



(12) **United States Patent**
Jarvinen et al.

(10) **Patent No.:** **US 6,470,470 B2**
(45) **Date of Patent:** ***Oct. 22, 2002**

(54) **INFORMATION CODING METHOD AND DEVICES UTILIZING ERROR CORRECTION AND ERROR DETECTION**

(75) Inventors: **Kari Jarvinen**, Tampere (FI); **Matti Kajala**, Tampere (FI); **Janne Vainio**, Saaksjarvi (FI)

(73) Assignee: **Nokia Mobile Phones Limited**, Espoo (FI)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/019,656**

(22) Filed: **Feb. 6, 1998**

(65) **Prior Publication Data**

US 2002/0035713 A1 Mar. 21, 2002

(30) **Foreign Application Priority Data**

Feb. 7, 1997 (FI) 970554

(51) **Int. Cl.⁷** **H03M 13/00**

(52) **U.S. Cl.** **714/755; 714/758**

(58) **Field of Search** 714/746, 758, 714/704, 755; 358/133; 341/95; 375/299, 346; 370/337

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,115,469 A	5/1992	Taniguchi et al.	381/36
5,243,419 A *	9/1993	Faryar et al.	358/133
5,243,629 A *	9/1993	Wei	375/299
5,245,339 A *	9/1993	Cideciyan	341/95
5,251,237 A *	10/1993	Baier	375/346
5,491,719 A *	2/1996	Sellin et al.	375/213
5,553,080 A *	9/1996	Fujiwara	714/704

5,557,639 A	9/1996	Heikkila et al.	375/224
5,675,372 A *	10/1997	Aguayo et al.	348/12
5,675,972 A *	10/1997	Aguayo et al.	348/12
5,701,390 A *	12/1997	Griffin et al.	395/2.15
5,737,331 A *	4/1998	Hoppal et al.	370/349
5,822,315 A *	10/1998	Seze et al.	370/337
5,901,186 A *	5/1999	Jamal et al.	375/346
6,170,073 B1 *	1/2001	Jarvinen et al.	714/758

FOREIGN PATENT DOCUMENTS

EP	0 651 531 A2	5/1995
EP	0 798 888 A2	10/1997
GB	2 291 570 A	1/1996
WO	WO 93/05502	3/1993

OTHER PUBLICATIONS

GSM recommendation 06.11 "Substitution and muting of lost frames for full-rate speech traffic channels", ETSI/GSM Jan. 1991.

GSM recommendation 06.10 "GSM full rate speech transcoding", ETSI/GSM Jan. 1991.

PCT International Search Report.

* cited by examiner

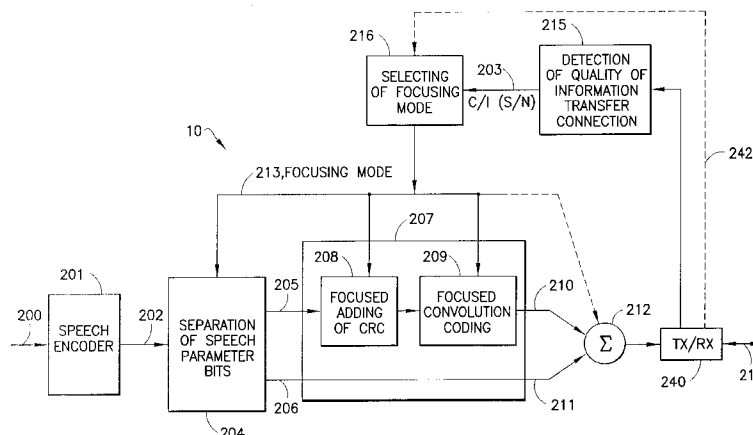
Primary Examiner—David Ton

(74) *Attorney, Agent, or Firm*—Perman & Green, LLP

(57) **ABSTRACT**

Focused error correction and/or focused error detection is used in the information coding system. A speech encoding method, in which the number of speech parameter bits on which error correction coding and/or error detection coding focuses is automatically adjusted in relation to the number of total speech parameter bits as a function of the quality of the information transfer connection. There is no need to reduce the number of bits used for speech encoding. Thus the voice quality of the speech remains high. The error correction and/or error detection is focused on the bits most important for the voice quality e.g., as a function of the C/I (Channel to Interference)13 parameter describing the quality of the information transfer connection. The muting of speech synthesizing occurring in prior systems on poor information transfer connection is reduced by using focused error detection.

