<i>displaying data associated with the gait training on a display of an electronic device included in the body weight support system.</i>
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Erturk teaches Element 1[f] because Erturk teaches that the trolley (*the body weight support system*) includes an “electronic system 1700” (*an electronic device*) that can include a “touch screen” (*a display for displaying data associated with the gait training*). Ex-1009, [0064], [0079], [0148]; Ex-1008, ¶178.

FIG. 1 of Erturk teaches *an electronic device included in the body weight support system* because FIG. 1 teaches an “electronic system 1700” (outlined in blue) that is included in the “trolley 1100” (outlined in red):

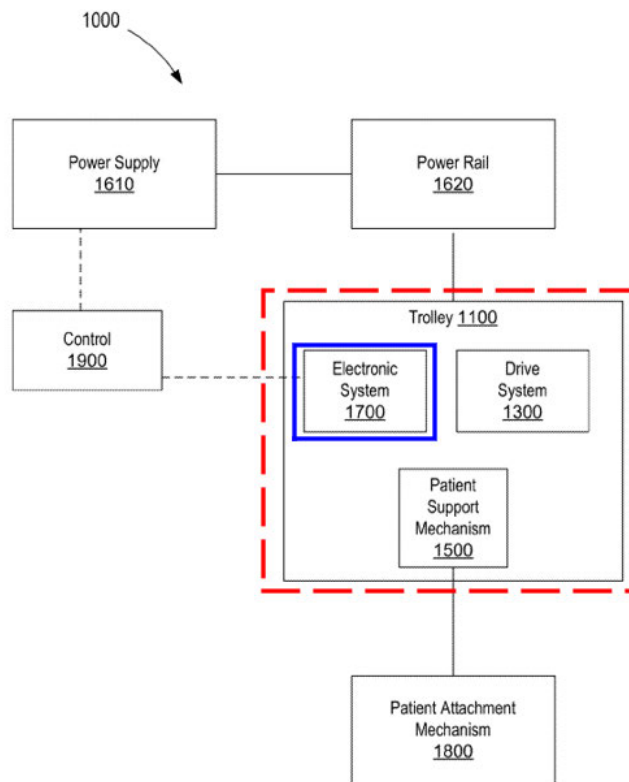


FIG. 1

Ex-1009, Fig. 1 (outlines added); *compare id. with* Ex-1001, Fig. 1 (identical); Ex-1008, ¶¶178-180⁶

Erturk teaches ***displaying data associated with the gait training on a display of an electronic device included in the body weight support system*** because Erturk teaches that the trolley’s “electronic system 1700 can include a user

⁶ Although FIG. 1 shows “control 1900” as a separate from “electronic system 1700” of the trolley, Erturk teaches that “control 1900” can also be included directly in “electronic system 1700” of the trolley itself.

interface (e.g., a touch screen and/or one or more dials, buttons, switches, toggles, or the like).” Ex-1009, [0079]; Ex-1008, ¶¶181-182. Electronic system 1700 is in communication with control 1900. A POSITA would have understood that this user interface displays data associated with the gait training because the user interface allows a user of the BWS system to input and receive information concerning the gait training. Ex-1008, ¶¶181-182. For example, “a user (e.g., a physical therapist, a doctor, a nurse, a technician, etc.) can engage the user interface... to establish **a set of parameters for the support system 1000.**” Ex-1009, [0079]. Erturk teaches that these “parameters” can include data associated with the gait training—for example, the patient’s body weight/height, the desired amount of body weight support, a desired speed of the patient, and the like. Ex-1009, [0148]. A POSITA would have understood that inputting such data associated with the gait training would result in such data being displayed on the touch screen display. Ex-1008, ¶182.

Erturk also teaches *displaying data associated with the gait training on a display of an electronic device* because Erturk teaches that “electronic system 1700” provides video “feedback” to a patient both in “real-time” and “post-session.” Ex-1009, [0083]; Ex-1008, ¶183. Erturk teaches that this visual feedback (“video monitoring”) can also be correlated to other data associated with the gait training, including the “sensed rope position, speed, tension, etc.,” as well as

“muscle usage (e.g., leg muscles, torso muscles, etc.).” Ex-1009, [0083], [0183]-[0184]; Ex-1008, ¶183.

Vector also teaches Element 1[f] because it teaches displaying a wide range of data associated with a gait training session on a PC computer – the same data that a user inputs using the touch screen of Erturk. Ex-1010, p.19 (Figure 5-8); Ex-1008, ¶183-188. Figure 5-8 from Vector provides an example



Figure 5-8: Trolley Tracking and DBWS Active

Indeed, Vector teaches displaying the very types of data that Erturk addresses in connection with “electronic system 1700”—e.g., the desired amount of body weight to be supported (10 lbs, 6%), the speed of the patient walking during gait therapy (0.2 mph), the distance walked (8.7 ft), and the rope position

(0.8 in), among other ***data associated with the gait training***. Ex-1010, p.19 (Figure 5-8); *compare id. with* Ex-1009, [0079], [0083].

