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# United States Patent [19]

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**Gillespie et al.**

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

[75] Inventors: **David W. Gillespie**, Palo Alto; **Timothy P. Allen**, Los Gatos; **Ralph C. Wolf**, Santa Clara; **Shawn P. Day**, San Jose, all of Calif.

[73] Assignee: **Synaptics, Incorporated**, San Jose, Calif.

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### Related U.S. Application Data

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[51] Int. Cl.<sup>6</sup> ..... **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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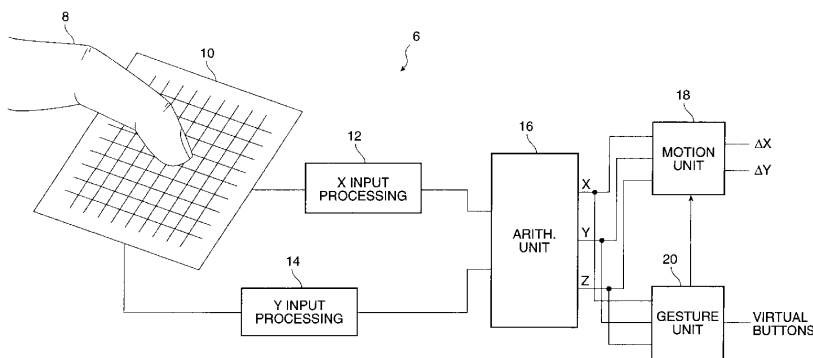
Primary Examiner—Vijay Shankar

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

### 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**



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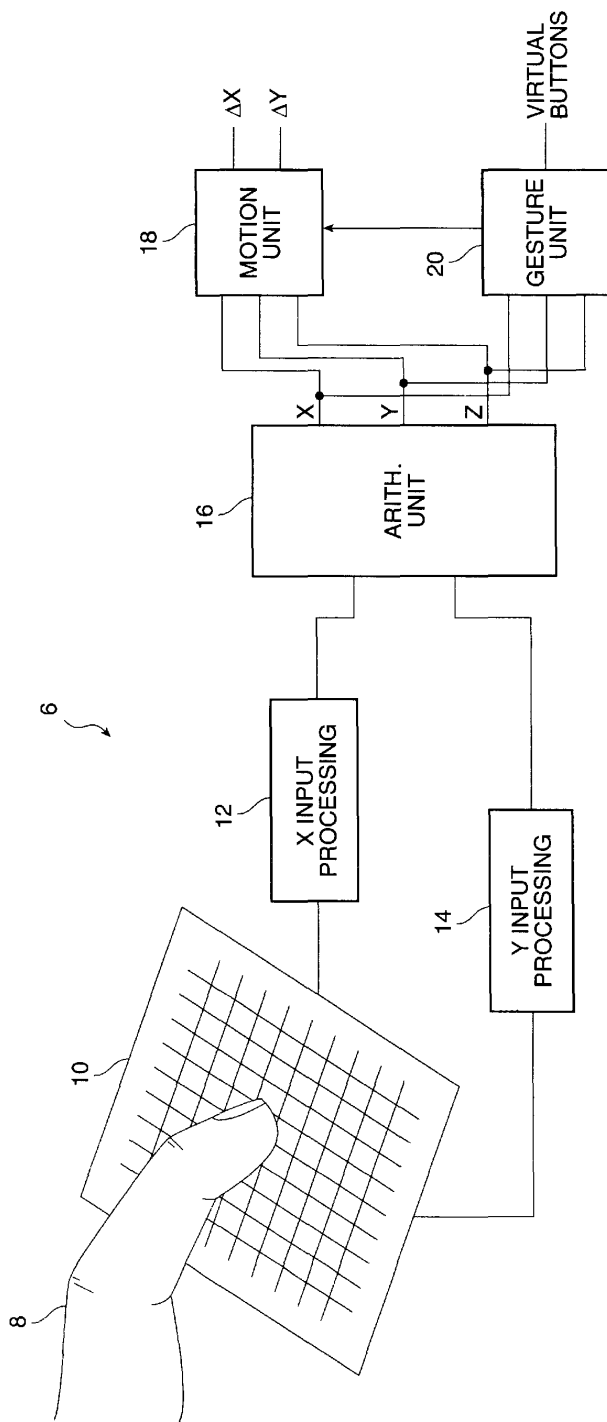


