

- [54] **METHOD AND APPARATUS FOR DETERMINING POSITION AND ORIENTATION OF A MOVEABLE OBJECT USING ACCELEROMETERS**
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- [52] U.S. Cl. .... **364/516; 364/517; 364/578; 364/410; 364/449.1; 340/988; 351/209**
- [58] Field of Search ..... **364/410, 449, 364/453, 516, 517, 578; 351/210, 209; 340/988, 989, 990**

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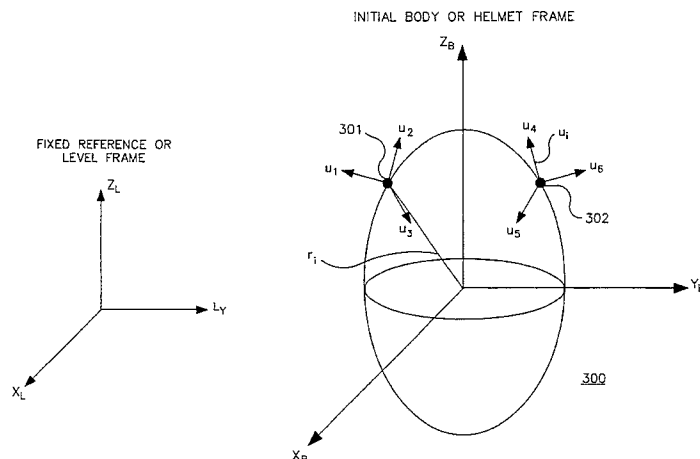
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[57] **ABSTRACT**

A three-dimensional position and orientation tracking system uses accelerometers to measure acceleration of a moveable object (e.g., a head-mounted display unit or a data glove). A tracking processor generates both position and orientation information on the object relative to a simulation environment as a function of the acceleration data. In one embodiment, a simplified radar-based tracking system is disposed relative to the object and periodically provides additional tracking data on the object to the tracking processor. The tracking processor uses the additional data to correct the position and orientation information using a feedback filter process. The position and orientation information signals generated can be used, for example, in a simulation or virtual reality application. Position and orientation information is received by a simulation processor relative to the object. The simulation processor modifies a simulation environment as a function of the position and orientation information received. Modified simulation environment information (e.g., video and/or audio information) is then presented to a user.

