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United States Patent [19]

Aijala et al.

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[45] **Date of Patent:** **Nov. 26, 1996**

[54] **METHOD AND APPARATUS FOR ENCODING/DECODING BROADCAST OR RECORDED SEGMENTS AND MONITORING AUDIENCE EXPOSURE THERETO**

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[21] Appl. No.: **396,342**

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Related U.S. Application Data

[63] Continuation of Ser. No. 976,558, Nov. 16, 1992, abandoned.

[51] **Int. Cl.**^{6} **H04N 5/76**; H04N 5/00
[52] **U.S. Cl.** **386/96**; 381/2; 386/98
[58] **Field of Search** 381/14, 2, 3, 4; 455/2, 49.1, 53, 67; 358/335, 341, 343; 348/1, 2, 3, 5

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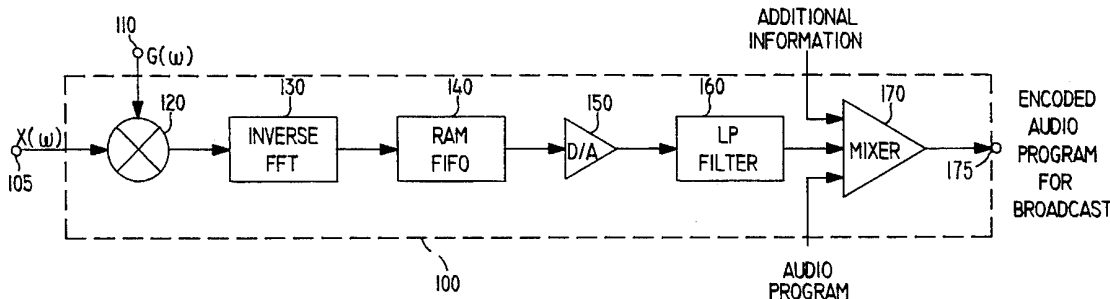
[57] **ABSTRACT**

Methods and apparatus for encoding and decoding information in broadcast or recorded segment signals are described. In certain embodiments, an audience monitoring system encodes identification information in the audio signal portion of a broadcast or recorded segment using spread spectrum encoding. A personal monitoring device receives an acoustically reproduced version of the broadcast or recorded signal via a microphone, decodes the identification information from the audio signal portion despite significant ambient noise, and stores this information, automatically providing a diary for the audience member which is later uploaded to a centralized facility. A separate monitoring device decodes additional information from the broadcast signal, which is matched with the audience diary information at the central facility. This monitor may simultaneously send data to the centralized facility using a dial-up telephone line, and receive data from the centralized facility through a signal encoded using a spread spectrum technique and modulated with a broadcast signal from a third-party.