A POSITA would have found it obvious to use the touch screen of Erturk to display the gait training data taught in Vector. Ex-1008, 184-189. Indeed, in addition to the discussion in Part V.A.1, it would have been obvious to combine Erturk's teachings of a touch screen display with Vector's teaching of displaying gait training data because the combination would have amounted to use of a known technique to improve a similar device in the same way. As discussed in V.A.1, above, the BWS systems taught in Erturk and Vector are nearly identical. Moreover, using a display in a BWS system to display data related to gait training therapy was a known and routine feature of such systems. *See, e.g.*, Ex-1008, ¶¶21, 44 (citing examples of conventional techniques), *see also id.*, ¶48.

Displaying gait training data on the touch screen of Erturk in view of the teachings of Vector would also be a combination of known elements to achieve predictable results. Ex-1008, ¶187. As noted above, such use of displays with BWS systems was known. *Id.*, ¶¶21, 44, 48. A POSITA would have been motivated to use the touch screen of Erturk to display gait training data, as taught in Vector, to achieve predictable results. *Id.*, ¶184-189. In particular, a POSITA would have understood that displaying data on the screen would promote safe operation of a BWS system by allowing a therapist to verify that the desired "system parameters"

were entered correctly. *Id.*, ¶187. Additionally, a POSITA would have understood that displaying data on the touch screen would increase the flexibility and efficacy of a BWS system by allowing a therapist to receive real-time data concerning the gait training and make corresponding adjustments to the system parameters. *Id.*

A POSITA also would have expected success in combining the display teachings of Erturk and Vector. Ex-1008, ¶188. As explained above, Erturk already teaches a touch screen display that is used to enter the gait training data displayed on the screen of Erturk. To the extent any modification of Erturk would be necessary, the modification would be minimal. *Id.*, ¶188. An example modification would involve simple addition of a display command into the executable software executed by the processors of control 1900, where the display command would cause the interface to display the number(s) or string(s) corresponding to the results of calculations already performed by the processor of the electronic system 1700. *Id.*

For the reasons set forth above, Erturk alone teaches ***displaying data associated with the gait training*** (e.g., amount of body weight support, speed, distance) ***on a display*** (e.g., a “touch screen”) ***of an electronic device*** (“electronic system 1700”) ***included in the body weight support system*** (the trolley). Ex-1008, ¶¶189-190. To the extent Patent Owner argues that Erturk alone does not teach Element 1[f], it would nonetheless have been obvious to modify the touch screen

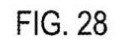
of Erturk to display gait training data in view of the teachings of Vector concerning displaying such data. *Id.*

3. Claims 2 & 3

2	<i>The method of claim 1, wherein the length of the tether is increased in response to an increase in force exerted by the user on the tether.</i>
3	<i>The method of claim 2, wherein the increase in the force exerted by the user on the tether is associated with the user falling during the gait training.</i>

Claims 2 and 3 add related limitations to claim 1. For brevity, Petitioner addresses these limitations together. Ex-1008, ¶¶191-196. Erturk teaches each of the additional elements of claims 2 and 3.

To achieve dynamic body weight support, Erturk discloses a pulley system and winch assembly coupled to the trolley, where “the movement of the at least one pulley can coincide and/or be caused by a force exerted on the attachment mechanism” by the patient. Ex-1009, [0071]; Ex-1008, ¶192. When the pulley is moved, the system can sense the “amount of movement of the pulley and/or the cam,” and then “signal... the motor” of the “winch” to “coil[] or uncoil[] the tether around the drum in accordance with the movement of the pulley.” *Id.*; Ex-1008, ¶193. Figure 28 of Erturk shows these component parts, with the winch assembly and motor (brown), the pulleys of the pulley system (blue), and the tether (red).



With respect to claim 2, Erturk teaches that *the length of the tether is*

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tether that extends out of the trolley and couples to the patient. Ex-1009, [0071]; Ex-1008, ¶¶193, 195-196.

With respect to claim 3, Erturk teaches *the increase in the force exerted by the user on the tether is associated with the user falling during the gait training.*

For example, Erturk teaches that “[i]n some instances, the amount of force exerted on the tether 2505 by the patient may increase,” because “a patient may stumble, thereby increasing the amount of force exerted on the tether 2505.” Ex-1009, [0150]; Ex-1008, ¶¶194-196.

4. Claim 4

4	<i>The method of claim 1, wherein the surface relative to which the user moves is a stationary surface.</i>
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The combination of Erturk and Vector teaches the additional elements of claim 4 because both references teach that a patient performs gait training exercises relative to a variety of stationary surfaces, including the ground. Ex-1008, ¶197.

The '316 Patent states that a “stationary surface” may be “for example, the floor, the ground, a platform, and/or any other suitable surface... [such as] a set of steps, a ramp, etc.”...” Ex-1001, 62:27-36; Ex-1008, ¶198.

Erturk teaches at least three of these examples (ground, set of steps, and ramp). Ex-1008, ¶199. For example, Erturk teaches that “support system 1000 can

be used to support a patient over a treadmill or stairs instead of or in addition to supporting a patient over and across level ground.” Ex-1009, [0063]; Ex-1008, ¶199. Erturk further discloses that “the trolley can be used to support a patient moving across an inclined/declined surface, up or down stairs, etc.” Ex-1009, [0065]; Ex-1008, ¶¶199, 201.

Vector also teaches that *the surface relative to which the user moves is a stationary surface*. For example, Vector teaches that “[t]he patient may walk along a predetermined path” and perform “over-ground walking.” Ex-1010, pp.1, 18; Ex-1008, ¶¶200-201.

