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Smith

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(54) **ALTERED SWEEP BELL-BLOOM MAGNETOMETER**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,837,649	A *	6/1958	Hershberger	331/3
6,919,770	B2 *	7/2005	Happer et al.	331/94.1
7,102,451	B2 *	9/2006	Happer et al.	331/94.1
7,202,751	B2 *	4/2007	Zhu et al.	331/3
7,276,902	B1 *	10/2007	Xiang et al.	324/300
7,439,814	B2 *	10/2008	Happer et al.	331/3

* cited by examiner

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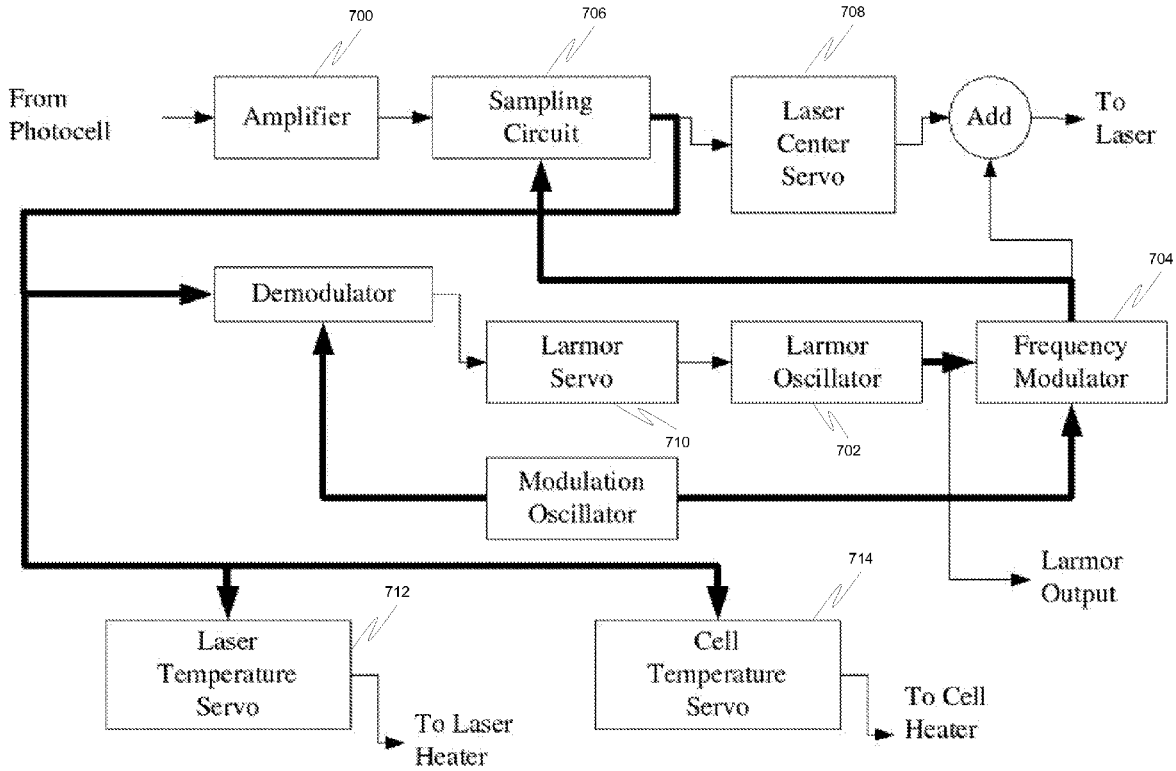
(57) **ABSTRACT**

A magnetometer is constructed wherein the sweeping is performed at one half the Larmor frequency and has as its center the absorption line. This allows the emitter to tune onto the absorption line twice per cycle as it passes through the line. This causes the increase in absorption as would the normal sweep of a Bell-Bloom magnetometer but avoids the drawbacks, such as drift and heading error.

21 Claims, 7 Drawing Sheets