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Gillespie et al.

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[54] **OBJECT POSITION DETECTOR WITH EDGE MOTION FEATURE AND GESTURE RECOGNITION**

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Timothy P. Allen, Los Gatos; **Ralph C. Wolf**, Santa Clara; **Shawn P. Day**, San Jose, all of Calif.

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[21] Appl. No.: **623,483**

[22] Filed: **Mar. 28, 1996**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 320,158, Oct. 7, 1994, Pat. No. 5,543,591, which is a continuation-in-part of Ser. No. 300,387, Sep. 2, 1994, abandoned, which is a continuation-in-part of Ser. No. 115,743, Aug. 31, 1993, Pat. No. 5,374,787, which is a continuation-in-part of Ser. No. 895,934, Jun. 8, 1992, abandoned.

[51] **Int. Cl.**⁶ **G08C 21/00**; G09G 5/08; G09G 5/00

[52] **U.S. Cl.** **178/18.01**; 178/19.01; 345/157; 345/159; 345/173

[58] **Field of Search** 178/18.01, 19.01, 178/20.01; 345/157, 159, 160, 173, 174; 382/119, 186, 187, 316

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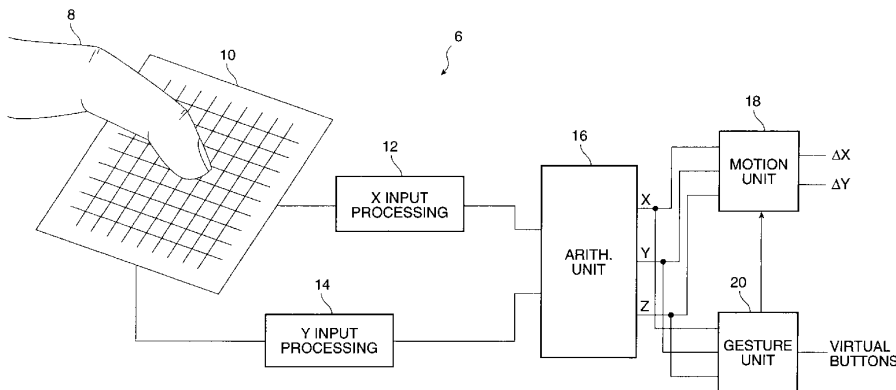
Primary Examiner—Vijay Shankar

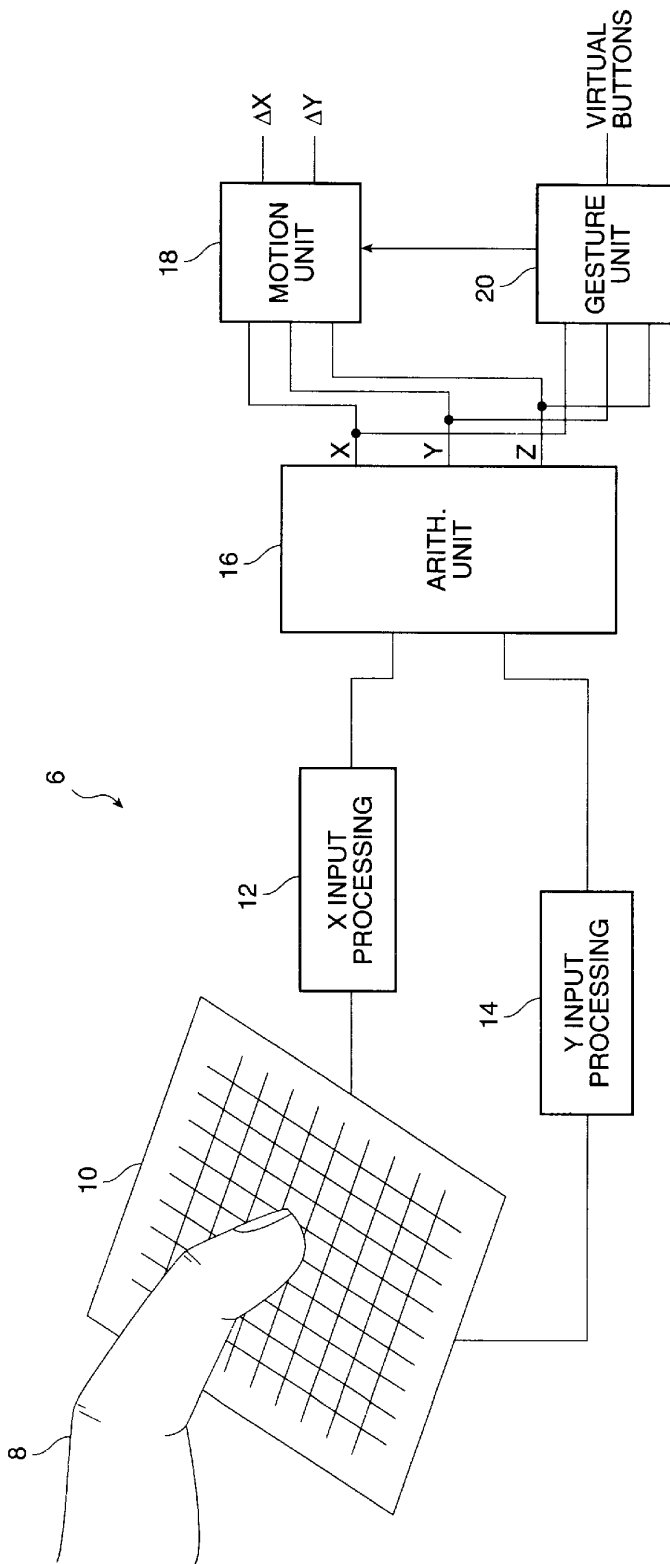
Attorney, Agent, or Firm—D’Alessandro & Ritchie

[57] **ABSTRACT**

Methods for recognizing gestures made by a conductive object on a touch-sensor pad and for cursor motion are disclosed. Tapping, drags, pushes, extended drags and variable drags gestures are recognized by analyzing the position, pressure, and movement of the conductive object on the sensor pad during the time of a suspected gesture, and signals are sent to a host indicating the occurrence of these gestures. Signals indicating the position of a conductive object and distinguishing between the peripheral portion and an inner portion of the touch-sensor pad are also sent to the host.

