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United States Patent [19]

[11] **Patent Number:** 5,543,590

Gillespie et al.

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

[54] **OBJECT POSITION DETECTOR WITH EDGE MOTION FEATURE**

5,194,862 3/1993 Edwards 341/20
5,327,161 7/1994 Logan et al. 345/157

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[57] ABSTRACT

[21] Appl. No.: **300,630**

A proximity sensor system includes a sensor matrix array having a characteristic capacitance on horizontal and vertical conductors connected to sensor pads. The capacitance changes as a function of the proximity of an object or objects to the sensor matrix. The change in capacitance of each node in both the X and Y directions of the matrix due to the approach of an object is converted to a set of voltages in the X and Y directions. These voltages are processed by circuitry to develop electrical signals representative of the centroid of the profile of the object, i.e., its position in the X and Y dimensions. Noise reduction and background level setting techniques inherently available in the architecture are employed.

[22] Filed: **Sep. 2, 1994**

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. 5,374,787, which is a continuation-in-part of Ser. No. 895,934, Jun. 8, 1992, abandoned.

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

[52] U.S. Cl. **178/18; 345/174; 341/33**

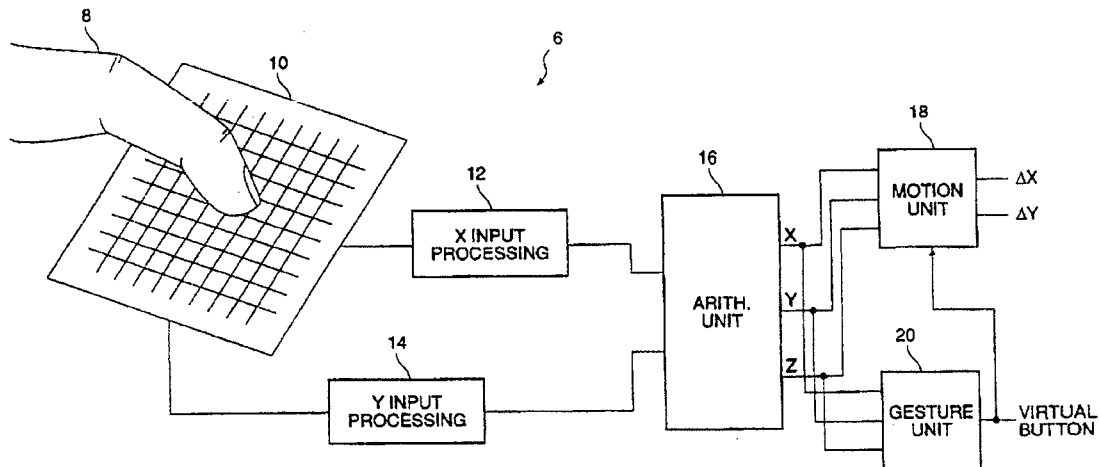
[58] **Field of Search** 178/18, 19; 341/33, 341/34; 345/173, 174