110 Claims, 10 Drawing Sheets

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FIG. I

ENCODED
AUDIO
PROGRAM
BROADCAST

RECEIVER 210

205

220

200

235A

AGC 240

230

LP
FILTER 250

A/D
CONVERTOR 255

RAM
FIFO 260

FFT 265

CORRELATOR 270

275

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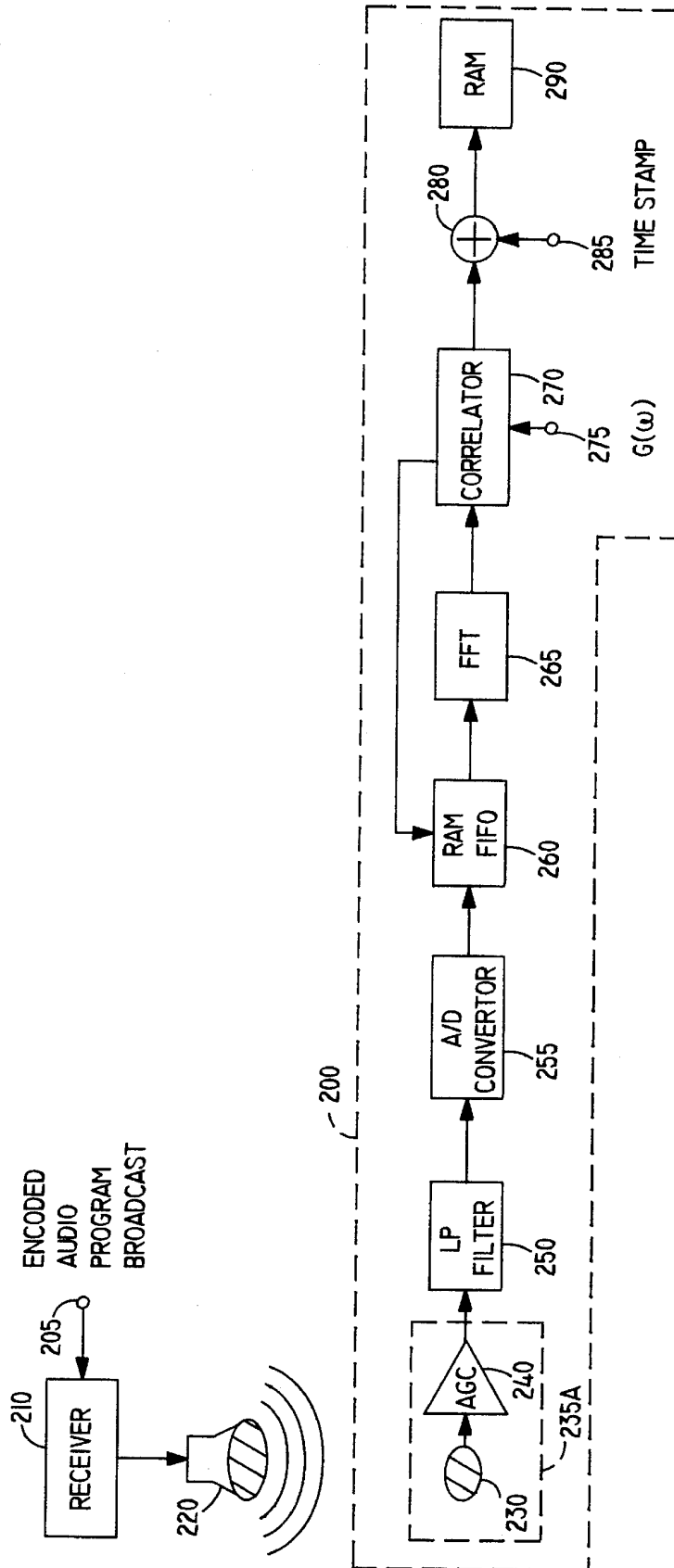
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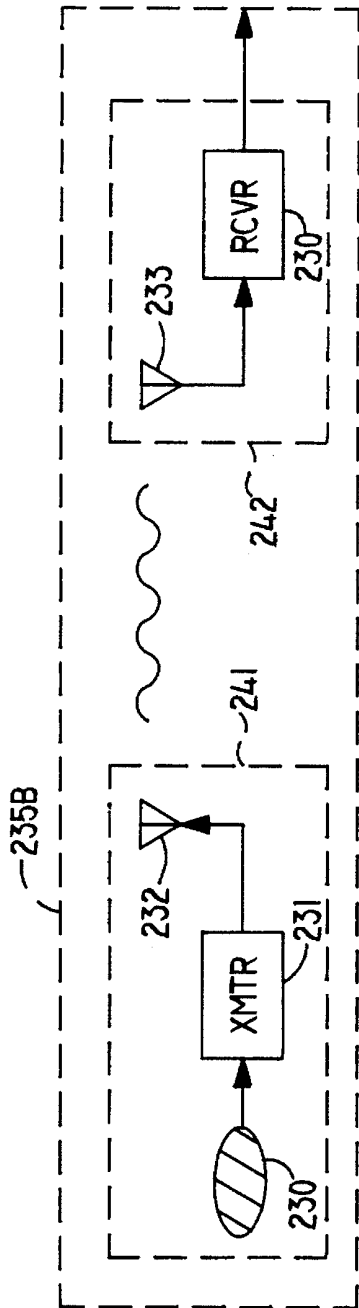285

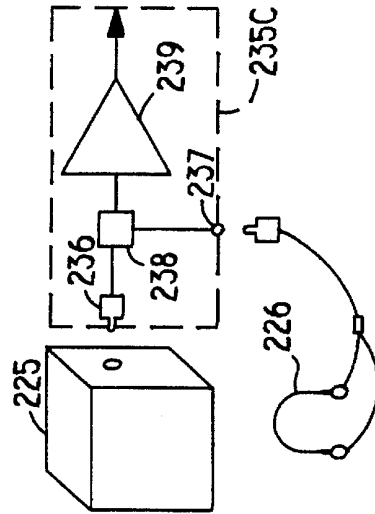TIME STAMP

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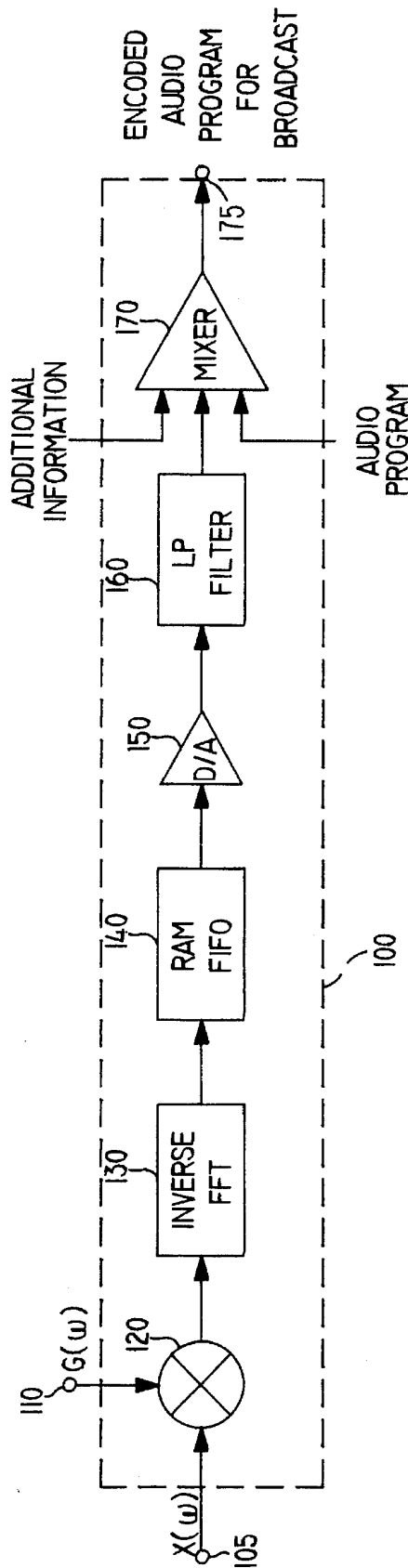
FIG. 2A

FIG. 2B

FIG. 2C

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