64 Claims, 28 Drawing Sheets





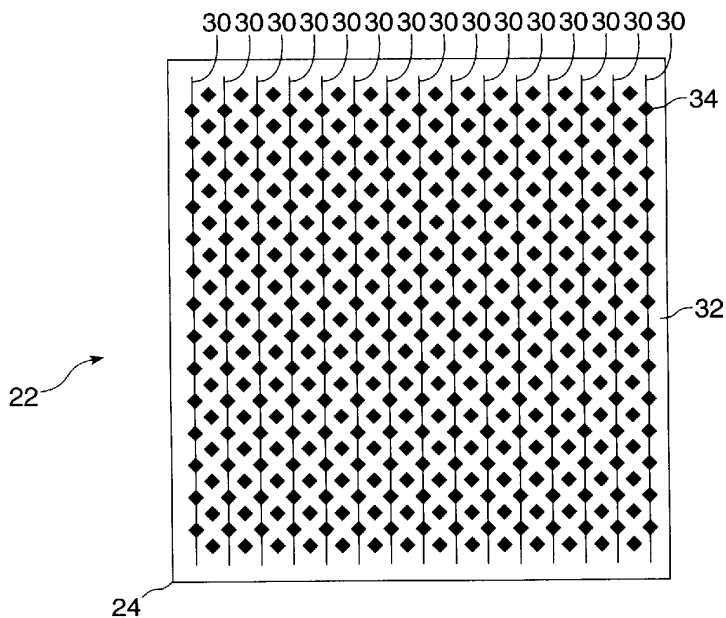


FIG. 2A

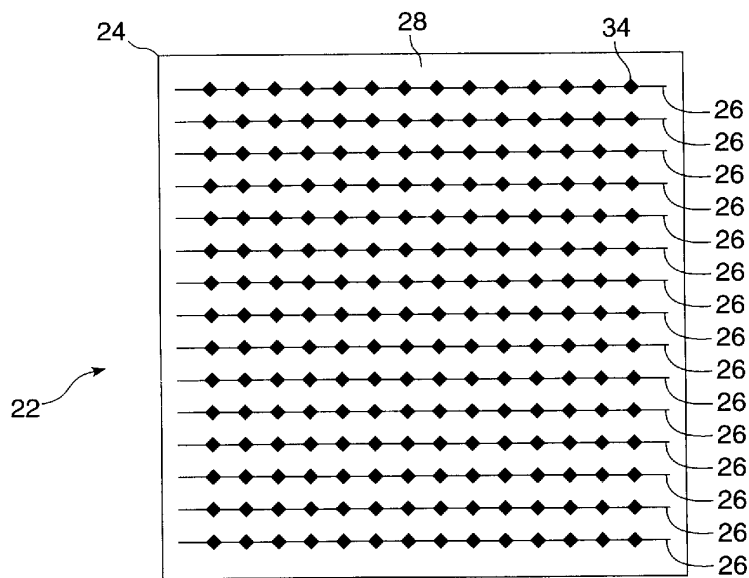


FIG. 2B

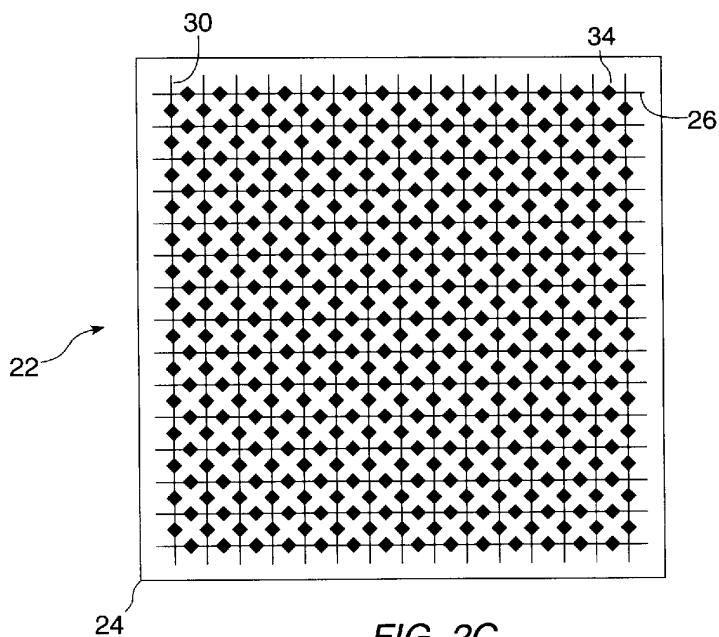


FIG. 2C

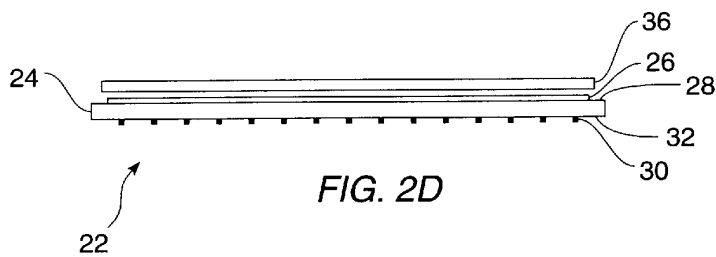


FIG. 2D

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