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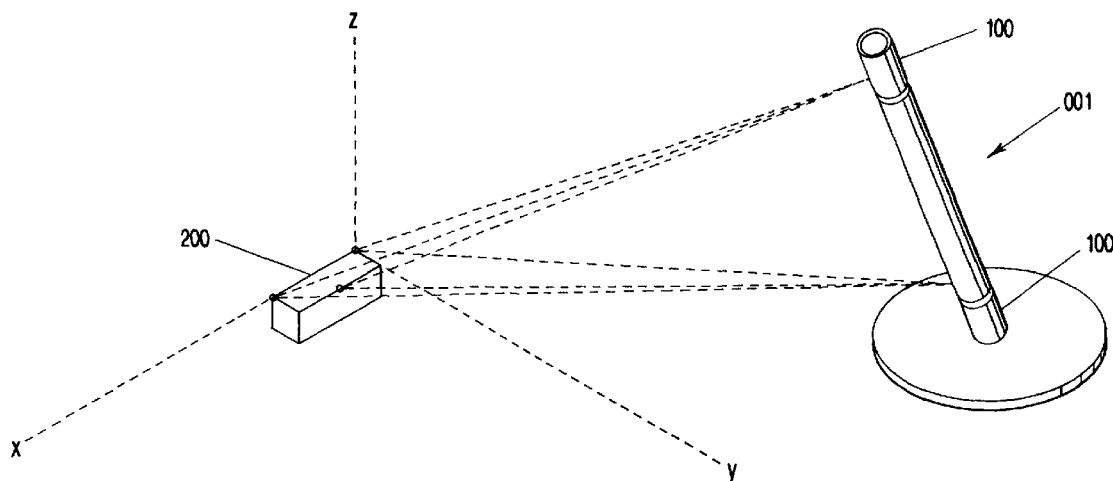
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(54) Title: REMOTE ATTITUDE AND POSITION INDICATING SYSTEM



(57) Abstract: A method and apparatus using ultrasonic sensors (108, 210) for determination of the pointing vector described by two points separated in space in the coordinate frame of the measuring system. For measurement, acoustic signals (240) are transmitted from two emitters (108) whose spatially separated coordinates form the desired pointing vector. Three detectors (210), associated receiver electronics (215, 218) and software (220, 222) are required to compute six distinct spheres (250) from the time of flight measurements. The intersection of the three spheres, associated with each emitter (108), describe the desired location in the detector coordinate system of that emitter (108). With the coordinates of each emitter (108), the pointing vector is computed using standard geometry. A reference (230) is required to determine the time of flight of the signals to each detector (210). Another embodiment uses an active reflective technique, where the timing is obtained through round trip transmission and reception of the signal (240) with a known fixed delay at the vector points.