**21 Claims, 9 Drawing Sheets**



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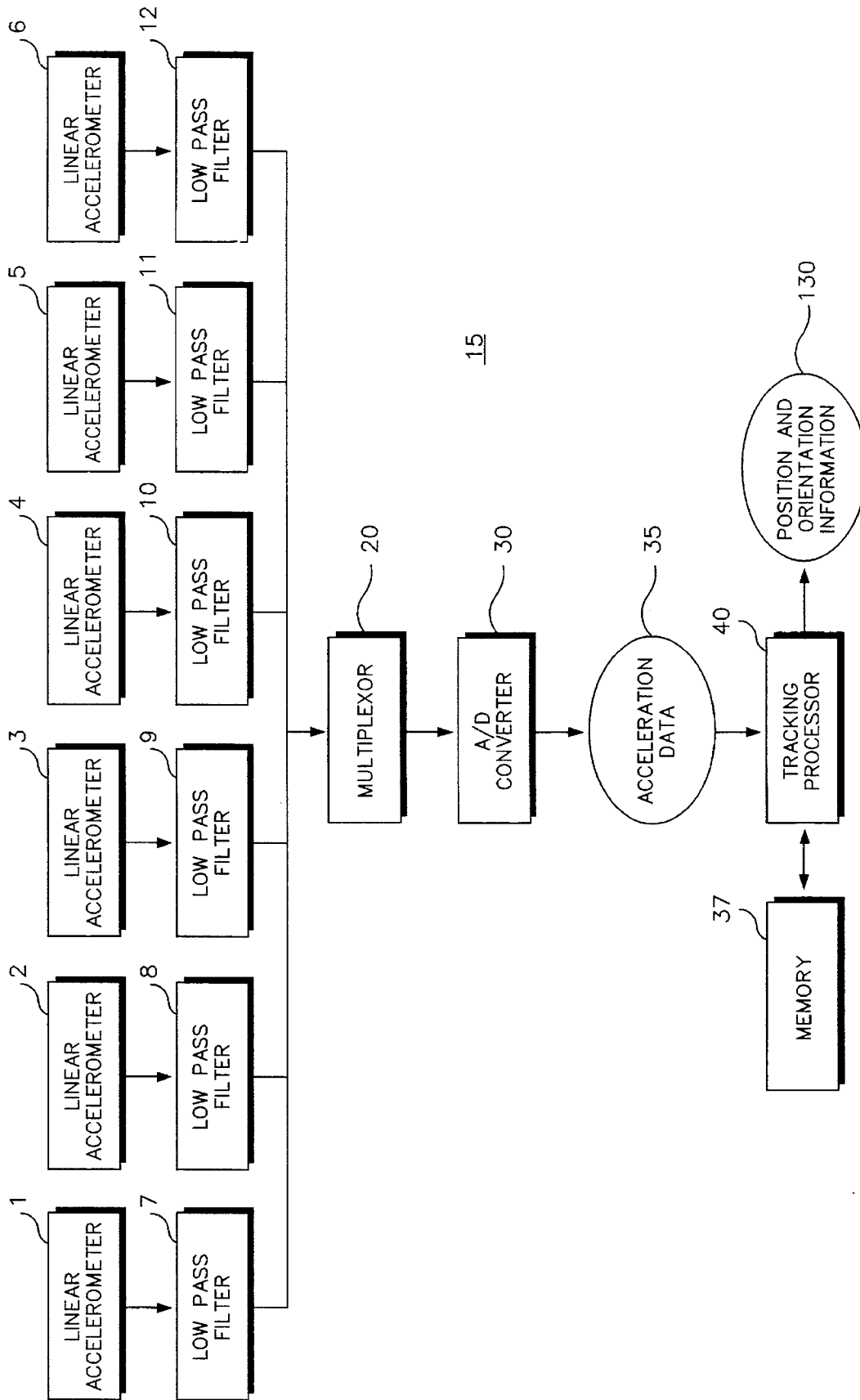
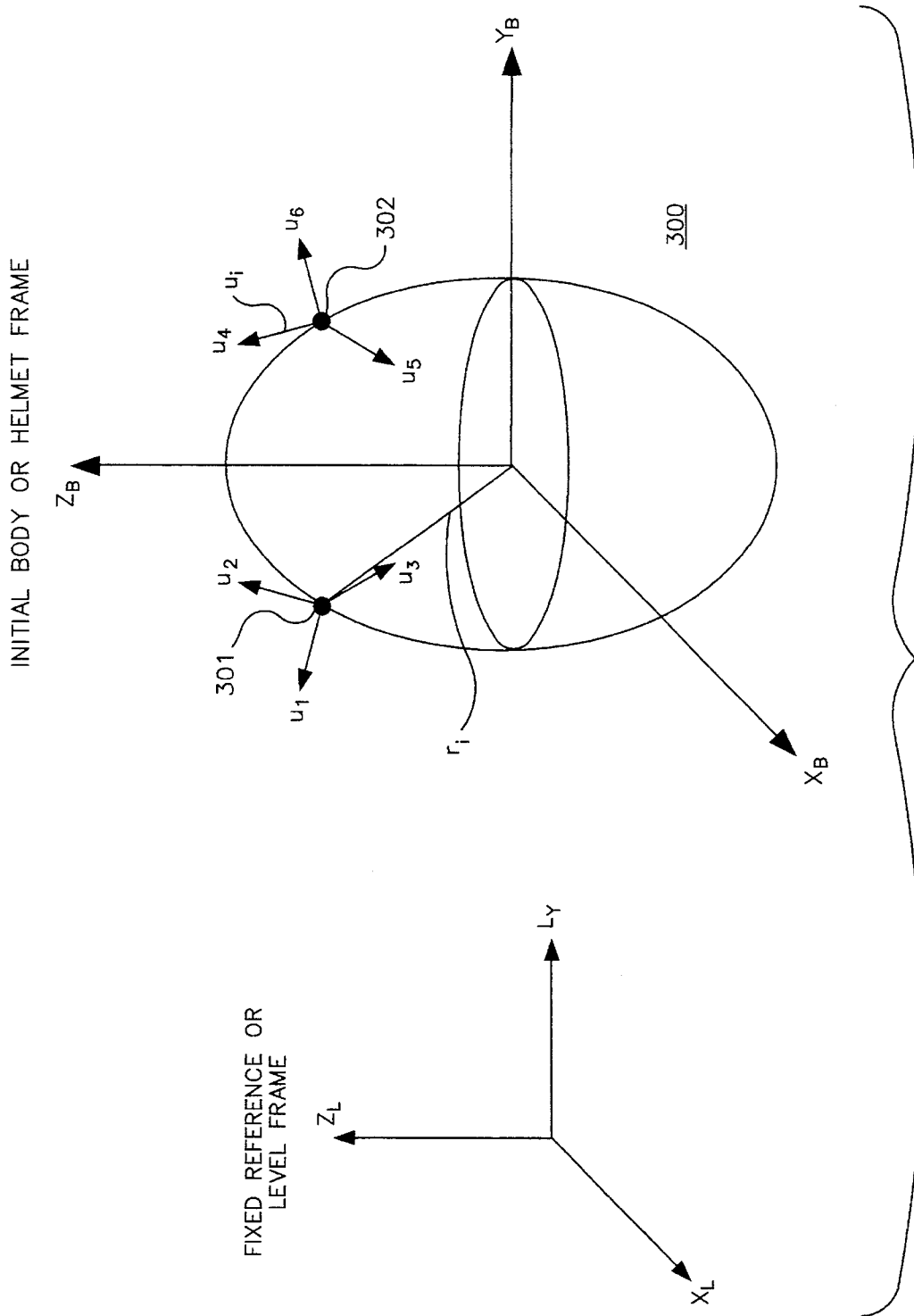


