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(54) Title: INPUT DEVICE WITH FORCE SENSING AND HAPTIC RESPONSE

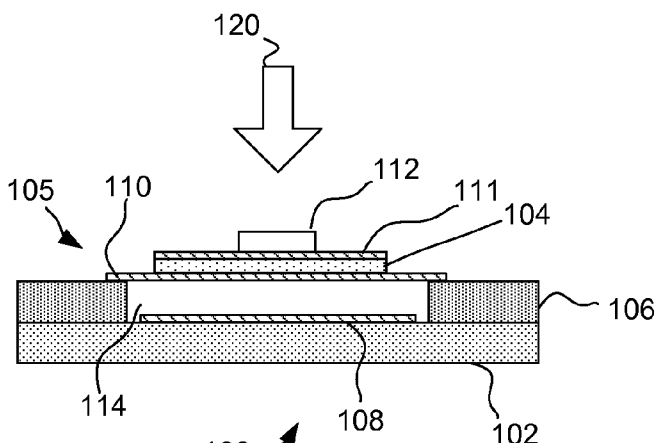


FIG. 1A

(57) Abstract: Devices and methods are provided that facilitate improved input device performance. The devices and methods utilize a first electrode disposed on a first substrate, a second electrode coupled to a first side of a piezoelectric material and a third electrode coupled to a second side of the piezoelectric material. The second electrode and the third electrode are configured to facilitate actuation of the piezoelectric material, while the first electrode and the second electrode define at least part of a variable capacitance that facilitates force determination. A spacing element is coupled to the first substrate and defines a spacing between the first electrode and the second electrode. A transmission element is coupled to the third electrode and configured such that a force biasing the transmission element causes the second electrode to deflect relative to the first electrode, thus changing the variable capacitance.



A. CLASSIFICATION OF SUBJECT MATTER**G06F 3/01(2006.01)i, G06F 3/044(2006.01)i, H02N 2/00(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06F 3/01; G06F 3/044; H01L 23/34; A61B 8/14; H02N 2/00; G09G 5/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: (capacitance, capacitor), (force, pressure), (detect, measure), (piezoelectric), (tactile, haptic)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007-0046642 A1 (LEE DONG_WON et al.) 01 March 2007 See Abstract, Claims 1,6,7, Paragraphs [0035]-[0050], Fig. 1.	1-21
A	US 2010-0149128 A1 (NO SANG-YONG et al.) 17 June 2010 See Abstract, Claims 2,6, Paragraphs [0045]-[0106], Figs. 3,5	1-21
A	US 2009-0001853 A1 (ADACHI HIDEO et al.) 01 January 2009 See Abstract, Claims 1,4, Paragraphs [0088]-[0097], Line 21, Fig. 1	1-21
A	US 2006-0065973 A1 (WILLIAM D. DALLENBACH et al.) 30 March 2006 See Abstract, Claims 2,7, Paragraphs [0026]-[0027], Fig. 2a	1-21



Further documents are listed in the continuation of Box C.



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