

- [54] **ACCURATE, RAPID, RELIABLE POSITION SENSING USING MULTIPLE SENSING TECHNOLOGIES**
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- [73] **Assignee:** Virtual Technologies, Inc., Palo Alto, Calif.
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- [52] **U.S. Cl.** ..... **364/550; 340/524; 340/619; 340/686; 364/559; 364/449.1; 473/128; 463/49**
- [58] **Field of Search** ..... 128/639, 640, 128/642, 774, 779, 781, 782; 340/524, 547-549, 551, 573, 619, 686, 853.8; 364/453, 449, 459, 550, 559; 395/100, 152; 473/128; 463/49

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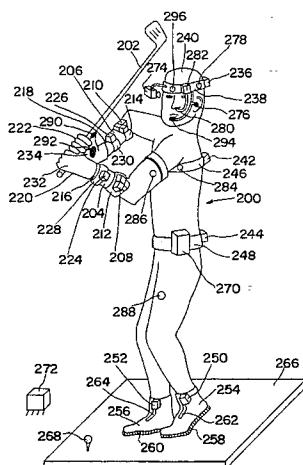
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*Primary Examiner*—Emanuel T. Voeltz  
*Assistant Examiner*—Hien Vo

[57] **ABSTRACT**

In accordance with the subject invention, devices and methods are provided for the accurate reporting of movement of an entity. Sensors which are accurate, but provide a delayed signal ("delayed signal sensors"), which delay is unacceptable for many applications, may be used in conjunction with fast sensors ("fast signal sensors"), which are usually subject to drift and other inaccuracies in providing information about a position. Additional sensors which may provide even more accurate and/or less signal sensor delay for a period of time, but which sensor signal is subject to periods of interrupted or undesirable output thereby making it unreliable ("unreliable signal sensors") may also be used in combination with one or more of the delayed signal sensors and fast signal sensors. By using a combination of such sensors, accurate, reliable position information is rapidly obtained to allow high-resolution and/or real-time analysis and depictions of movement. Complex rapid movements associated with athletics, music, and other rapid activities can be monitored in real-time to provide accurate information during the movement. Such information may then be used to analyze the movement, for instruction for improvement, for repeating the activity in a virtual setting and the like.

**31 Claims, 5 Drawing Sheets**



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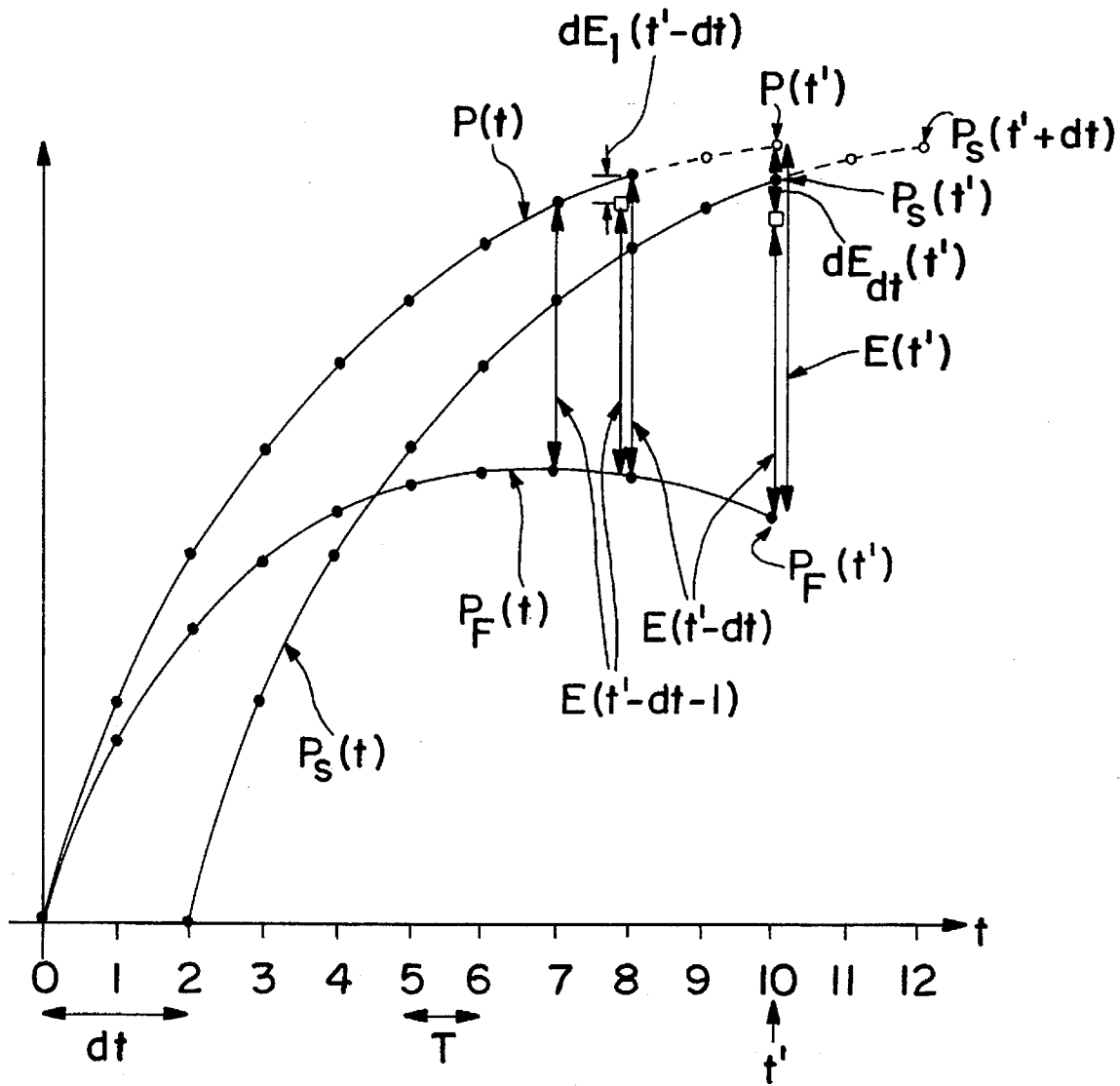


