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United States Patent [19]

Gillespie et al.

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[45] Date of Patent: **Aug. 6, 1996**

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

[75] Inventors: **David Gillespie**, Palo Alto; **Timothy P. Allen**, Los Gatos; **Ralph Wolf**, Palo Alto, all of Calif.

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

4,148,014	4/1979	Burson	340/709
4,198,539	4/1980	Pepper, Jr.	178/18
4,293,734	10/1981	Pepper, Jr.	178/18
4,302,011	11/1982	Pepper, Jr.	273/85
4,313,113	1/1982	Thornburg	340/709
4,371,746	2/1983	Pepper, Jr.	178/18
4,430,917	2/1984	Pepper, Jr.	84/1.01
4,511,760	4/1985	Garwin et al.	178/18
4,734,685	3/1988	Watanabe	340/710
4,766,423	8/1988	Ono et al.	340/709
4,918,262	4/1990	Flowers et al.	178/18
4,988,982	1/1991	Rayner et al.	345/173

[21] Appl. No.: **320,158**

[22] Filed: **Oct. 7, 1994**

FOREIGN PATENT DOCUMENTS

2139762 11/1984 United Kingdom G06F 3/033

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 300,387, Sep. 2, 1994, which is a continuation-in-part of Ser. No. 115,743, Aug. 31, 1993, Pat. No. 5,734,787, which is a continuation-in-part of Ser. No. 895,934, Jun. 8, 1992.

[51] **Int. Cl.⁶** **G08C 21/00**
 [52] **U.S. Cl.** **178/18; 341/33**
 [58] **Field of Search** **345/173, 174; 178/18; 382/3, 13**

Primary Examiner—Stephen Chin
Assistant Examiner—Kevin Kim
Attorney, Agent, or Firm—D'Alessandro & Ritchie

[57] ABSTRACT

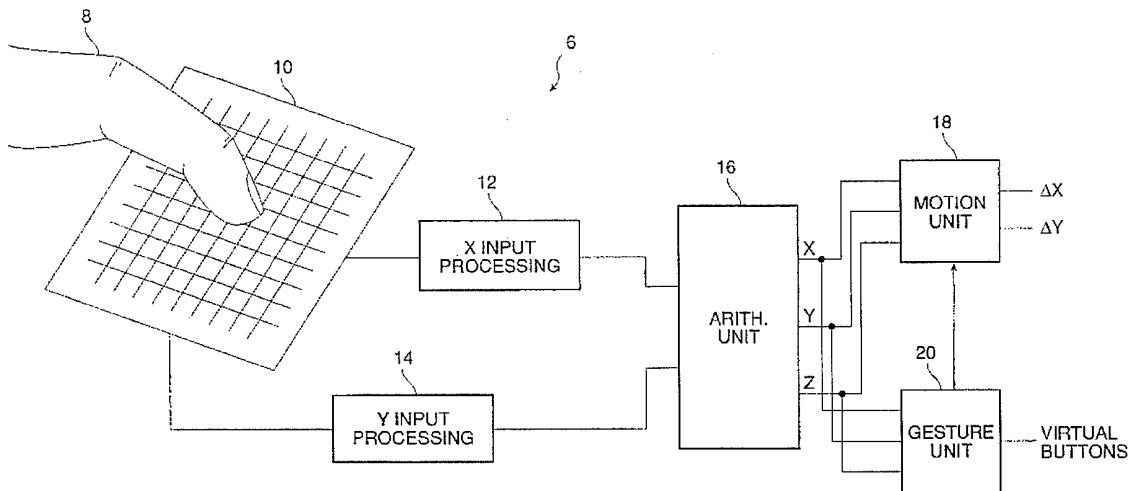
Methods for recognizing gestures made by a conductive object on a touch-sensor pad are disclosed. Tapping, pushing, hopping, and zigzag gestures are recognized by analyzing the position, pressure, and movement of the conductive object on the sensor pad during the time of a suspected gesture, and signals are sent to a host indicating the occurrence of these gestures. Signals for compensating for unintended motion of the conductive object on the touch-sensor pad during the gestures are also sent to the host.

