



# United States Patent [19]

[11] **Patent Number:** 6,145,389

**Ebeling et al.**

[45] **Date of Patent:** Nov. 14, 2000

[54] **PEDOMETER EFFECTIVE FOR BOTH WALKING AND RUNNING**

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[57] **ABSTRACT**

A pedometer is disclosed that accurately calculates the length of the strides taken by a user when walking and running. The length of each stride is calculated using measurements of the acceleration of the wearer's foot during each stride. This acceleration is measured by an accelerometer attached either directly or indirectly to the wearer's foot. The calculation of the stride length is performed by a data processor which analyzes the accelerations of the foot as measured by the accelerometer. The acceleration values for each stride are identified, and these are used in conjunction with a set of coefficients to calculate the length of each stride. These coefficients are determined for each user by means of a calibration process during which the pedometer measures the characteristics of the wearer's stride for a variety of different walking and running speeds. Since the length of each stride is calculated independently, the user can change walking and running speeds and gaits without affecting the accuracy of the distance calculation.

[21] Appl. No.: **08/970,174**

[22] Filed: **Nov. 13, 1997**

**Related U.S. Application Data**

[60] Provisional application No. 60/030,743, Nov. 12, 1996.

[51] **Int. Cl.<sup>7</sup>** ..... **A61B 5/00**

[52] **U.S. Cl.** ..... **73/865.4; 73/865.4**

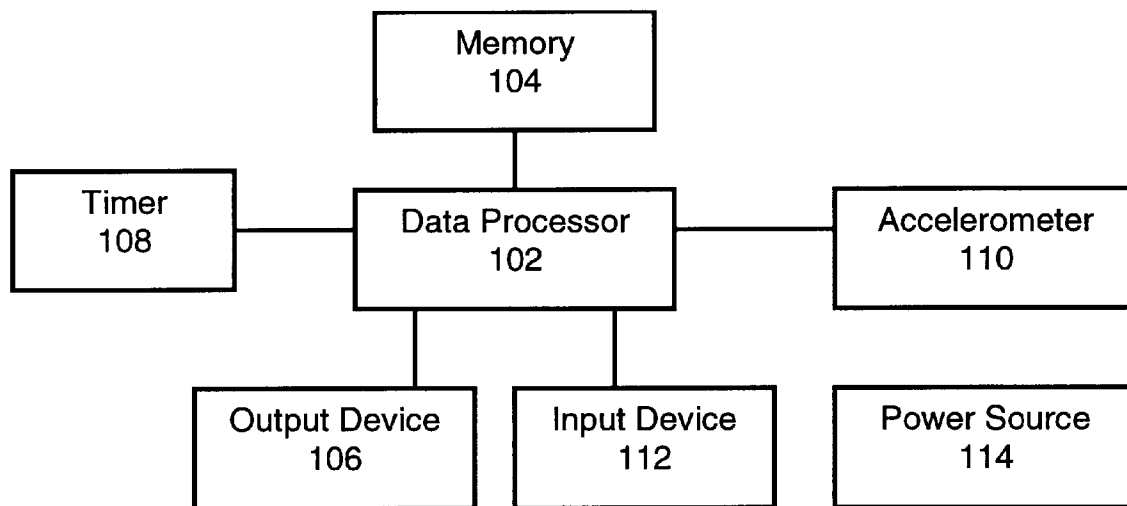
[58] **Field of Search** ..... **73/865.4; 364/565, 364/569, 566, 561**

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**12 Claims, 6 Drawing Sheets**