FIG. 1

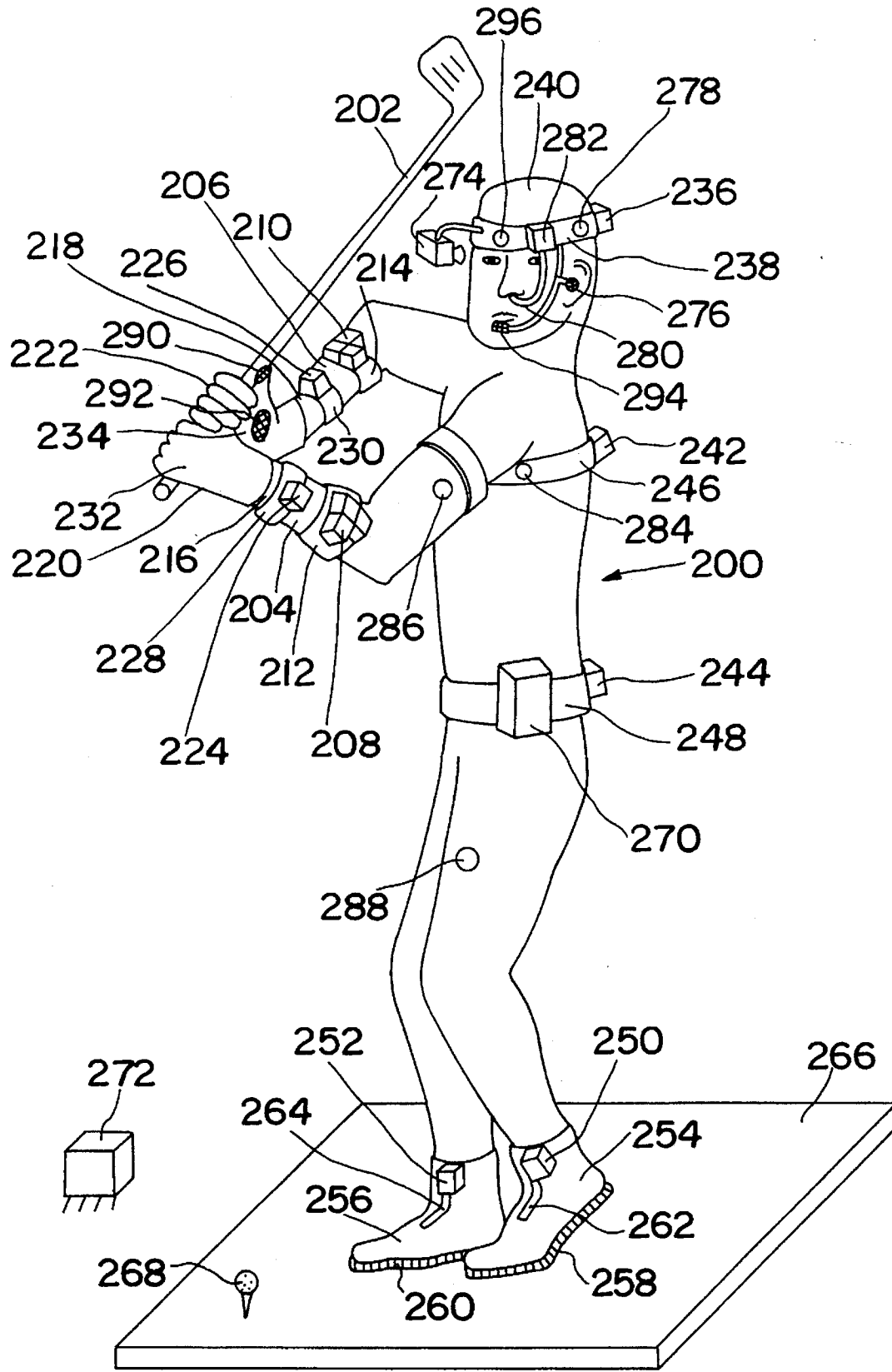


FIG. 2

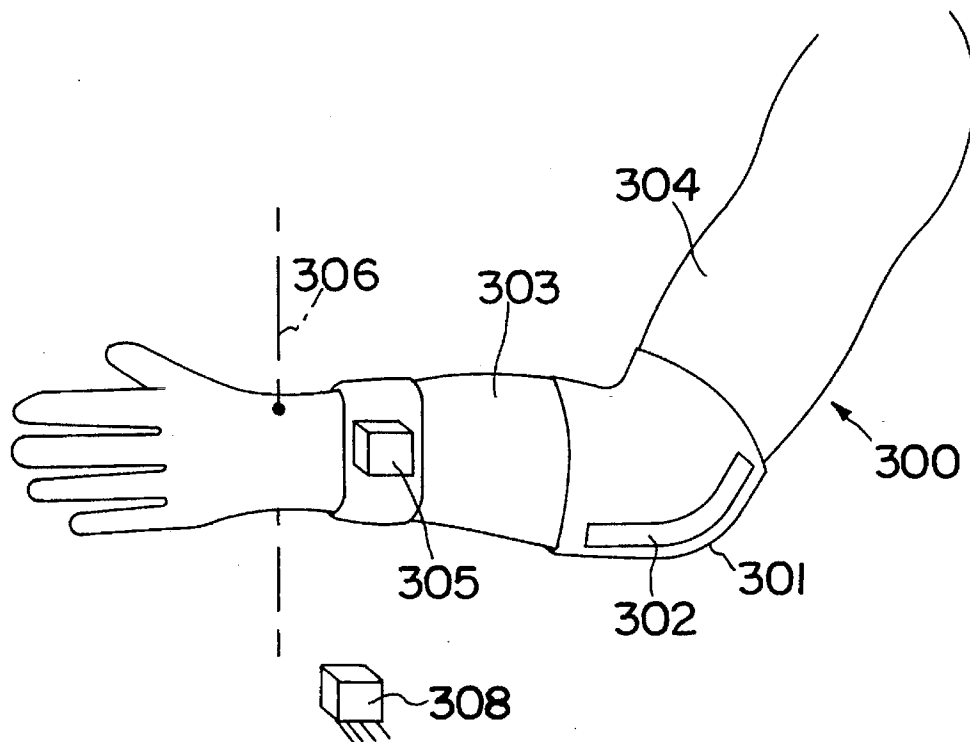


FIG. 3