[56] References Cited

U.S. PATENT DOCUMENTS

4,071,691 1/1978 Pepper, Jr. 178/19
 4,129,747 12/1978 Pepper, Jr. 178/19

11 Claims, 26 Drawing Sheets



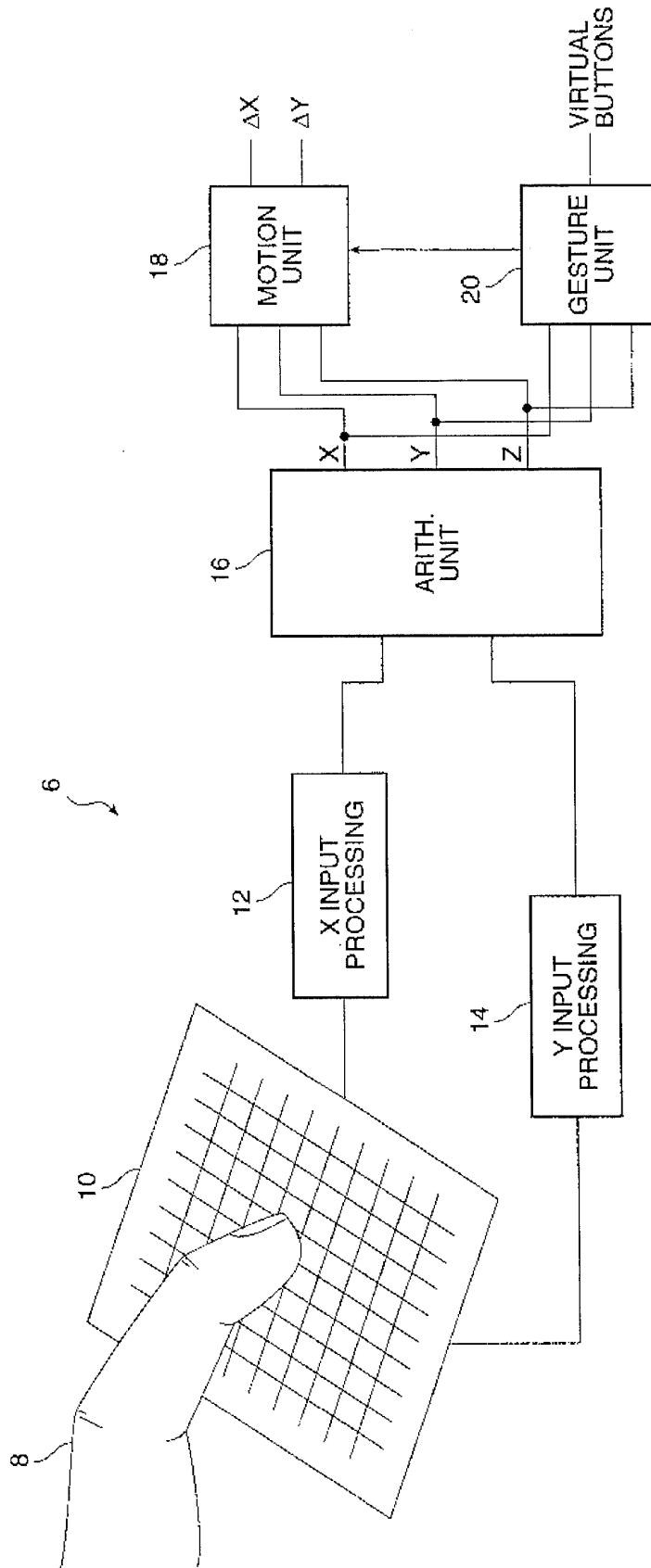


FIG. 1

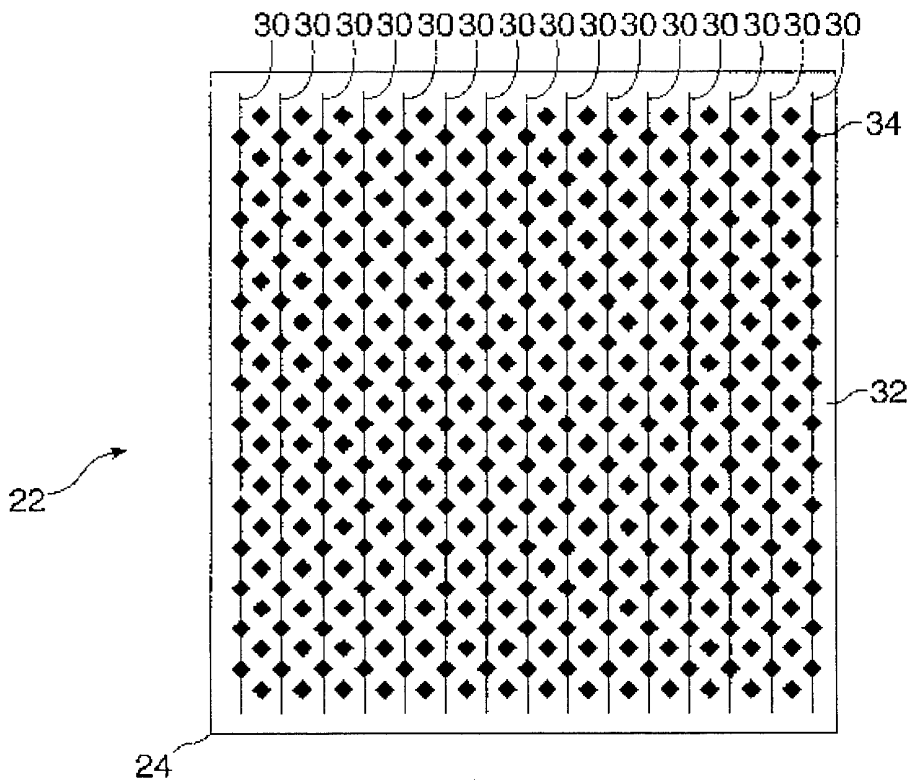


FIG. 2A