FIG. 1

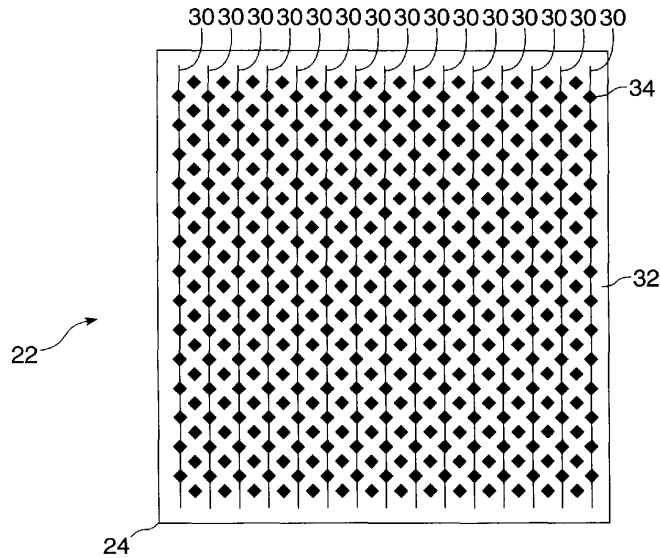


FIG. 2A

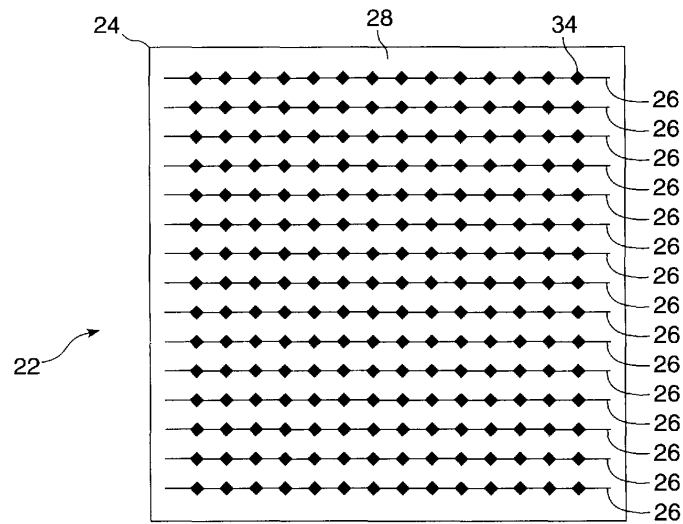


FIG. 2B

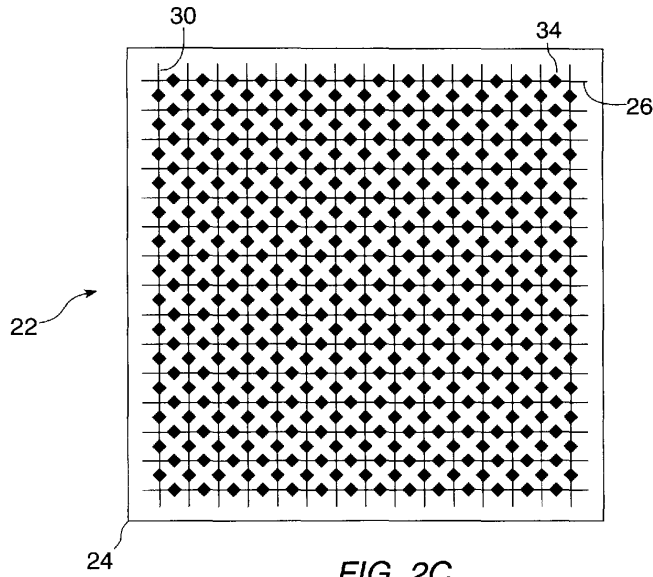


FIG. 2C

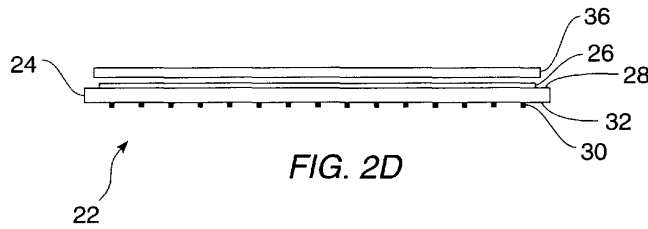


FIG. 2D

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