



US009411428B2

(12) **United States Patent**
Simpkins et al.

(10) **Patent No.:** **US 9,411,428 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **3D POINTING DEVICES WITH KEYBOARDS**

(75) Inventors: **Daniel S. Simpkins**, Bethesda, MD (US); **Frank A. Hunleth**, Rockville, MD (US); **Kris Carter**, Arlington, VA (US)

(73) Assignee: **HILLCREST LABORATORIES, INC.**, Rockville, MD (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1969 days.

(21) Appl. No.: **11/700,507**

(22) Filed: **Jan. 31, 2007**

(65) **Prior Publication Data**
US 2007/0176896 A1 Aug. 2, 2007

Related U.S. Application Data

(60) Provisional application No. 60/763,620, filed on Jan. 31, 2006.

(51) **Int. Cl.**
G06F 3/033 (2013.01)
G06F 3/023 (2006.01)
G06F 3/02 (2006.01)
G06F 3/0346 (2013.01)
G06F 3/038 (2013.01)
H04N 5/44 (2011.01)
H04N 21/422 (2011.01)

(52) **U.S. Cl.**
CPC **G06F 3/0231** (2013.01); **G06F 3/0213** (2013.01); **G06F 3/0346** (2013.01); **G06F 3/0383** (2013.01); **H04N 5/4403** (2013.01); **H04N 21/42214** (2013.01); **H04N 21/42222** (2013.01)

(58) **Field of Classification Search**

CPC G06F 3/0213
USPC 345/157
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,440,326 A	8/1995	Quinn	
5,491,784 A *	2/1996	Douglas	G06F 3/0481 715/776
6,038,614 A *	3/2000	Chan et al.	710/1
7,239,301 B2	7/2007	Liberty et al.	
2001/0002126 A1	5/2001	Rosenberg et al.	
2004/0135819 A1 *	7/2004	Maa	G06F 3/0481 715/840
2004/0263479 A1 *	12/2004	Shkolnikov	345/169
2004/0268393 A1	12/2004	Hunleth et al.	
2005/0104867 A1	5/2005	Westerman et al.	
2005/0219213 A1	10/2005	Cho et al.	

OTHER PUBLICATIONS

International Search Report for PCT/US07/02622 mailed Feb. 7, 2008.
Written Opinion for PCT/US07/02622 mailed Feb. 7, 2008.

* cited by examiner

Primary Examiner — Towfiq Elahi
(74) *Attorney, Agent, or Firm* — Patent Portfolio Builders PLLC

(57) **ABSTRACT**

A 3D pointing device includes a keyboard for character entry. In pointing mode, data from at least one motion sensor is provided, e.g., to be transmitted to a user interface for movement of a cursor. In text entry mode, data from at least one depressed key is provided, e.g., to be transmitted to a user interface for display thereon.

5 Claims, 6 Drawing Sheets