16 Claims, 12 Drawing Sheets



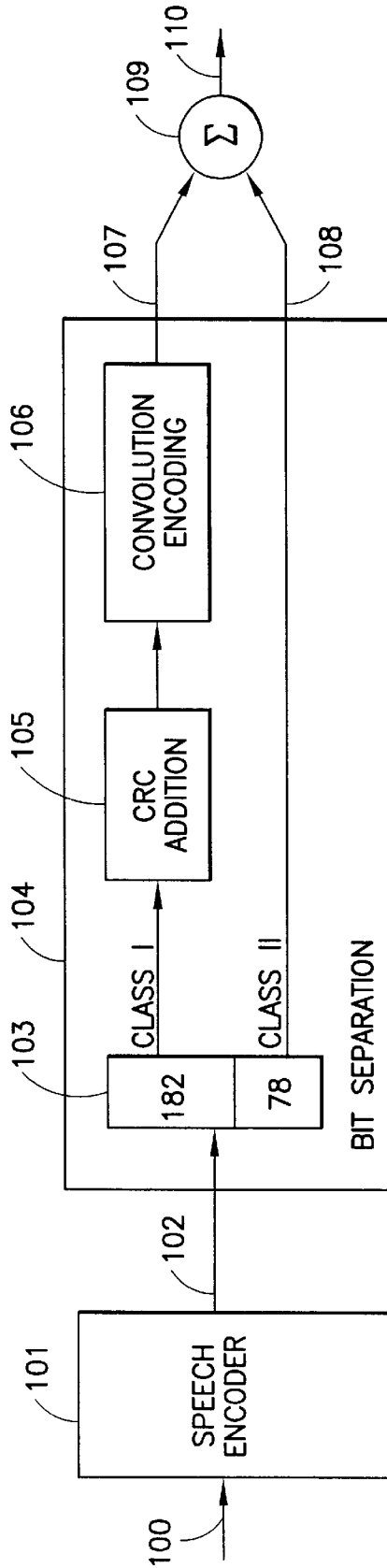


FIG. 1A

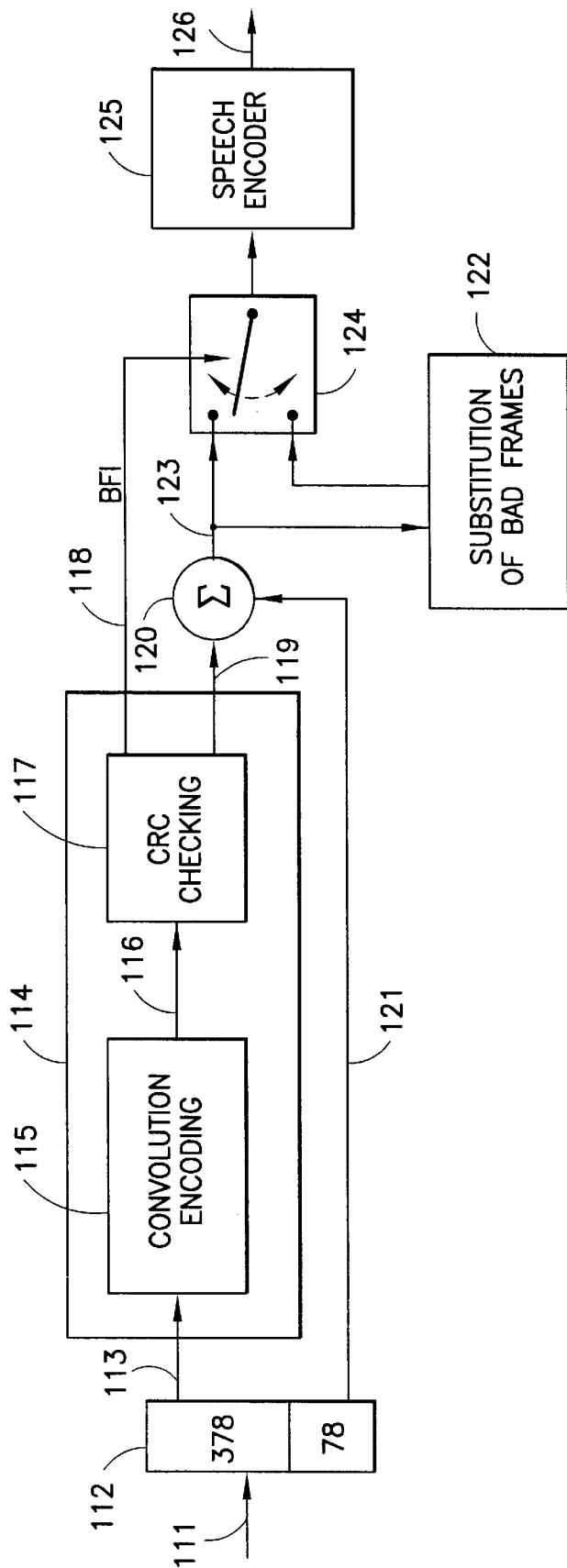
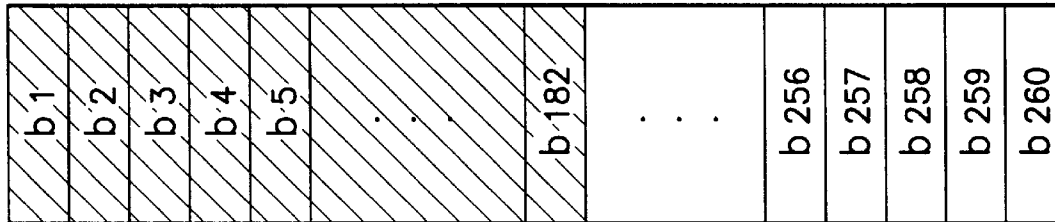