5. Claim 5

5	<i>The method of claim 1, wherein the surface relative to which the user moves is a moving surface included in a treadmill.</i>
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The combination of Erturk and Vector teaches the additional elements of claim 5 because both references teach that a patient performs gait training exercises relative to the surface of a treadmill. Ex-1008, ¶202.

Erturk teaches that its “support system 1000 can be used to support a patient **over a treadmill** or stairs instead of or in addition to supporting a patient over and across level ground.” Ex-1009, [0063]; *see also* [0070] (describing operation of the drive system “when the patient is walking over a treadmill”); Ex-1008, ¶¶203, 205.

Vector similarly teaches that “[t]he patient may walk along a predetermined path or on a treadmill.” Ex-1010, p. 1. Ex-1008, ¶¶204, 205.

B. Ground 2: Obviousness over Erturk in view of Vector and Stockmaster

Claims 7-8 of the ’316 Patent are invalid because they are obvious over the teachings of Erturk in view of Vector and Stockmaster. Ex-1008, ¶¶159-173.

1. Motivation to Combine Erturk, Vector, and Stockmaster

A POSITA would have been motivated to combine Erturk and Vector for at least the reasons detailed in Part V.A.1, above. Moreover, as is set forth in the declaration of Dr. Reinkensmeyer, a POSITA would have been motivated to further modify the fall detection and prevention feature to utilize additional fall detection criteria taught in Stockmaster. Ex-1008, ¶207.

First, as noted in Part V.A.1, Erturk includes an express teaching and suggestion that it would be desirable to include a fall detection and prevention feature such as the feature taught in Stockmaster. *See* Part V.A.1. Based on these same express teachings/suggestions, a POSITA would have likewise been motivated to combine Stockmaster’s fall detection and prevention methods into Erturk’s BWS system. Ex-1008, ¶208.

Second, a POSITA would have understood that combining the teachings of Erturk and Stockmaster would have amounted to use of a known technique to

improve a similar device in the same way. *KSR*, 550 U.S. at 417; Ex-1008, ¶209.

Here, Erturk and Stockmaster also teach undeniably similar devices. *Id.* Both references are from the same field of endeavor (overhead gait therapy); both are directed to the same objectives (providing a body weight support system for gait therapy in a safe and controlled environment); both teach providing a BWS system for gait therapy in a safe and controlled environment; and both teach fall prevention through system monitoring; and both teach providing “dynamic” or “active” body weight support. *See* Part V.A.1 (citing Ex-1009 teachings); *compare* Ex-1011, Abstract, [0002]-[0009], Figs. 1-2 (discussing and illustrating overhead “body weight support systems” for “providing rehabilitative services and therapy to individuals with significant walking deficits,” including BWS systems that “reduce the likelihood of falls,” and that “dynamically adjust[ing] the amount of support provided to the person), *see also* [0338]-[0341] (fall prevention); Ex-1008, ¶209. The proposed combination would apply the fall prevention feature of Stockmaster “in the same way” to the BWS system of Erturk. Ex-1008, ¶209.

Erturk’s BWS is already configured to detect changes in system components such as the tether position, velocity, etc. *See* Part V.A.1; *see also* Ex-1009, [0126-1030]. The fall protection feature of Stockmaster is provided in the very same way, being configured to detect changes in system components (e.g., the “downward travel of

the strap 430 (and patient)” and “speed of the downward vertical movement of strap 430”) to detect the fall. Ex-1011, [0338]-[0341]; Ex-1008, ¶209.

Third, the combination of the fall detection feature of Stockmaster with the BWS system of Erturk is a combination of known elements to achieve predictable results. *See KSR*, 550 U.S. at 416. Ex-1008, ¶210. The combination of the known elements discussed above would only require minor software modifications to Erturk’s BWS system, and would leverage data that Erturk’s BWS system is already configured to capture. *See, e.g.*, Ex-1009, [0062], [0070], [0121]-[0130], [0134], *see also* [0092], [0149]-[0152], [0180]-[0185]; Ex-1008, ¶¶210. Thus, a POSITA would have had a reasonable expectation of success in applying the teachings of Stockmaster to the BWS of Erturk. Ex-1008, ¶¶210.

Fourth, a POSITA would have been motivated to use Stockmaster’s “speed-based” fall detection criteria in addition to the fall limit criteria (of Vector or Stockmaster) to enhance Erturk’s ability to distinguish between training exercises that include rapid descents, on the one hand, and fall scenarios where the patient’s descent continues for longer than would occur during such exercises, on the other. Ex-1008, ¶211. Stockmaster itself suggests to a POSITA that detection of various fall scenarios can be enabled by – and the capability of BWS systems improved by – using “a combination of two or more detection options.” Ex-1011, [0340]; Ex-1008, ¶211.

Accordingly, a POSITA would have been motivated to combine the BWS system of Erturk with the fall prevention feature of Stockmaster, and would have expected success in doing so. Ex-1008, ¶212.