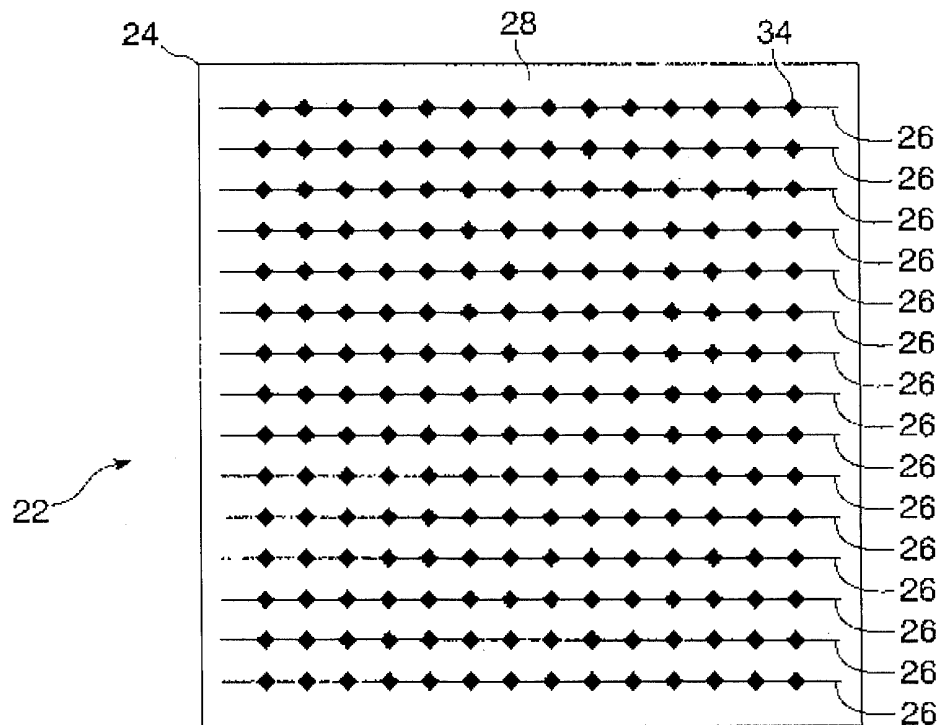


FIG. 2B

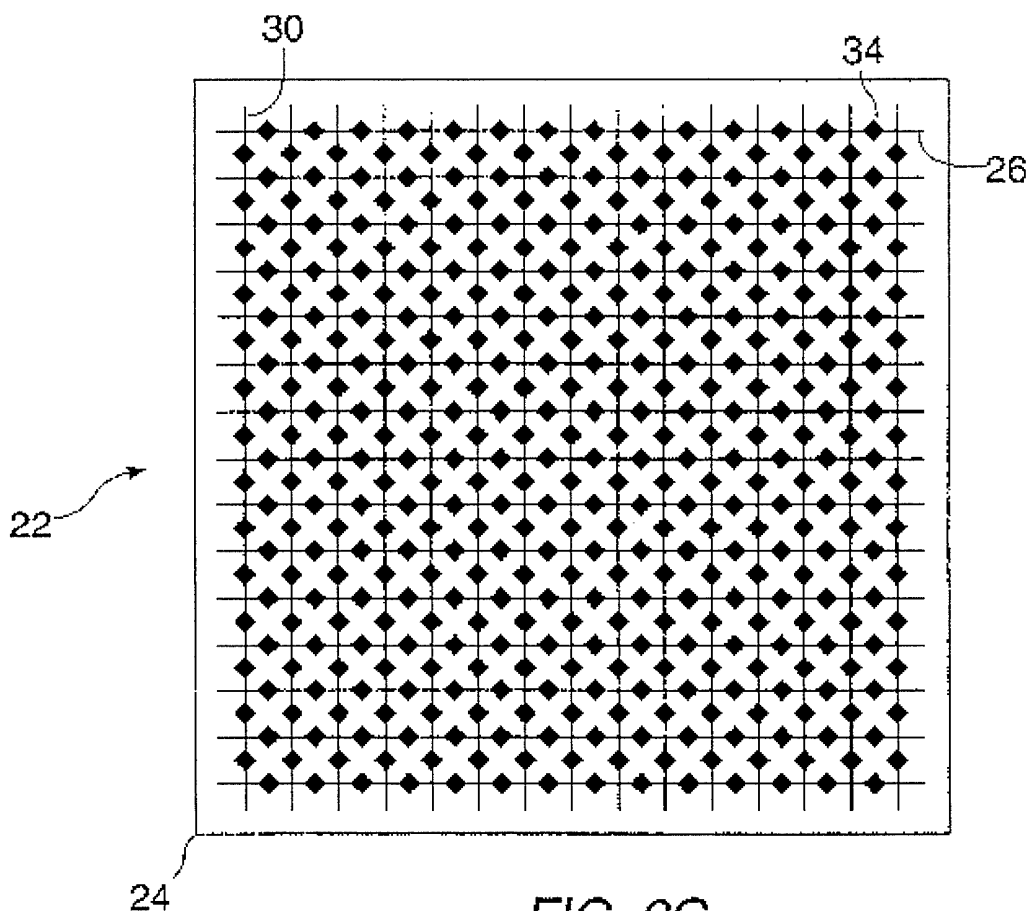


FIG. 2C

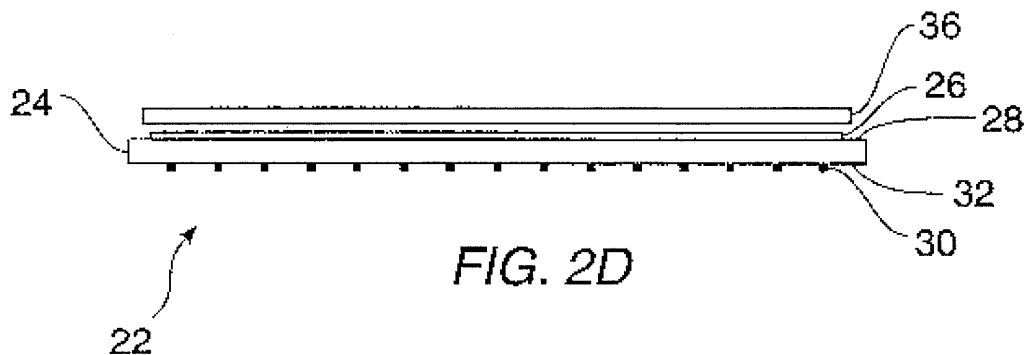


