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**Breitwieser et al.**

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(54) **METHOD AND DEVICE FOR DETERMINING THE STATIC UNBALANCE**

(56) **References Cited**

U.S. PATENT DOCUMENTS

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- 3,661,016 A \* 5/1972 Dopp ..... G01M 1/02  
73/462
- 3,754,447 A \* 8/1973 Turton-Smith ..... G01M 1/28  
73/457
- 3,805,623 A \* 4/1974 Seghesio ..... G01R 13/208  
73/459
- 3,813,948 A \* 6/1974 Ito ..... G01M 1/20  
73/460
- 3,862,570 A \* 1/1975 Ongaro ..... G01M 17/022  
73/146
- 4,428,225 A \* 1/1984 Kato ..... G01M 1/12  
73/483

(Continued)

FOREIGN PATENT DOCUMENTS

- DE 34 19 546 A1 11/1985
- DE 33 30 974 C2 7/1986

(Continued)

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See application file for complete search history.

(57) **ABSTRACT**

Disclosed is a method for determining the static unbalance of a body (30) provided with a locating surface (31) by means of a center-of-gravity weighing scale (10), the method including measuring the position of the locating surface (31) of the body (30) with respect to its mount by means of electric displacement sensors (16), computing from the measurement signals of the displacement sensors (16) the eccentricity of the locating surface (31) of the body (30) with respect to the reference point of the scale (10) by means of an electric evaluating circuit, weighing the body (30) and recording mass and position of the center of gravity of the body (30) with respect to the reference point of the scale (10), and computing the unbalance of the body (30) from the measurement signals of the scale (10) and the eccentricity of the locating surface (31) of the body (30) with respect to the reference point of the scale (10) by means of the evaluating circuit.

**11 Claims, 2 Drawing Sheets**