2. Claim 7

a. Preamble

7[pre]	<i>A method of using a body weight support system to provide body weight support during gait training, the body weight support system including a tether configured to be coupled to an attachment device worn by a user to couple the user to the body weight support system, the method comprising:</i>
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The elements of 7[pre] are the same as the elements of 1[pre] except that 7[pre] does not require *a drive assembly configured to movably suspend the body weight support system from a support track*. Accordingly, 7[pre] is broader than 1[pre] and Erturk discloses 7[pre] as detailed above. See Part V.A.2.a; Ex-1008, ¶213.

b. Element 7[a]

7[a]	<i>defining a reference length of the tether when the attachment device is in an initial position;</i>
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The limitations of Element 7[a] are the same as the limitations of Element 1[a]. As such, the combination of Erturk and Vector teaches Element 7[a] as detailed above in connection with Element 1[a].⁷ See Part V.A.2.b; Ex-1008, ¶214.

c. Element 7[b]

7[b]	<i>defining a first criterion associated with a change in a length of the tether;</i>
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Both Vector and Stockmaster teach Element 7[b].

Vector teaches Element 7[b] because Vector teaches setting a “fall limit value,” which is a criterion for determining whether a user is falling (*defining a first criterion*). See Parts V.A.2.c-V.A.2.e; Ex-1008, ¶216. The “fall limit value” is *associated with a change in the length of the tether* because the fall limit value is defined as the change in the length of the tether against the “zero point.” See Ex-1010, pp.17-20; Ex-1008, ¶216. For example, Vector teaches that “[d]uring a training session the Vector Elite System will detect and prevent a fall when the **fall distance from the zero point** is **greater than the set Fall Limit value**,” where the “**zero point represents the location of the rope**.” *Id.*

⁷ The term “reference length” does not appear again anywhere in claim 7, nor in any of claims 8, 9, 10, or 11. “Reference length” only appears again in unchallenged claim 12.

Stockmaster teaches using multiple distinct criterion for detecting a fall, any one of which would qualify as the ***first criterion***. See Ex-1011, [0338]-[0341] (discussing a “speed based” criterion, a “Descent Limit” criterion, etc.). Ex-1008, ¶217.

For example, similar to Vector’s fall limit value, Stockmaster teaches defining a “Descent Limit” that would qualify as ***a first criterion*** as claimed. Ex-1011, [0341] (“a fall is detected with Descent Limit”); Ex-1008, ¶218. Stockmaster teaches that the “Descent Limit” is ***associated with a change in the length of the tether***: it “set[s] a maximum amount of downward travel of the strap 430 (and patient).” *Id.*

In another example, Stockmaster teaches using a “speed-based” fall detection criterion that would qualify as ***a first criterion*** as claimed. Ex-1011, [0340]; Ex-1008, ¶219. Stockmaster’s “speed-based” criterion involves setting a speed “threshold” (***defining a first criterion***) for the “speed of the downward vertical movement of strap 430” (***associated with a change in a length of the tether***), and then monitoring “the speed of the downward vertical movement of strap 430” so that “in the event of the speed exceeding [the] threshold,” the patient’s fall can be “dampened or stopped by the system.” See Ex-1011, [0340]; Ex-1008, ¶219.

A POSITA would have been motivated to combine one or both of (i) Vector’s “fall limit value” criterion, and (ii) Stockmaster’s “speed-based” criterion with the teachings of Erturk for at least the reasons set forth in Part V.B.1, above. Ex-1008, ¶220.

d. Element 7[c]

7[c]	<i>defining a second criterion associated with a change in a length of the tether;</i>
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The combination of Erturk, Vector, and Stockmaster teaches Element 7[c]. Ex-1008, ¶221. As explained above, Stockmaster teaches using multiple district criterion for detecting a fall, any one of which qualifies as the *first criterion*. Ex-1008, ¶222. To the extent that any one of those criterion (or the Vector criterion) is identified as the *first criterion*, any of the remaining criterion would qualify as a *second criterion*. Ex-1008, ¶222. For example, where Vector’s “fall limit value” or Stockmaster’s “Descent Limit” are identified as the first criterion, Stockmaster’s speed-based criterion qualifies as a *second criterion associated with a change in a length of the tether*. Ex-1008, ¶222.

For example, Stockmaster’s speed-based criterion would qualify as the claimed *second criterion* because it teaches defining a threshold speed as a criterion for determining when a user is experiencing a fall. Ex-1008, ¶223. This threshold speed is *associated with a change in a length of the tether* because

Stockmaster teaches that the speed is measured based on the downward movement of the strap (i.e., the tether): “the speed of the downward vertical **movement of strap** 430 is monitored, and in the event of the speed exceeding a threshold the motion is dampened or stopped by the system.” Ex-1011, [0340] (emphasis added); Ex-1008, ¶223.

Stockmaster also teaches defining additional metrics that would each qualify as a *second criterion associated with a change in a length of the tether*. Ex-1008, ¶224. For example, Stockmaster teaches that “there may be other system performance metrics that could be used in fall detection (e.g., rapid change in strap angle), and it is also contemplated that **a combination of two or more detection options** may also be implemented in order to permit the system to detect other “fall” scenarios.” Ex-1011, [0340]; Ex-1008, ¶224.

e. Element 7[d]

7[d]	<i>defining an amount of the body weight support to provide in response to the user falling during the gait training;</i>
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The combination of Erturk, Vector, and Stockmaster teaches Element 7[d]. Ex-1008, ¶¶225-228.