[56] References Cited

U.S. PATENT DOCUMENTS

4,935,728 6/1990 Kley 340/709

13 Claims, 15 Drawing Sheets



**Wintek Exhibit 1023
Wintek v. TPK
IPR2013-00567
IPR2014-00541**

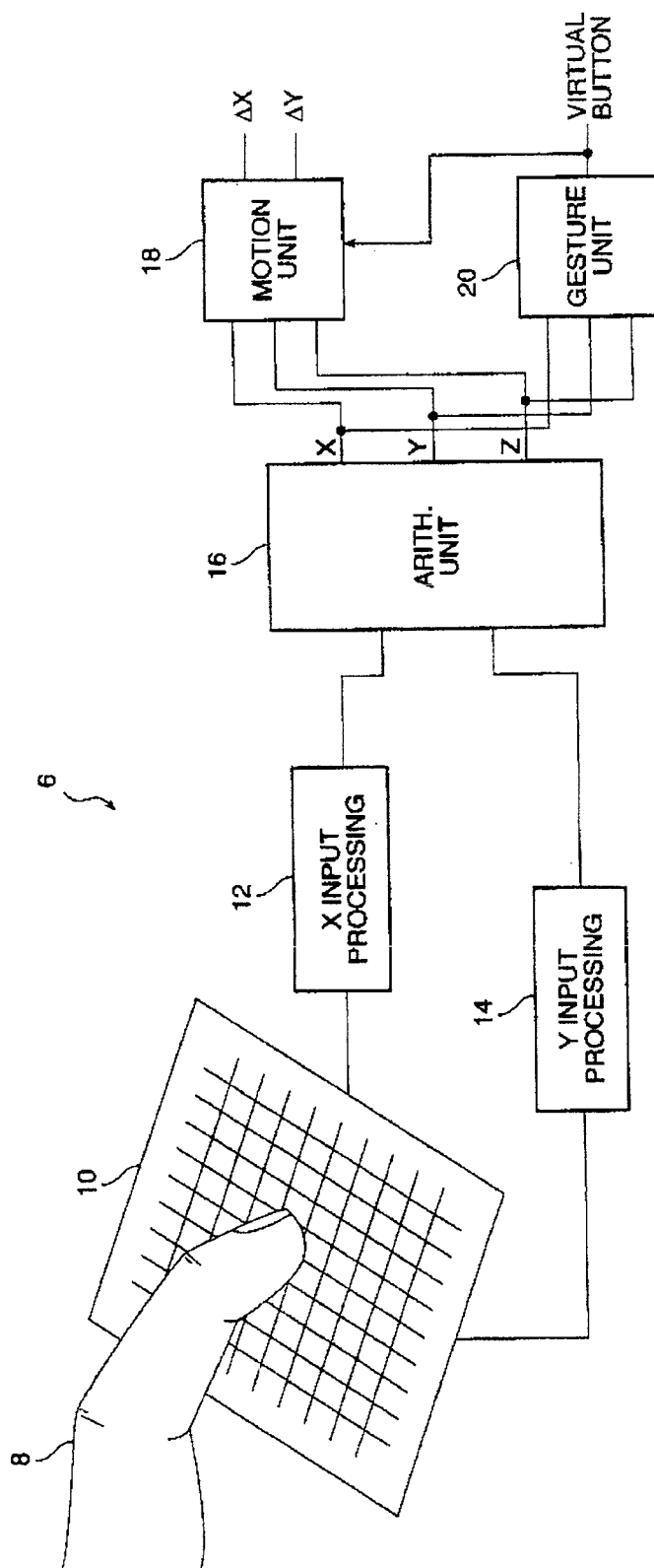


FIG. 1

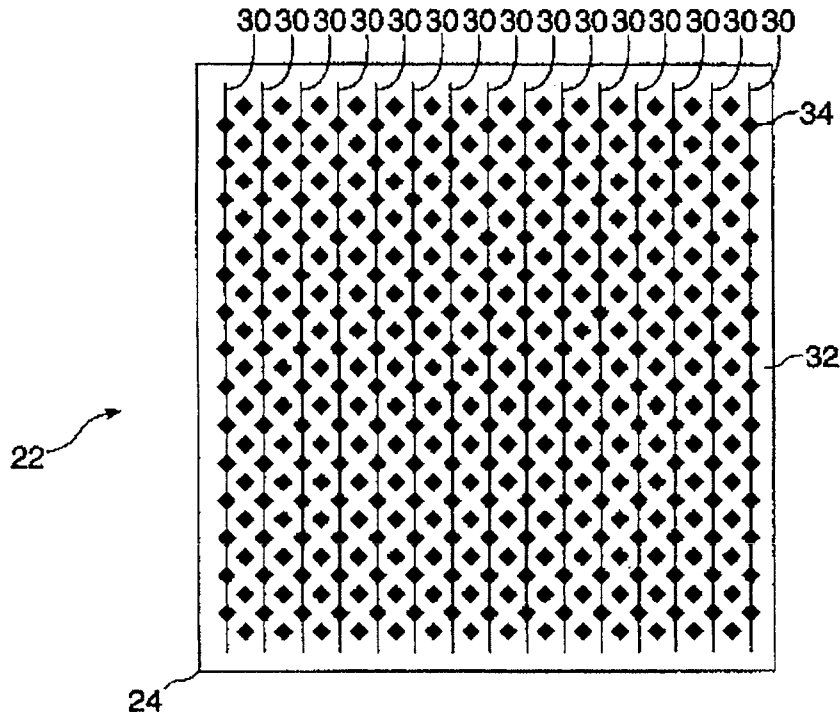


FIG. 2A

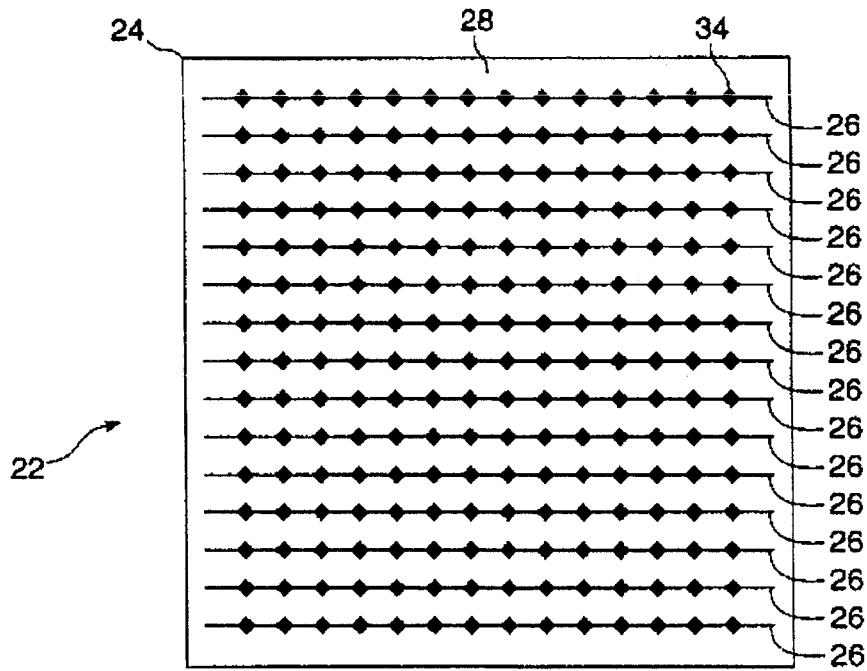


FIG. 2B

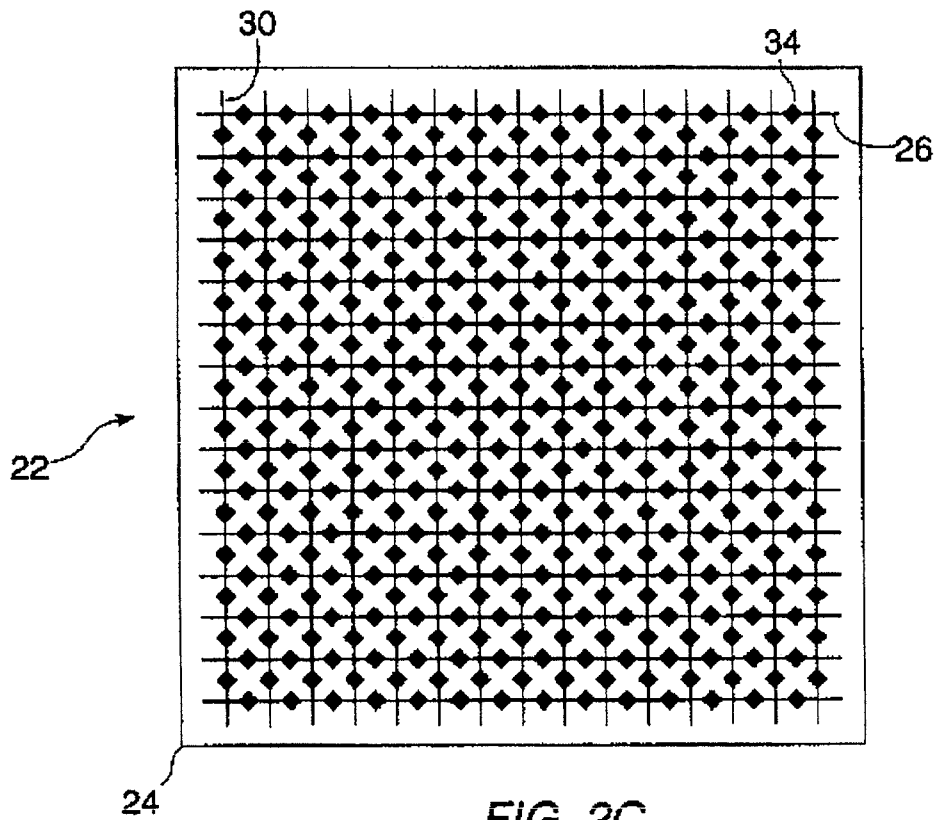