FIG. 1B



BITS PROTECTED WITH CONVOLUTION CODING



UNPROTECTED BITS



FIG.1C

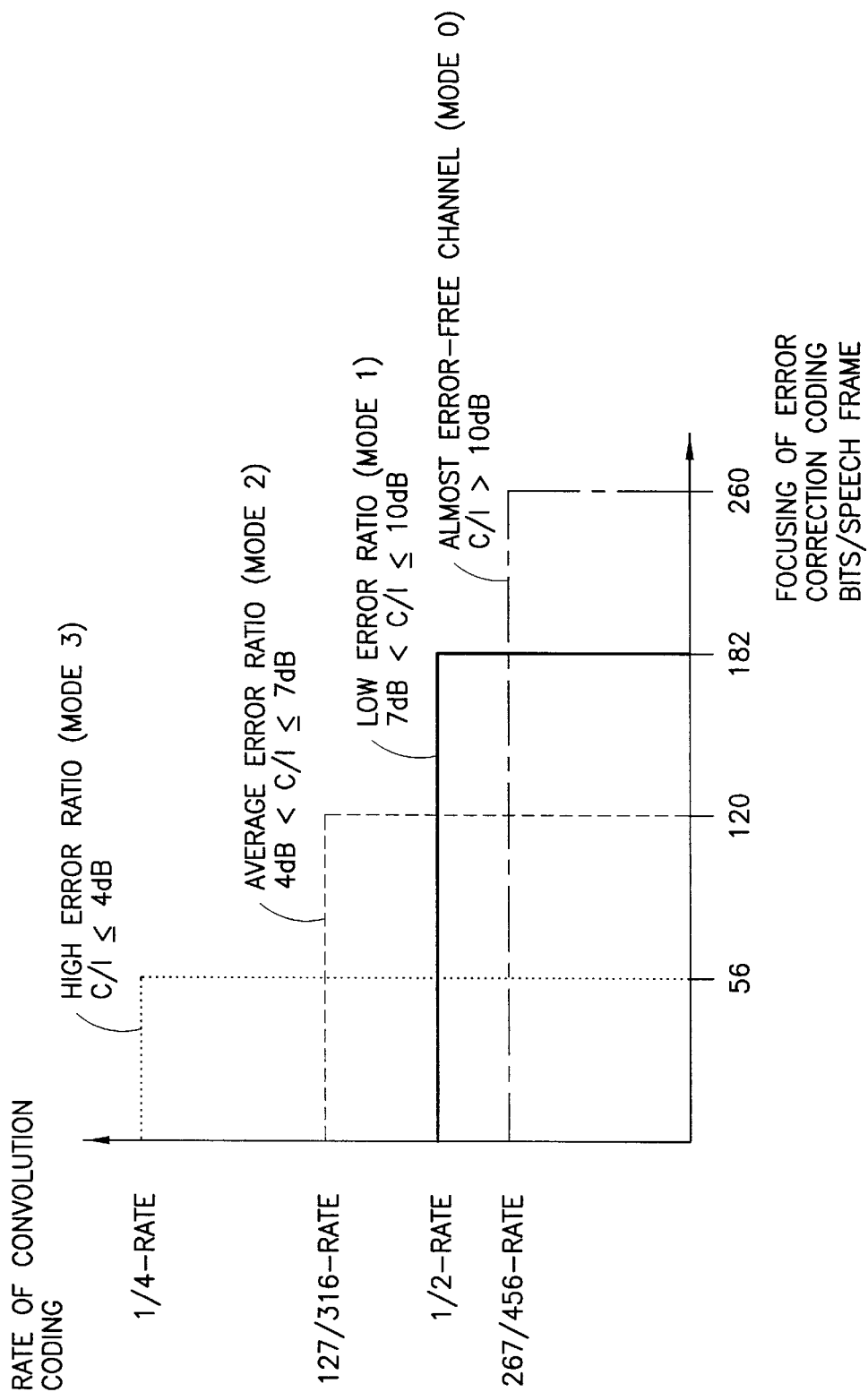


FIG.2

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.