Vector teaches Element 7[d] for the reasons set forth in connection with Element 1[d], above. Ex-1008, ¶226. *See* Part V.A.2.e. When Vector’s BWS system detects that a user is falling, the “system locks the rope winch,” thereby

catching the user before they hit the ground and supporting 100% of the user's bodyweight. The "Trolley Patient Weight Limit" is "400lbs (181.4 kg)." Ex-1010, p.51; Ex-1008, ¶226. The Vector thus teaches *defining an amount of the body weight support to provide in response to the user falling during the gait training*—i.e., setting the system to provide 100% body weight support, up to 400 lbs, when the system detects a fall. Ex-1008, ¶226.

Similarly, Stockmaster teaches Element 7[d]. Stockmaster teaches that "[w]hen a fall is detected with DFP [(dynamic fall protection)], further vertical movement in the downward direction is inhibited." Ex-1011, [0338]. Ex-1008, ¶226. In this scenario, "[t]he patient is allowed movement in only the upward direction and horizontally, albeit at a reduced speed, making it easier to right themselves." *Id.* Stockmaster thus teaches *defining an amount of the body weight support to provide in response to the user falling during the gait training*—i.e., setting the system to provide full body weight support (inhibiting further vertical movement) when the system detects a fall. Ex-1008, ¶¶226-227.

f. Element 7[e]

7[e]	<i>maintaining the body weight support system in a substantially overhead position relative to the user as the user moves relative to a surface;</i>
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The limitations of Element 7[e] are largely the same as the limitations of Element 1[e], with the exception that Element 7[e] does not require a *drive*

assembly configured to move the body weight support system relative to the support track. Ex-1008, ¶¶229-230. Accordingly, Element 7[e] is broader than Element 1[e] and Erturk teaches 7[e] as detailed in Part V.B.2.f, above.

g. Element 7[f]

7[f]	<i>determining a fall has occurred based on the first criterion and the second criterion being satisfied; and</i>
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The combination of Erturk, Vector, and Stockmaster teaches Element 7[f]. Ex-1008, ¶231. As noted in Parts V.B.2.c-V.B.2.d, Stockmaster teaches a body weight support system that uses multiple criterion in combination (i.e., *a first criterion* and *a second criterion*) that are associated with a change in the length of the tether—the “Descent Limit,” the speed-based threshold, and/or other performance metrics (e.g., changes in strap angle). *See* Part V.B.2.c-V.B.2.d. Ex-1008, ¶¶232-233. Stockmaster explains that it is “also contemplated that **a combination of two or more detection options** may also be implemented in order to permit the system to detect other “fall scenarios.” Ex-1011, [0340]; Ex-1008, ¶¶233-234. Thus, a POSITA would have understood Stockmaster to disclose that its system could be configured so that falls could be detected based on two criteria being satisfied. *Id.*

Moreover, based on Stockmaster’s suggestion to use multiple criteria, together with Stockmaster’s recognition that “other system performance metrics

that could be used in fall detection,” a POSITA would have understood that Vector’s “fall limit value” criteria could also be used in combination with any of Stockmaster’s criteria. *See, e.g.,* Ex-1011, [0340]; Ex-1008, ¶234. Thus, even if Vector’s “fall limit value” is identified as the ***first criterion*** (see Element 7[b]) and Stockmaster’s speed-based threshold is identified as the ***second criterion*** (see Element 7[c]), the combination of Erturk, Vector, and Stockmaster teaches Element 7[f]. Ex-1008, ¶¶234-235.

h. Element 7[g]

7[g]	<i>providing the amount of body weight support in response to the first criterion and the second criterion being satisfied.</i>
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Erturk in view of Vector and further in view of Stockmaster teaches Element 7[g]. As discussed in Element 7[f], Stockmaster teaches detecting a fall when two or more criterion are both satisfied. *See* Part V.B.2.g. Further, as discussed in Element 7[d], Stockmaster teaches that, “[w]hen a fall is detected... further vertical movement in the downward direction is inhibited” such that the system bears the entire weight of the patient (***providing the amount of body weight support***) instead of just a partial amount of the patients weight. Ex-1011, [0338]-[0341]; Ex-1008, ¶237. Vector also teaches that, in response to detecting a fall, the “system locks the rope winch” and bears the entire weight of the user (***providing the amount of body weight support in response***). *See* Part V.B.2.e; Ex-1008, ¶238.

3. Claim 8

8	<i>The method of claim 7, wherein the first criterion is a rate of change in the length of the tether.</i>
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The combination of Erturk, Vector, and Stockmaster teaches the additional elements of claim 8. Ex-1008, ¶¶240-241.

As noted in connection with Element 7[b], Stockmaster’s “speed-based” criteria can be considered *the first criterion*. Not only is the Stockmaster’s “speed-based” criteria *associated with a rate of change in the length of the tether*, but it is a rate of change in the length of the tether. See Part V.B.2.c. When this *first criterion* is applied to Erturk’s BWS system, Stockmaster’s “speed-based” criteria corresponds to the rate at which the length of the tether is changing as a user’s speed of descent increases when they fall toward the ground. See, e.g., Ex-1009, [0126]-[0130] (monitoring the “feed rate of the tether”), [0140] (“the patient attachment mechanism... can be mated with... the tether). Ex-1008, ¶241.

C. Grounds 3: Obviousness over Erturk in view of Vector Guide, Stockmaster and Ranaan

Claims 9-11 of the ’316 Patent are invalid because they are obvious over the teachings of Erturk in view of Vector, Stockmaster, and Ranaan. Ex-1008, ¶¶248-258.