FIG. 2D

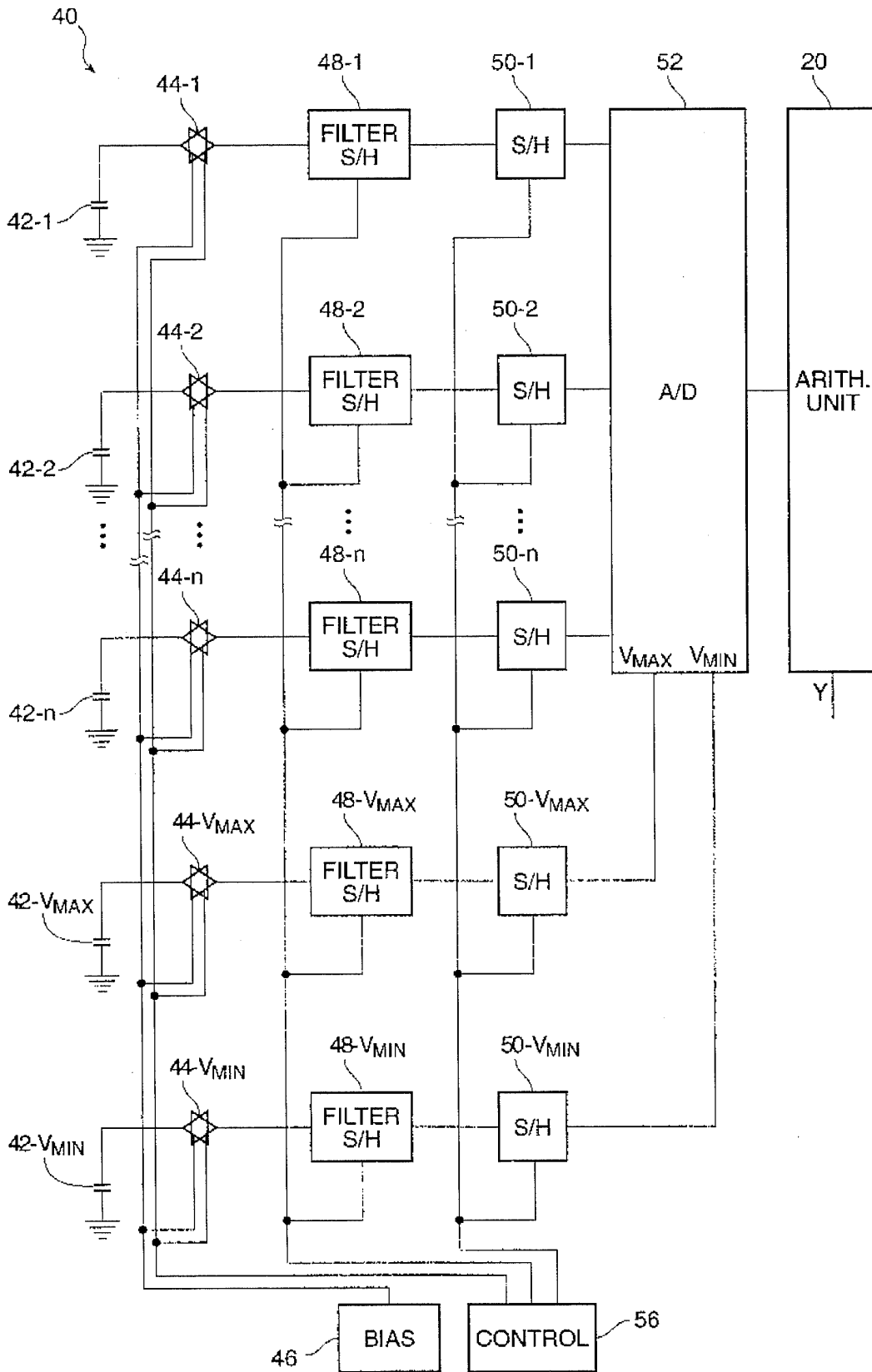


FIG. 3

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