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Allum

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[54] **METHOD AND APPARATUS FOR ANGULAR POSITION AND VELOCITY BASED DETERMINATION OF BODY SWAY FOR THE DIAGNOSIS AND REHABILITATION OF BALANCE AND GAIT DISORDERS**

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Related U.S. Application Data

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[51] **Int. Cl.**[6] **A61B 5/103**

[52] **U.S. Cl.** **600/595**

[58] **Field of Search** 600/587, 595; 73/862.042, 865.4

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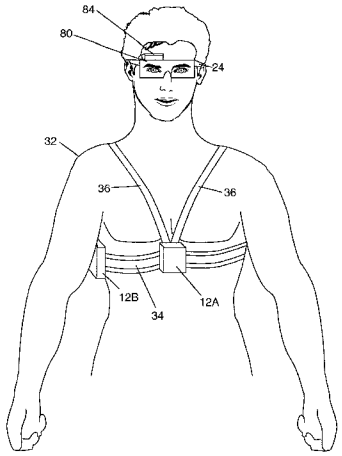
[57] **ABSTRACT**

A method and apparatus for the diagnosis and rehabilitation of abnormal postural sway of a subject during standing or the performance of movement tasks is provided. Body sway sensors, such as angular velocity transducers, are attached to the body, such as the upper torso, of the subject. Output signals from the body sway sensors are transformed into detailed body sway angular displacement and velocity information by a system processor. The body sway angular displacement and velocity information may be displayed to an operator for diagnosis of the subject's balance or gait disorders. The angular displacement and velocity information may also be provided as feedback to the subject, to augment the signals normally used by the subject's brain to help stabilize body sway and improve balance. Rehabilitory feedback may be in visual, auditory, and/or tactile form, and/or in the form of electrical stimulation of the vestibular nerve. For visual feedback, a lightweight imaging system mounted on a pair of eyewear may be used to project a body sway angle and angular velocity feedback display into an eye of the subject. An angular position and velocity based body sway diagnosis system in accordance with the present invention may be used to monitor simultaneously the body sway of multiple subjects, and to provide rehabilitory feedback to such subjects, without interfering with or restricting the normal movement activities of the subjects.

67 Claims, 5 Drawing Sheets



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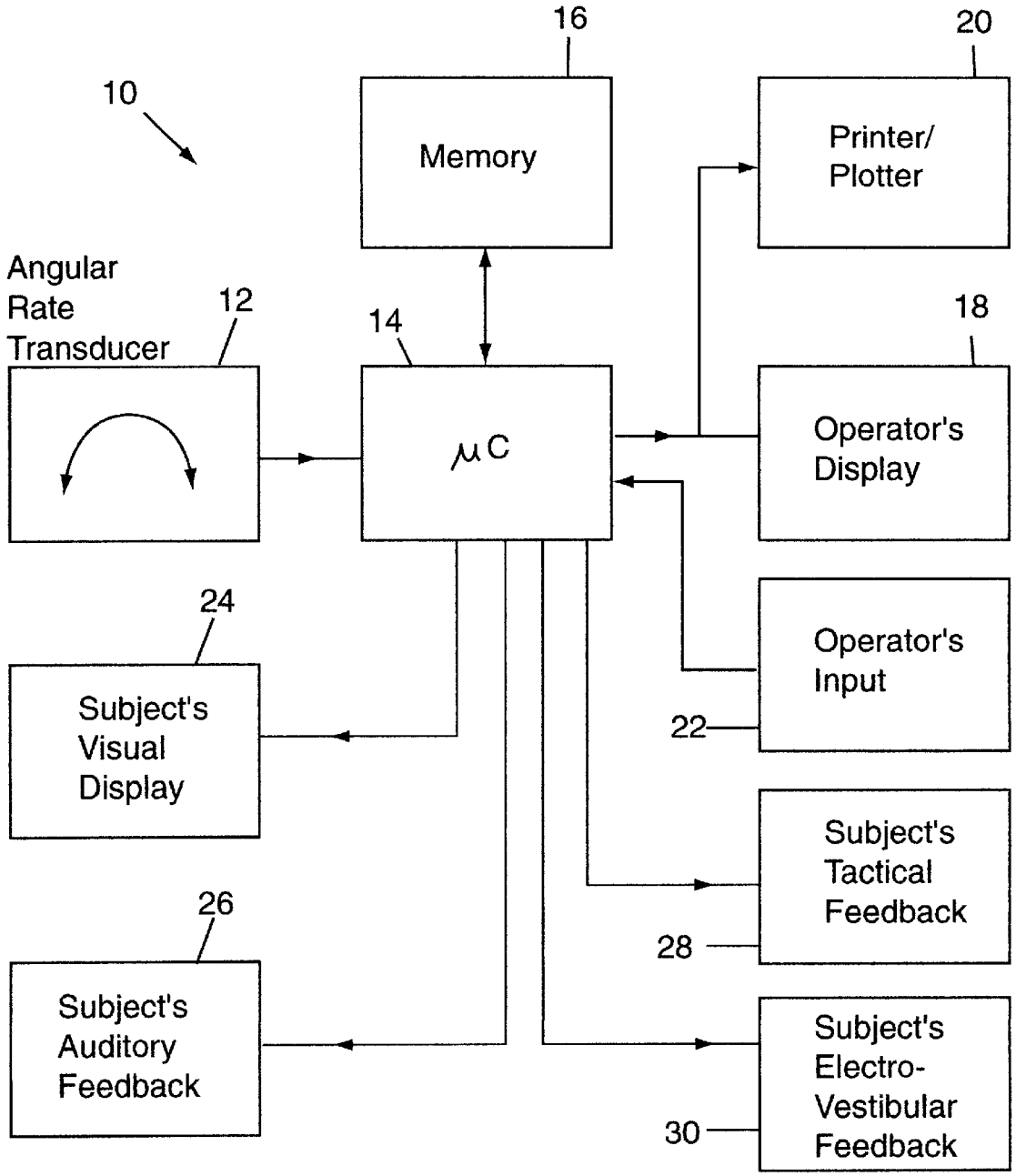