1. Motivation to Combine Erturk, Vector, Stockmaster, and Ranaan

A POSITA would have been motivated to combine Erturk, Vector, and Stockmaster for at least the reasons detailed in Part V.B.1, above. Moreover, as is set forth in the declaration of Dr. Reinkensmeyer, a POSITA would have been motivated to further modify the fall detection and prevention feature to utilize additional fall detection criteria taught in Ranaan. Ex-1008, ¶242.

First, as noted in Part V.A.1, Erturk includes an express teaching and suggestion that it would be desirable to include a fall detection and prevention feature such as the feature taught in Ranaan. *See* Part V.A.1. Based on these same express teachings/suggestions, a POSITA would have likewise been motivated to combine Ranaan's fall detection and prevention methods into Erturk's BWS system (both alone, and as modified by Vector and/or Stockmaster). Ex-1008, ¶243.

Second, a POSITA would have understood that combining the teachings of Erturk and Ranaan would have amounted to use of a known technique to improve a similar device in the same way. *KSR*, 550 U.S. at 417; Ex-1008, ¶244. Here, although Ranaan is not directed to a BWS system used for gait therapy specifically, it is directed to the same safety objectives, including primarily fall prevention, in an environment where a user is exercising while attached to a

protection belt that is fixed around a user's waist, similar to Erturk's harness. Ex-1012, Abstract, 7:13-18. Ranaan's technology uses "sensors" to detect changes in the person's height above the ground that are indicative of a fall. *See, e.g.*, Ex-1012, 2:2-4 ("[t]he device includes a processor, an acceleration sensor operatively attached to the processor"). This is similar to Erturk's BWS, which is equipped with "sensors" and "encoders" designed to collect the same type of data – "position," "velocity," "acceleration," etc. – to detect changes indicative of a fall. Ex-1009, [0062], [0130], [0150]-[0153].

Third, the combination of the fall detection feature of Ranaan with the BWS system of Erturk is a combination of known elements to achieve predictable results. *See KSR*, 550 U.S. at 416. Ex-1008, ¶245. The combination of the known elements from Ranaan's fall detection algorithm would only require minor software modifications to Erturk's BWS system, and would leverage data that Erturk's BWS system is already configured to capture via other sensors. *See* Ex-1009, [0062]; Ex-1008, ¶245. For the same reasons, a POSITA would have had a reasonable expectation of success in applying the fall detection algorithms of Ranaan to the BWS of Erturk. Ex-1008, ¶245.

Fourth, a POSITA would have been motivated to use Ranaan's multiple criteria based fall detection approach – including to test for "rapid" downward velocity, and the "continuity of velocity" for a minimum duration to confirm a fall

is actually occurring (*see* Ex-1012, 12:10-13, 3:9-15) – in order to enhance Erturk’s ability to distinguish between training exercises that include rapid descents (e.g., deep knee bends, sit-to-stand activities, jump squats, burpees, etc.), on the one hand, and fall scenarios where the patient’s descent continues for longer than would occur during such exercises, on the other. Ex-1008, ¶246. Ranaan itself suggests to a POSITA that detection of various fall scenarios can be enhanced by considering multiple criteria in combination. *See, e.g.*, Ex-1012, 6:6-7:2 (“the more... data points used prior to activation [of the fall prevention mechanism] the better is the reliability of determination of a true fall event and elimination of false positive events.”); Ex-1019, 12902-12921; Ex-1016, 1:30-41, 4:50-5:5, Fig. 34; Ex-1008, ¶246. Indeed, it was a well-known technique to a POSITA to use multiple criteria together – including measures of position/velocity over time – to detect falls. *See, e.g.*, Ex-1016, 4:50-5:5 (“if at any point the vertical height of the subject falls more than four inches or if their vertical speed moves faster than ten inches per second, the system automatically switches into a holding mode and prevents the subject from descending.”); *see also* 1:30-41, 4:50-5:5, Fig. 34; Ex-1019, 12902-12921; Ex-1018, Fig. 11B(1)-(2) (and related discussion); Ex-1008, ¶246.

Accordingly, a POSITA would have been motivated to combine the BWS system of Erturk with fall prevention features of Ranaan, and would have expected success in doing so. Ex-1008, ¶247.

2. Claims 9 & 10

9.	<i>The method of claim 7, wherein the second criterion is a duration during which the length of the tether is changed.</i>
10	<i>The method of claim 9, wherein the second criterion is a minimum duration.</i>

Claims 9 and 10 add related limitations to claim 7. For brevity, Petitioner addresses these limitations together. Ex-1008, ¶¶248-254. Ranaan teaches each of the additional elements of claims 2 and 3.

Claims 9 and 10 both further limit the *second criterion*. Viewing Stockmaster’s speed-based criteria as the *first criterion*, for the reasons stated in Part V.C.1, it would have been obvious to a POSITA to also consider *duration* of the speed criterion to distinguish between certain training exercises that include rapid descents, from fall scenarios where the patient’s descent continues for longer than would occur during such exercises. Ex-1008, ¶250.