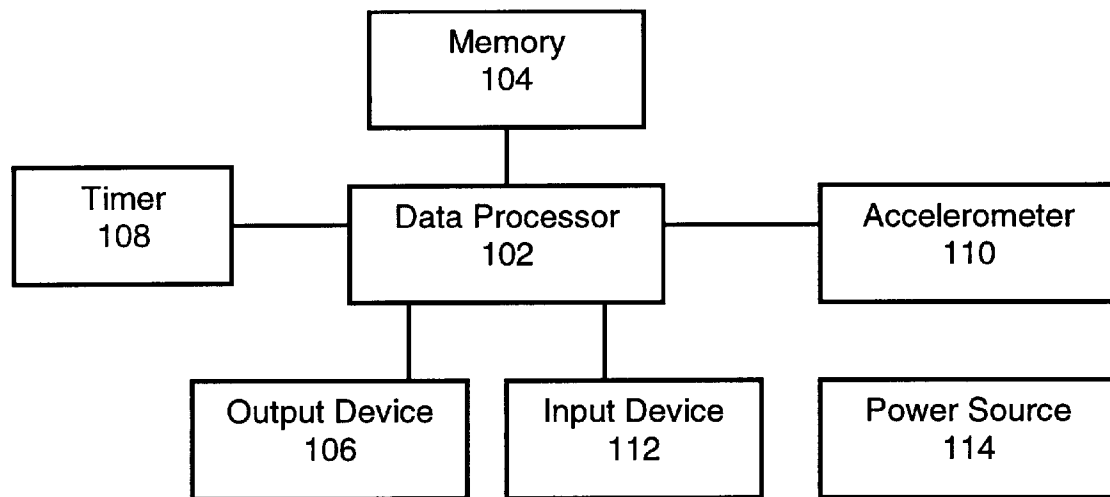


Fig. 1

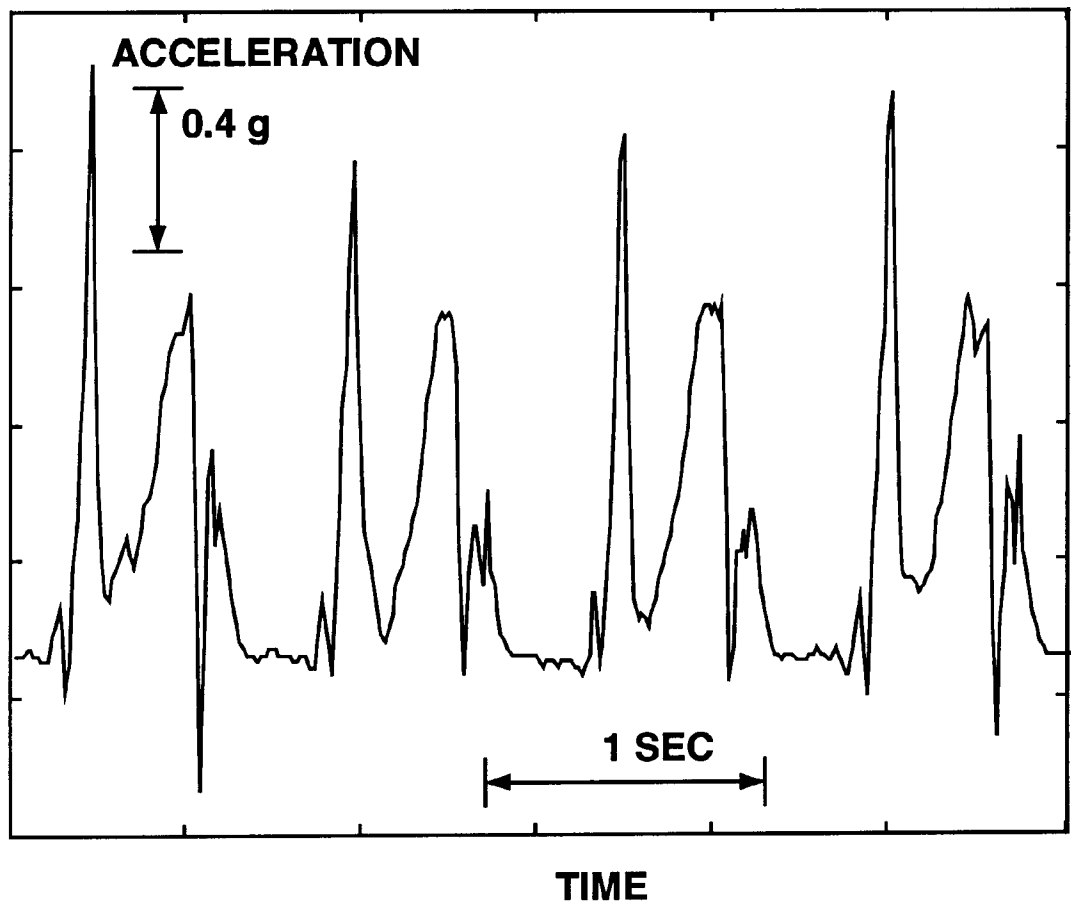


Fig. 2

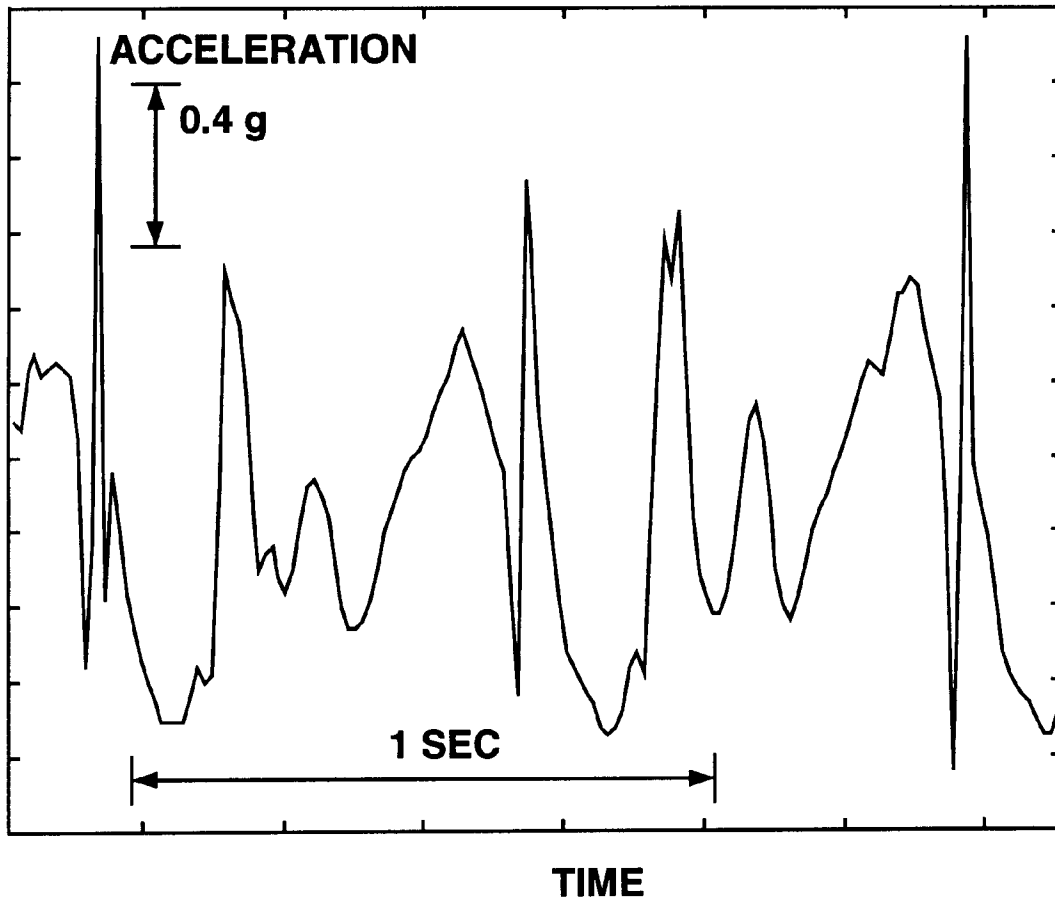