Fig. 1

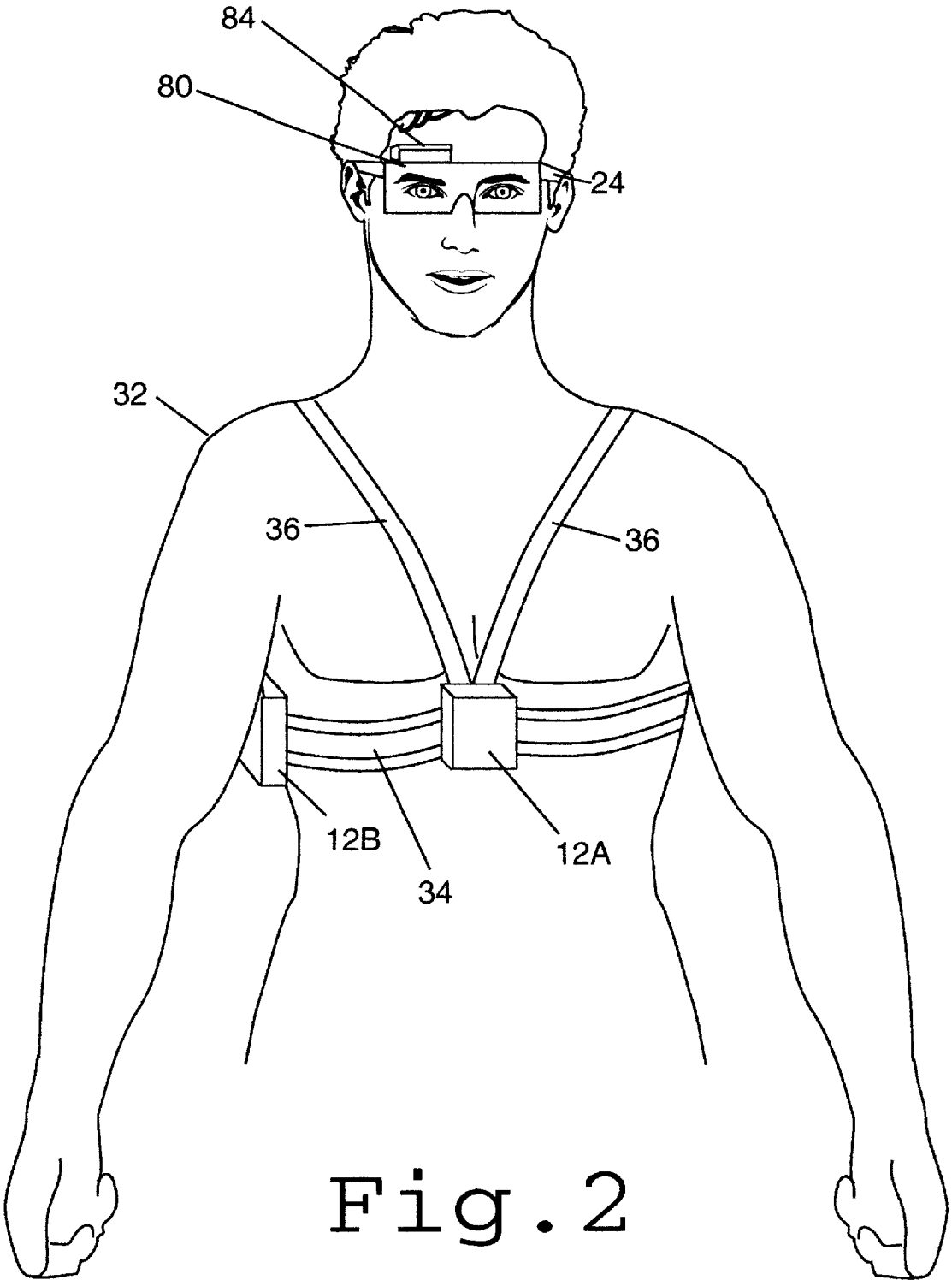

Fig.2

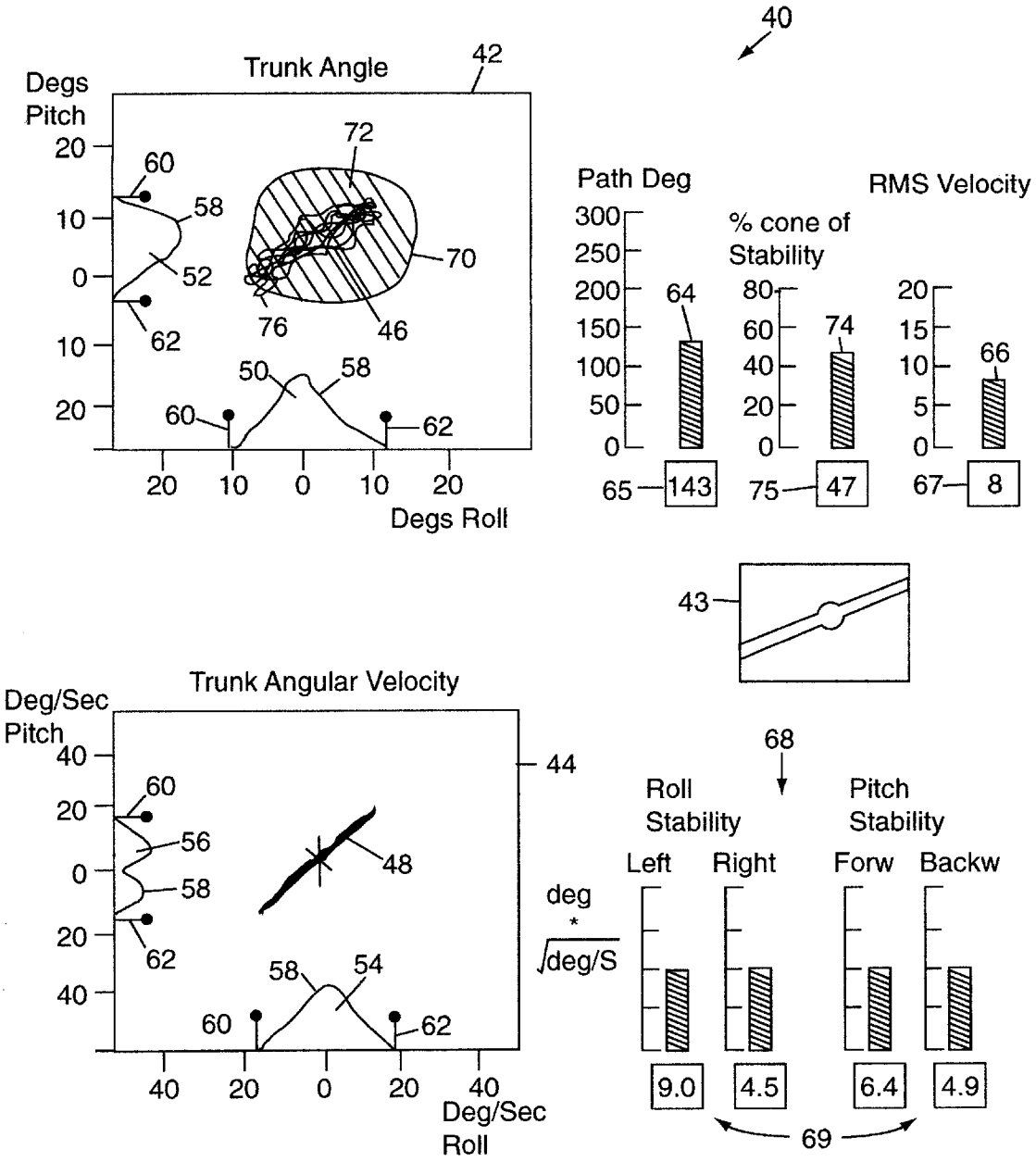

Fig. 3

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