Like Stockmaster, Raanan considers the patient’s “velocity towards ground V_z .” Ex-1012, 12:7-17, 12:10-13, 3:9-15; Ex-1008, ¶¶251-252. If that velocity meets or exceeds a “rapid” criterion, the system recognizes that a potential fall event may be occurring. *Id.* To confirm it is a true fall event, Ranaan considers the

duration over which the increased speed is occurring. Raanan discloses that a “continuity of velocity towards ground V_z ” measured “over time” (*a duration*) should be considered to confirm that the suspected fall is actually occurring, and to avoid false fall detections where the user is merely performing an intensive exercise. *See* Ex-1012, 12:10-13, 3:9-15 (a true fall event is not detected if the “decrease of the computed heights is followed by an increase in computed heights indicating that the user is exercising”); Ex-1008, ¶¶251-252. When Raanan’s technology is combined with Erturk’s system, and as an additional criterion to Stockmaster’s speed-based criterion, Raanan’s “continuity of velocity” criterion corresponds to *a duration during which the length of the tether is changed* in accordance with claim 9. Ex-1008, ¶¶251-252

Moreover, Ranaan specifies that the “continuity of velocity” is measured by taking a second velocity measurement that is “separated in time by at least 200 milliseconds” from the initial measurement. Ex-1008, ¶¶253-254. Because “at least 200 milliseconds” must pass between velocity samples, 200 milliseconds represents a *minimum duration* in accordance with claim 10. Ex-1012, 6:23-7:2, 11:18-12:17, 13:13-16; Ex-1008, ¶¶253-254.

3. Claim 11

11[a]	<i>The method of claim 7, wherein the first criterion is a rate of change in the length of the tether,</i>
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11[b]	<i>the second criterion is a duration during which the length of the tether is changed, and</i>
11[c]	<i>the amount of body weight support provided in response to the first criterion and the second criterion being satisfied is a first amount of body weight support, the method further comprising:</i>
11[d]	<i>providing a second amount of body weight support when at least one of the first criterion or the second criterion is not satisfied, the second amount of body weight support being less than the first amount of body weight support.</i>

The elements of limitations 11[a], 11[b], and 11[c] are the same as the elements of claim 8, claim 9, and Element 7[g], respectively. As such, the combination of Erturk, Vector, Stockmaster and Raanan teaches limitations 11[a], 11[b], and 11[c] as set forth above. *See* Parts V.B.3, V.C.2, V.B.2.h, Ex-1008, ¶256.

As to 11[d], Ranaan discloses that if the “continuity of velocity” – the *second criterion* for purposes of claims 9 and 10 – is not satisfied, and instead the “decrease of the computed heights is followed by an increase in computed heights indicating that the user is exercising,” Ranaan will not detect a fall nor attempt to prevent it. Ex-1012, 3:9-15; Ex-1008, ¶257. In that case, the combined system would not “lock[] the rope winch” (would not provide full body weight support) because it will not detect a fall event, and would instead continue providing the “dynamic” or “active” body weight support (some fractional percentage of the patient’s body weight, i.e., less than full support). Ex-1008, ¶257. Accordingly, the

combination of Erturk, Vector, Stockmaster and Raanan teaches limitations 11[d] and the entirety of claim 11. Ex-1008, ¶258.

VI. CONCLUSION

Based on the foregoing, Petitioner respectfully requests cancelation of Claims 1-5, 7-11 of the '316 Patent.

VII. MANDATORY NOTICES AND FEES

A. Real Party In Interest

The real party-in-interest is Aretech, LLC. Aretech, LLC has insurance through CFC Underwriting Limited, a coverholder associated with Lloyd's London (together, "Insurer"). Insurer may be responsible to reimburse or indemnify a portion of the defense costs including this Inter Partes Review. Insurer is disclosed here out of an abundance of caution only. Aretech, LLC alone directs and controls this Inter Partes Review proceeding (IPR).

B. Related Matters

The '316 Patent is the subject of the following civil actions and administrative proceedings:

- *Bioness Inc. v. Aretech, LLC*, No. 1:22-cv-00679-MSD-IDD (E.D. Va.).
- U.S. Application No. 17/188,714 (pending continuation of the '731 Application).

- European Application No. EP18753980.4A (foreign application related to the '731 Application)
- Japanese Application No. JP2019539192A (foreign application related to the '731 Application)
- Australian Application No. AU2018220931A (foreign application related to the '731 Application)
- Canadian Application No. CA3050322A (foreign application related to the '731 Application)

C. Lead and Backup Counsel

Pursuant to 37 C.F.R. §42.8(b)(3) and 42.10(a), Petitioner designates Robert Masters (Reg. No. 35,603) as lead counsel and Trevor Quist (Reg. No. 75,856) as back-up counsel, each of Sheppard, Mullin, Richter & Hampton LLP.

D. Service Information:

Petitioner consents to service by electronic mail addressed to:

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Petitioner's counsel may also be served by mail or hand delivery at Sheppard, Mullin, Richter & Hampton LLP, 2099 Pennsylvania Ave, Suite 100, NW Washington, DC 20006. Petitioner's counsel may be reached by telephone at (202) 747-1935 and by facsimile at (202) 747-3370.

E. Fees:

The Office is authorized to charge fees for this Petition to Deposit Account 50-4561, Ref. 69ZR-356929.

