



US005712478A

**United States Patent** [19]  
**Olsson**

[11] **Patent Number:** **5,712,478**  
[45] **Date of Patent:** **Jan. 27, 1998**

[54] **APPARATUS FOR MEASURING POSITION OF BALL JOINT**

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[21] **Appl. No.:** 634,182

[57] **ABSTRACT**

[22] **Filed:** Apr. 18, 1996

A sensor for three dimensional detection of the position of a ball joint 1 in which two emitters 14–15 and two collectors 20–21 are located in the ball 4 and socket 5, respectively, of the ball joint 1, and at least one more emitter or collector is located in either the ball 4 or socket 5. Each of the emitters emits a unique signal characteristic and each of the collectors detects and decodes the signals from all emitters. By analyzing the influence of all the emitters on each of the collectors, the position of the ball joint can be deduced. The emitters can be coils or light emitting diodes that emit unique signal frequencies and the collectors can be coils or photo transistors which detects the ratio of signals from each of the emitters. Alternatively, a rotating magnetic field can be induced by three emitter coils in one of the joint halves and detected by three collector coils located in the other joint half.

[30] **Foreign Application Priority Data**

Apr. 20, 1995 [SE] Sweden ..... SE.A.9501442-9

[51] **Int. Cl.<sup>6</sup>** ..... **G01D 5/34**

[52] **U.S. Cl.** ..... **250/231.13; 250/231.16; 356/373**

[58] **Field of Search** ..... 250/231.13, 231.16, 250/231.18, 221, 227.22; 73/510, 836, 843; 356/373, 375, 24–25

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**18 Claims, 5 Drawing Sheets**