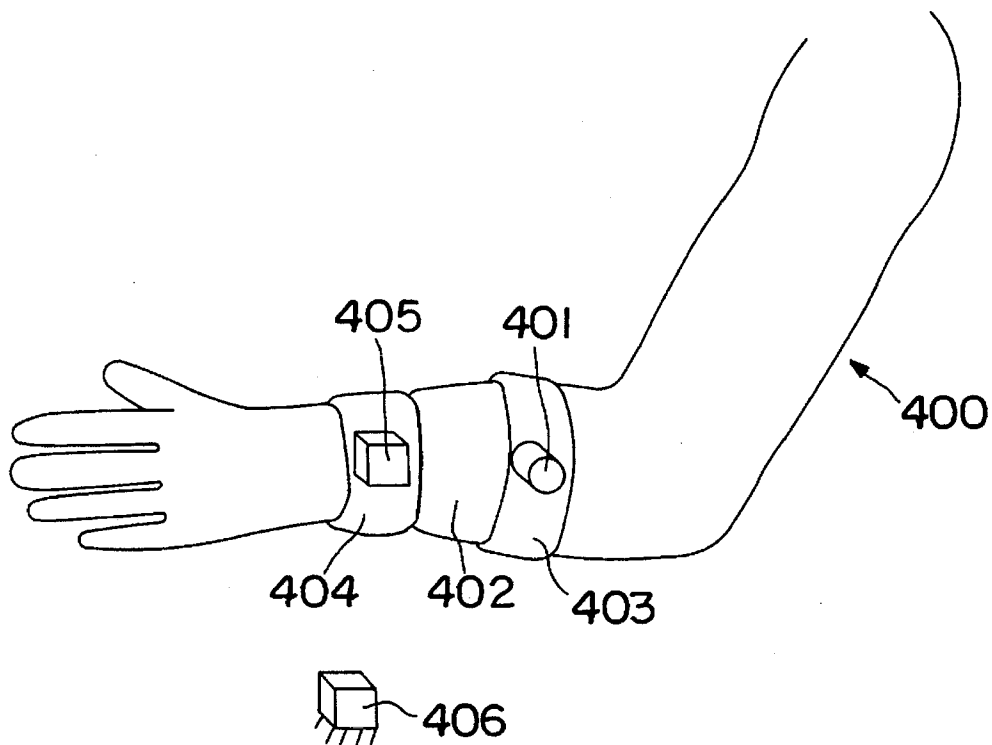


FIG. 4

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