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(54) **INTERACTIVE APPARATUSES WITH TACTILEY ENHANCED VISUAL IMAGING CAPABILITY AND RELATED METHODS**

(75) Inventor: **Satoshi Nakajima**, Redmond, WA (US)

(73) Assignee: **UIEvolution, Inc.**, Bellevue, WA (US)

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(58) **Field of Classification Search** 345/173–174, 345/702; 200/521, 571; 340/825.19, 825; 715/702

See application file for complete search history.

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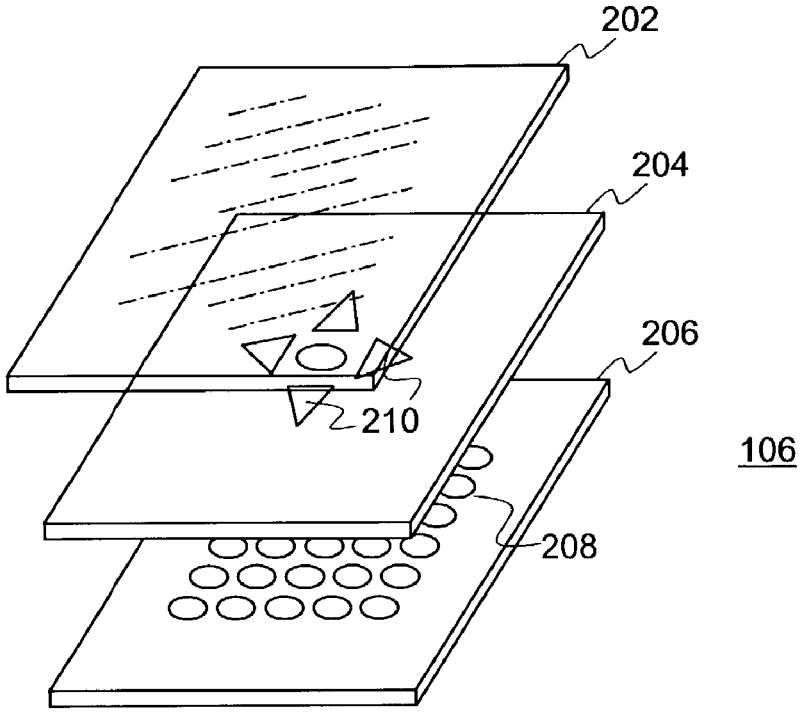
Primary Examiner—Richard Hjerpe
Assistant Examiner—Leonid Shapiro
(74) *Attorney, Agent, or Firm*—Schwabe, Williamson & Wyatt, P.C.

(57) **ABSTRACT**

An interactive apparatus is provided with a display, on which tactilely enhanced (TE) visual images may be rendered, to temporally realize a wide range of user input keys and/or user selectable menu/list items. In one embodiment, the display includes a flexible visual display layer and a tactile display layer, and the apparatus includes corresponding device drivers for controlling rendering on the respective layers. In one embodiment, the apparatus is further provided with graphics functions, which generate in response to a request to render a TE visual image, pixel and piston data of the TE visual image, in accordance with an image specification of the TE visual image, having tactile attributes of the tactile enhancements.

39 Claims, 13 Drawing Sheets