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**Gottesman et al.**

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(45) **Date of Patent:** **\*Sep. 1, 2009**

(54) **REW PARAMETRIC VECTOR  
QUANTIZATION AND DUAL-PREDICTIVE  
SEW VECTOR QUANTIZATION FOR  
WAVEFORM INTERPOLATIVE CODING**

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(75) Inventors: **Oded Gottesman**, Goleta, CA (US);  
**Allen Gersho**, Goleta, CA (US)

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(73) Assignee: **The Regents of the University of  
California**, Oakland, CA (US)

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 98 days.

I.S. Burnett et al., "Multi-Prototype Waveform Coding Using Frame-By-Frame Analysis-By-Synthesis," Department of Electrical and Computer Engineering, University of Wollongong, NSW, Australia (1997), pp. 1567-1570.

This patent is subject to a terminal disclaimer.

I.S. Burnett et al., "New Techniques for Multi-Prototype Waveform Coding at 2.84kb/s," Department of Electrical and Computer Engineering, University of Wollongong, NSW, Australia (1995), pp. 261-264.

(21) Appl. No.: **11/234,631**

I.S. Burnett et al., "Low Complexity Decomposition and Coding of Prototype Waveforms," Dept. of Electrical and Computer Eng., University of Wollongong, NSW, 2522, Australia, pp. 23-24.

(22) Filed: **Sep. 23, 2005**

(Continued)

(65) **Prior Publication Data**

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*Primary Examiner*—Susan McFadden

(74) *Attorney, Agent, or Firm*—Berliner & Associates

**Related U.S. Application Data**

(62) Division of application No. 09/811,187, filed on Mar. 16, 2001, now Pat. No. 7,010,482.

(60) Provisional application No. 60/190,371, filed on Mar. 17, 2000.

(57) **ABSTRACT**

An enhanced analysis-by-synthesis waveform interpolative speech coder able to operate at 2.8 kbps. Novel features include dual-predictive analysis-by-synthesis quantization of the slowly-evolving waveform, efficient parametrization of the rapidly-evolving waveform magnitude, and analysis-by-synthesis vector quantization of the rapidly evolving waveform parameter. Subjective quality tests indicate that it exceeds G.723.1 at 5.3 kbps, and of G.723.1 at 6.3 kbps.

(51) **Int. Cl.**  
**G10L 19/14** (2006.01)

(52) **U.S. Cl.** ..... **704/222**

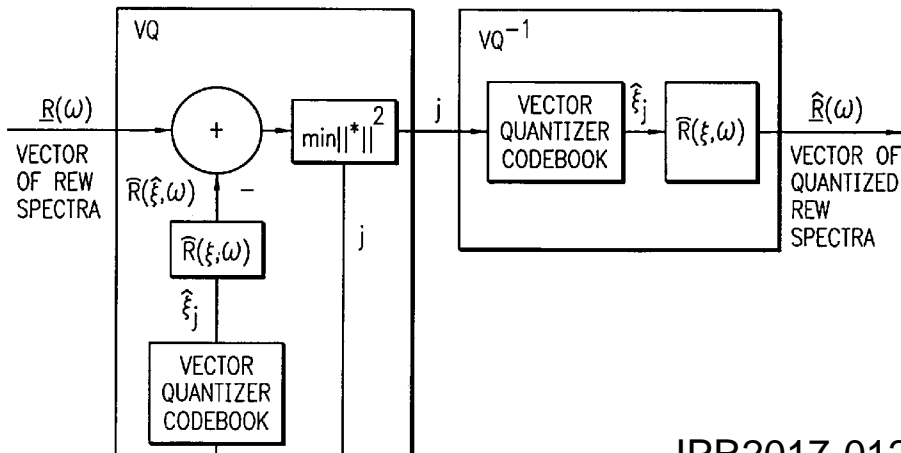
(58) **Field of Classification Search** ..... 704/222  
See application file for complete search history.