Fig. 3

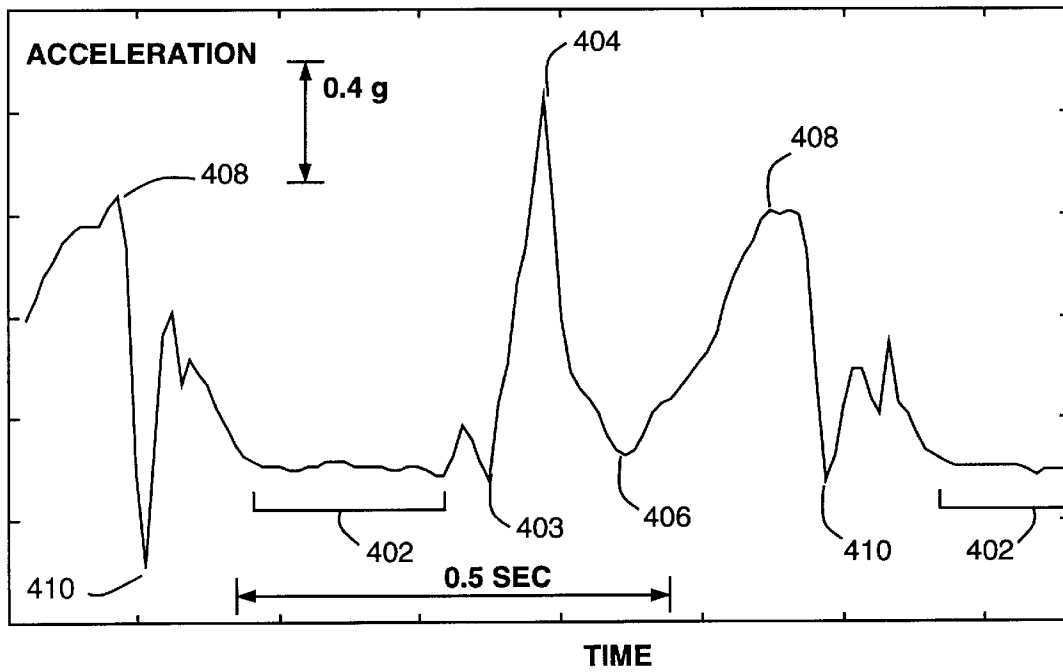


Fig. 4

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