



US008264364B2

(12) **United States Patent**  
**Sprague**

(10) **Patent No.:** **US 8,264,364 B2**  
(45) **Date of Patent:** **Sep. 11, 2012**

(54) **PSYCHOPHYSIOLOGICAL TOUCH SCREEN  
STRESS ANALYZER**

(76) Inventor: **Phillip Roger Sprague**, San Diego, CA  
(US)

(\* ) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 347 days.

(21) Appl. No.: **12/206,703**

(22) Filed: **Sep. 8, 2008**

(65) **Prior Publication Data**

US 2010/0060461 A1 Mar. 11, 2010

(51) **Int. Cl.**  
**A61B 5/00** (2006.01)

(52) **U.S. Cl.** ..... **340/665; 600/301**

(58) **Field of Classification Search** ..... 340/573.1,  
340/665; 715/864; 600/301; 601/46, 48,  
601/49, 148, 152

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,855,416	A	12/1974	Fuller	
3,855,418	A	12/1974	Fuller	
4,600,807	A	7/1986	Kable	
5,564,433	A	10/1996	Thornton	
6,007,340	A *	12/1999	Morrel-Samuels	434/236
7,683,776	B2 *	3/2010	Glenn et al.	340/531
8,033,996	B2 *	10/2011	Behar	600/300
8,199,018	B2 *	6/2012	Shigetou	340/573.1
2006/0244732	A1 *	11/2006	Geaghan	345/173
2008/0009393	A1 *	1/2008	Glusco	482/8
2008/0195980	A1 *	8/2008	Morris	715/864
2008/0221401	A1 *	9/2008	Derchak et al.	600/301
2009/0281450	A1 *	11/2009	Reichow et al.	600/558
2009/0295545	A1 *	12/2009	O'Haire et al.	340/10.5

**OTHER PUBLICATIONS**

Jankovic J. Fahr S.: Physiologic and pathologic tremors. Diagnosis, mechanism, and management. *Ann Intern Med.* 1980;93:460-5. PMID 7001967.

M. Manto, M. Topping, M. SOede, J. Sanchez-Lacuesta, W. Harwin, J. Pons, J. Williams, S. Skaarup, L. Normie: Dynamically Responsive Intervention for Tremor Suppression *IEEE Engineering in Medicine and Biology Magazine*, 22-3, pp. 120-132, 2003.

E. Rocon, J.M. Belda-Lois, J. Sanchez-Lacuesta, J.L. Pons: Pathologica Tremor Management: modelling, compensatory technology and evaluation *Technology and Disability*, 16-, pp. 3-18, 2004.

E. Rocon, A.O. Andrade, J.L. Pons, P. Kyberd, S.J. Nasuot, EMD: A novel technique for the study of tremor time series, *Medical and Biological Engineering & Computing*, 44-7, pp. 569-582, 2006.

E Rocon, J.A. Miranda, J.L. Pons, TechFilter: Filtering undesired tremorous movements from PC mouse cursor *Journal of Technology and Disability*, 18-, pp. 3-8, 2006.

Rocon E. Belda-Louis JM, Ruiz AF, Manto M, Moreno JC, Pons JL: Design and Validation of a Rehabilitation Robotic Exoskeleton for Tremor Assessment and Suppression. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*. 2007;15(3):367-378.

M. Manto, E Rocon, J.L. Pons, J.M. Belda-Lois, S. Camut: Evaluation of a wearable orthosis and an associated algorithm for tremor suppression, *Physiological Measurement*, 28-,pp. 415-425, 2007.

(Continued)

*Primary Examiner* — Benjamin C Lee

*Assistant Examiner* — Sigmund Tang

(74) *Attorney, Agent, or Firm* — Patric J. Rawlins; Procopio Cory Hargreaves & Savitch LLP

(57) **ABSTRACT**

The Psychophysiological Touch Screen Stress Analyzer is capable of capturing information on how a person emotionally reacts to a series of verbal, visual, or written stimulus when the person touches the touch screen computer monitor in response to the stimulus.

**7 Claims, 2 Drawing Sheets**