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**18 Claims, 6 Drawing Sheets**



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FIG. 1

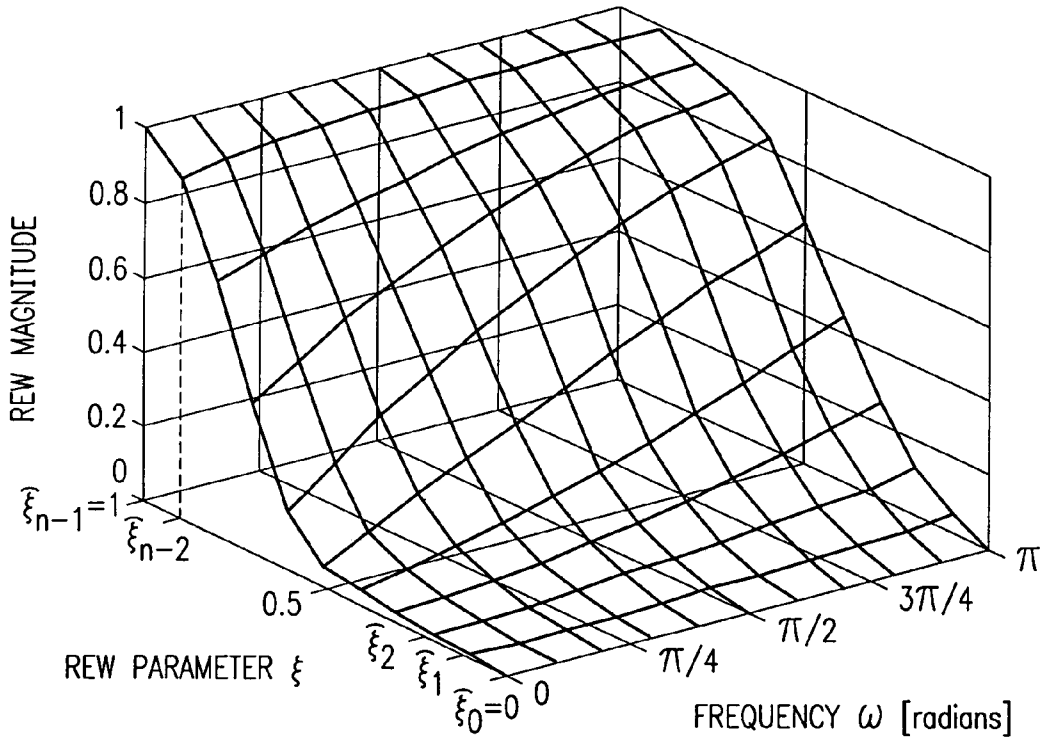


FIG. 2

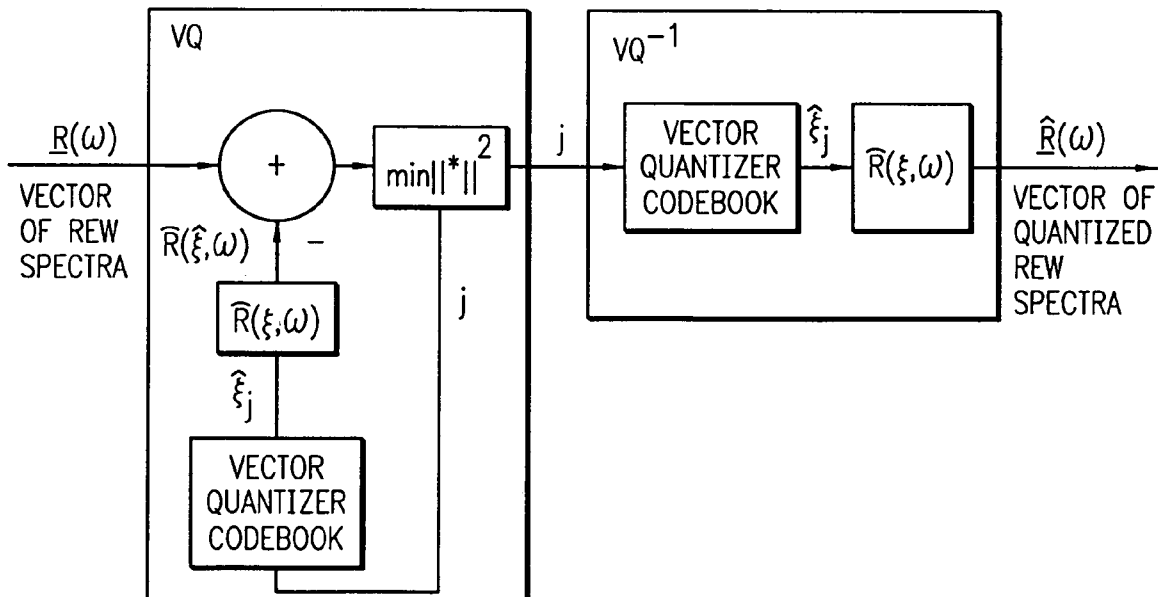