Dated: January 10, 2023

Respectfully submitted,

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CLAIM APPENDIX

1. A method of using a body weight support system to provide body weight support during gait training, the body weight support system including a drive assembly configured to movably suspend the body weight support system from a support track and a tether configured to be coupled to an attachment device worn by a user to couple the user to the body weight support system, the method comprising:

defining a reference length of the tether when the attachment device is in an initial position;

defining a threshold length of the tether;

providing a first amount of body weight support during the gait training as the user moves relative to a surface and the length of the tether is less than the threshold length of the tether;

providing a second amount of body weight support during the gait training as the user moves relative to the surface and the length of the tether is greater than the threshold length of the tether, the drive assembly configured to move the body weight support system relative to the support track to maintain the body weight support system in a substantially overhead position relative to the user as the user moves relative to the surface; and

displaying data associated with the gait training on a display of an electronic device included in the body weight support system.

2. The method of claim 1, wherein the length of the tether is increased in response to an increase in force exerted by the user on the tether.

3. The method of claim 2, wherein the increase in the force exerted by the user on the tether is associated with the user falling during the gait training.

4. The method of claim 1, wherein the surface relative to which the user moves is a stationary surface.

5. The method of claim 1, wherein the surface relative to which the user moves is a moving surface included in a treadmill.

6. The method of claim 5, wherein displaying the data associated with the gait training on the display includes displaying data associated with an operating condition of the body weight support system and an operating condition of the treadmill.

7. A method of using a body weight support system to provide body weight support during gait training, the body weight support system including a tether configured to be coupled to an attachment device worn by a user to couple the user to the body weight support system, the method comprising:

defining a reference length of the tether when the attachment device is in an initial position;

defining a first criterion associated with a change in a length of the tether;
defining a second criterion associated with a change in a length of the tether;
defining an amount of the body weight support to provide in response to the user falling during the gait training;
maintaining the body weight support system in a substantially overhead position relative to the user as the user moves relative to a surface;
determining a fall has occurred based on the first criterion and the second criterion being satisfied; and
providing the amount of body weight support in response to the first criterion and the second criterion being satisfied.

8. The method of claim 7, wherein the first criterion is a rate of change in the length of the tether.

9. The method of claim 7, wherein the second criterion is a duration during which the length of the tether is changed.

10. The method of claim 9, wherein the second criterion is a minimum duration.

11. The method of claim 7, wherein the first criterion is a rate of change in the length of the tether, the second criterion is a duration during which the length of the tether is changed, and the amount of body weight support provided in

response to the first criterion and the second criterion being satisfied is a first amount of body weight support, the method further comprising:

providing a second amount of body weight support when at least one of the first criterion or the second criterion is not satisfied, the second amount of body weight support being less than the first amount of body weight support.

12. The method of claim 7, further comprising:

redefining the reference length of the tether in response to a change in the length of the tether that does not satisfy at least one of the first criterion or the second criterion.

13. A method of using a body weight support system to provide body weight support during gait training, the body weight support system including tether configured to be coupled to an attachment device worn by a user to couple the user to the body weight support system, the method comprising:

defining a reference length of the tether when the attachment device is in an initial position;

defining a threshold length of the tether, the threshold length of the tether being associated with the user falling during the gait training;

defining a threshold number of falls during the gait training;

providing a predetermined amount of body weight support during the gait training as the user moves relative to a surface and the number of falls is less than the threshold number of falls;

increasing the predetermined amount of body weight support to be provided to the user during the gait training in response to the threshold number of falls being met; and

displaying data associated with the gait training on a display of an electronic device included in the body weight support system.

14. The method of claim 13, wherein the surface relative to which the user moves is a stationary surface.

15. The method of claim 14, wherein the body weight support system includes a drive assembly configured to movably suspend the body weight support system from a support track, the drive assembly configured to move the body weight support system relative to the support track in response to the user moving relative to the surface such that the body weight support system is maintained in a substantially overhead position relative to the user.

16. The method of claim 13, wherein the surface relative to which the user moves is a moving surface included in a treadmill.

17. The method of claim 16, wherein displaying the data associated with the gait training on the display includes displaying data associated with an operating

condition of the body weight support system and an operating condition of the treadmill.

18. The method of claim 13, wherein providing the predetermined amount of body weight support during the gait training as the user moves relative to the surface is in response to a length of the tether exceeding the threshold length of the tether.

19. The method of claim 13, wherein the reference length of the tether is a first reference length of the tether, the method further comprising:

defining a second reference length of the tether in response to the threshold number of falls being met, the second reference length of the tether being shorter than the first reference length of the tether.

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), Petitioner certify that this petition complies with the type-volume limitation of 14,000 words, includes 13,977 words, as measured by Microsoft Word, exclusive of the table of contents, table of authorities, mandatory notices under §42.8, certificates of service, word count, or appendix of exhibits.

Additionally, this petition complies with 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman.

Date: January 10, 2023

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that on January 10, 2023, true and correct copies of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,668,316 and Exhibits 1001-1030, 1035-1038 were served in entirety on the Patent Owner at the following addresses of record as listed in the Patent Center, via Priority Mail Express®:

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ATTN: IP Docketing Department
1299 Pennsylvania Avenue, NW
Suite 700, Washington, DC

BIONESS INC.
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The undersigned certifies that on January 10, 2023, true and correct copies of the Petition for *Inter Partes* Review of U.S. Patent No. 10,668,316 and Exhibits 1001-1030, 1035-1038 were also sent via electronic mail to the attorneys of record for Plaintiff in the concurrent litigation matter(s):

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