FIG. 2C

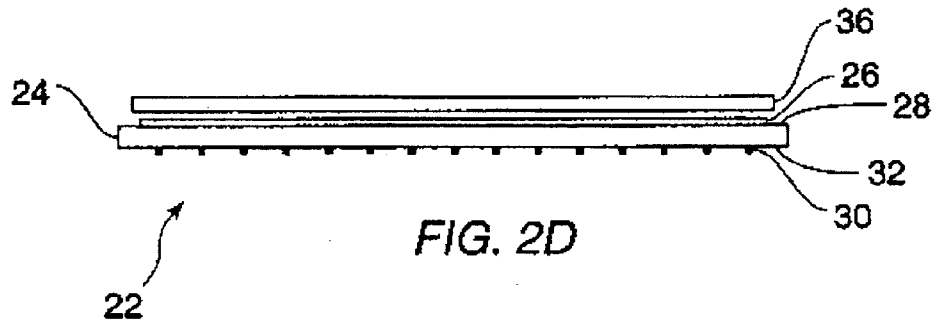


FIG. 2D

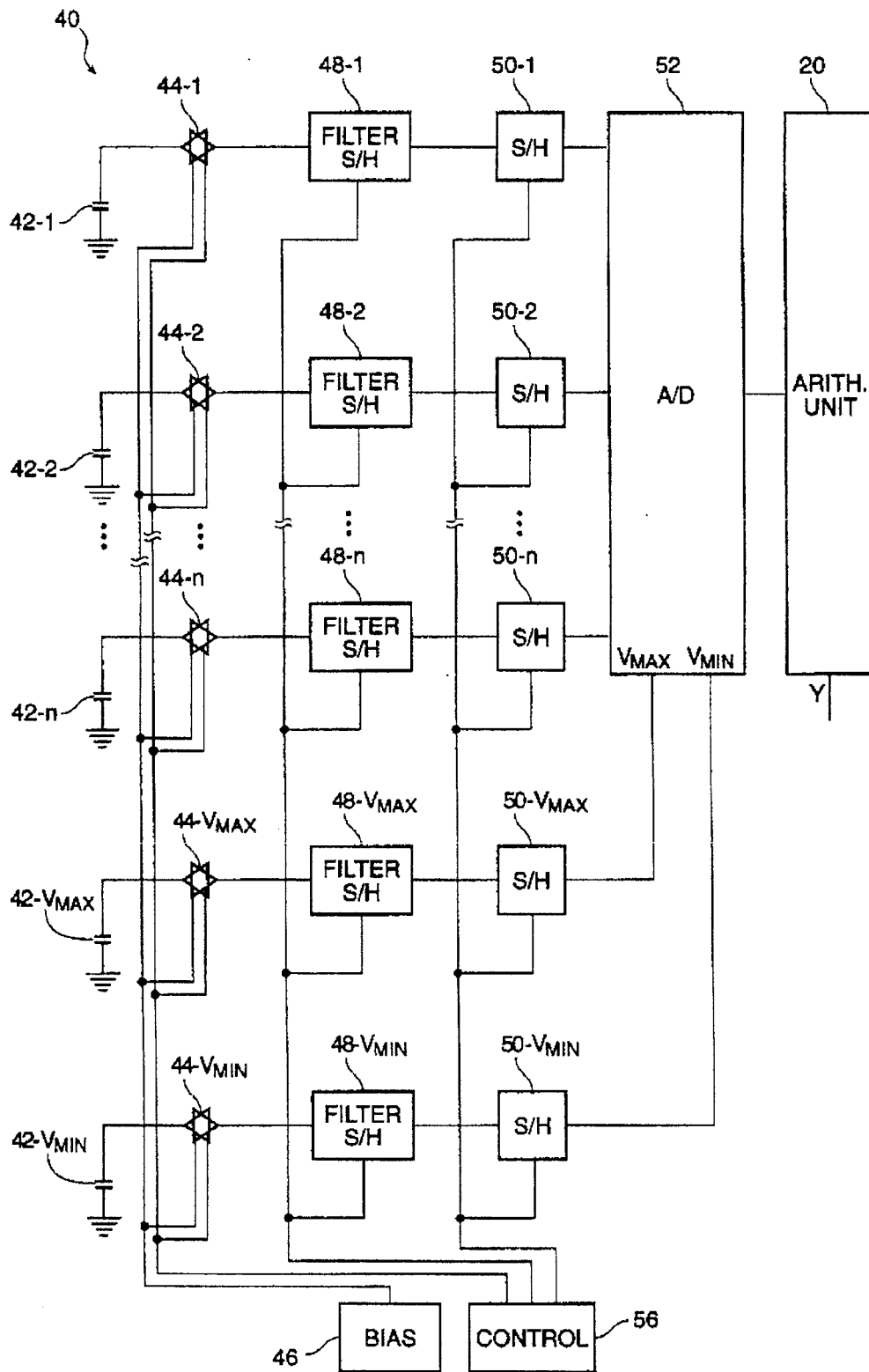


FIG. 3

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