FIGURE 1



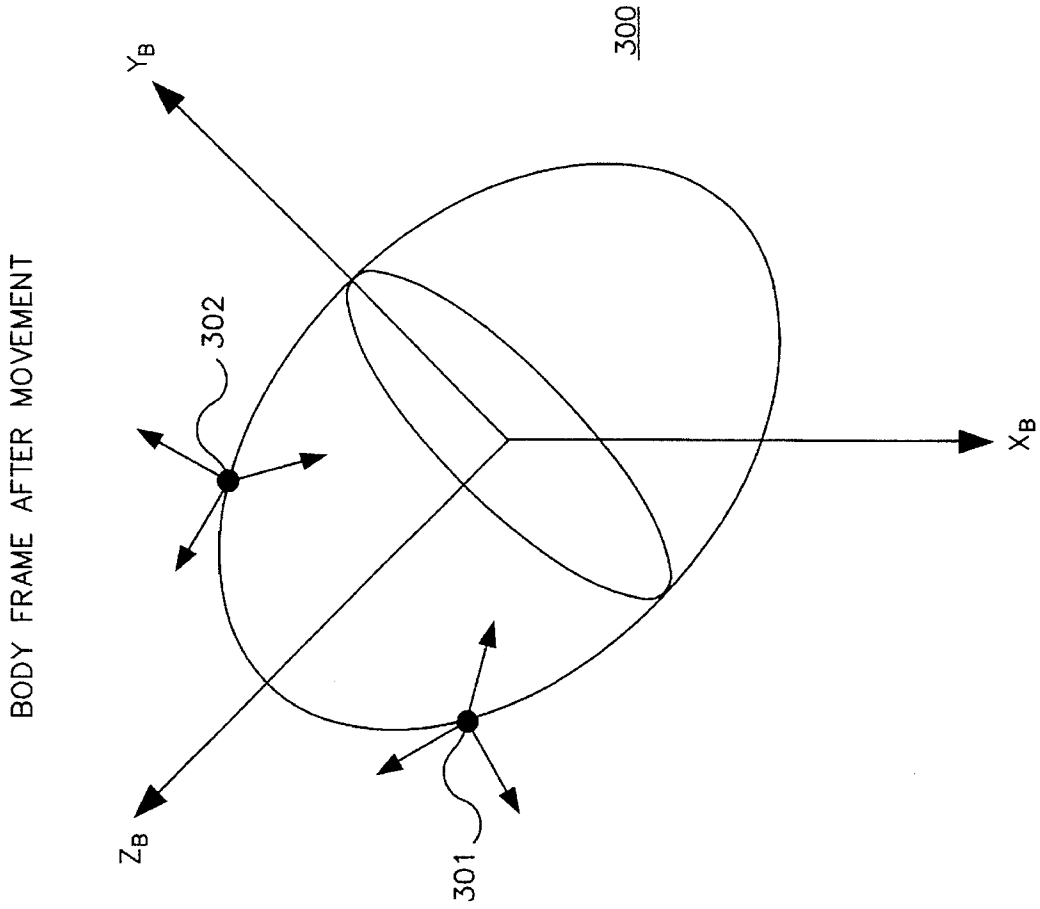


FIGURE 2A

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