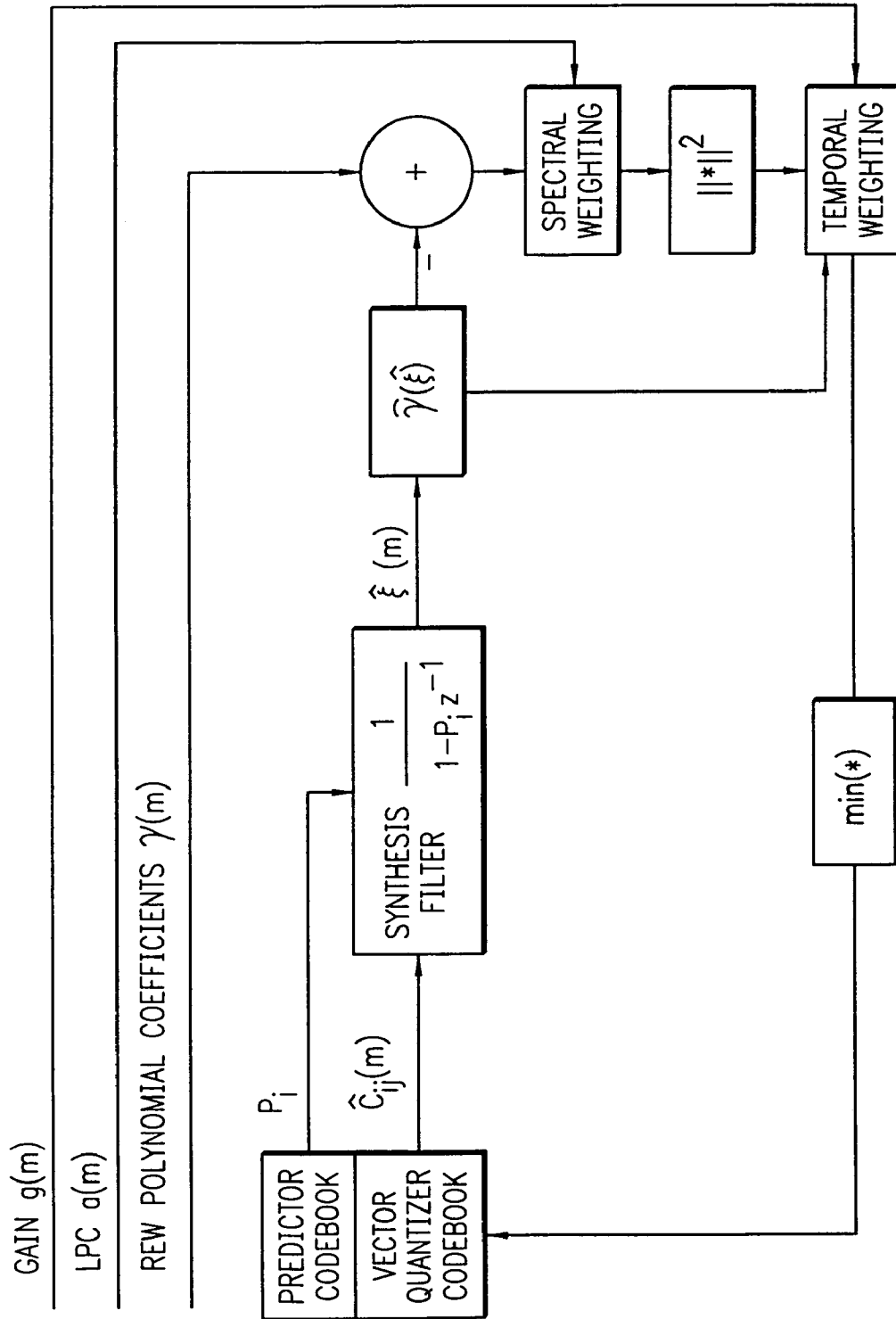
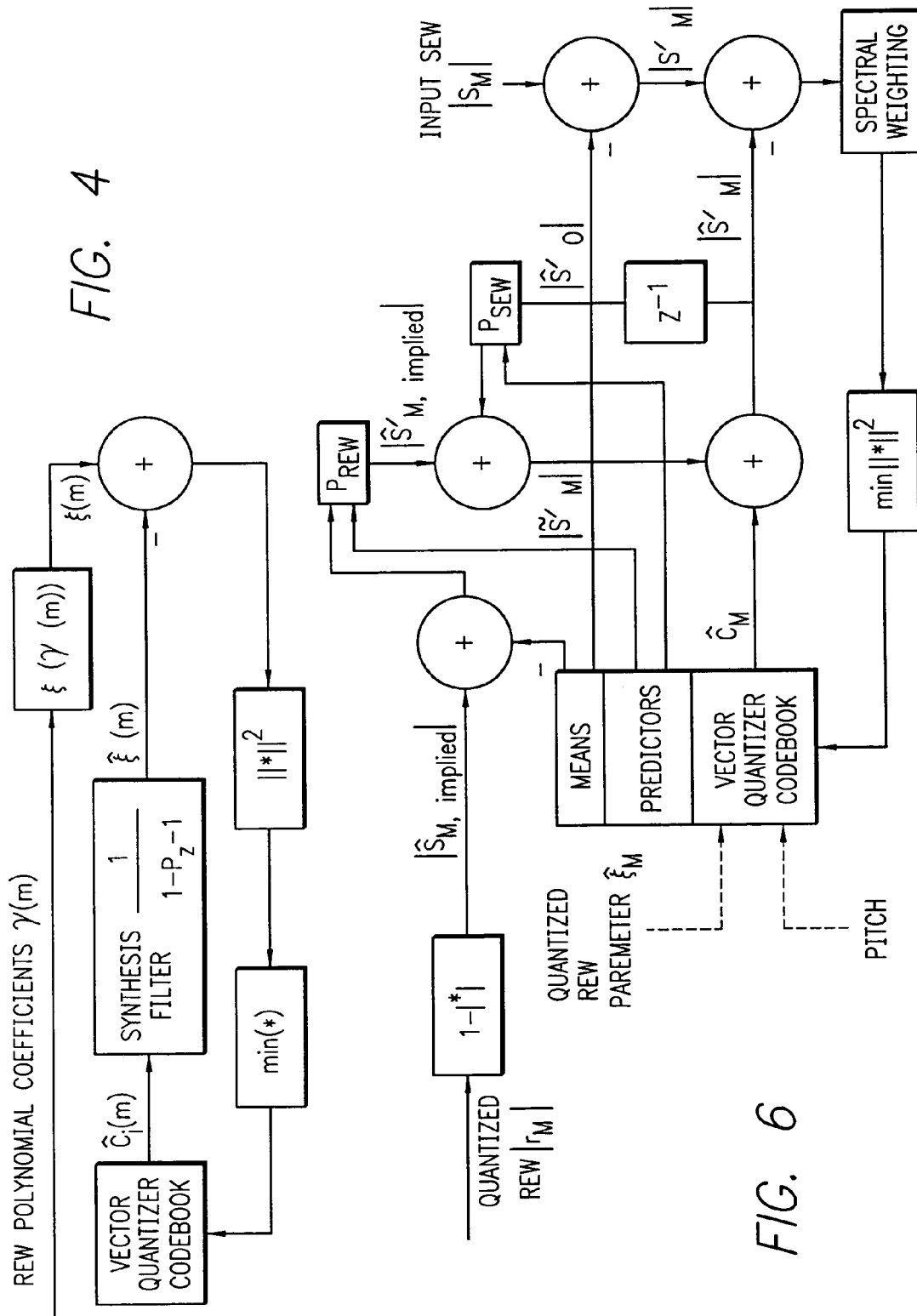


FIG. 3





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