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United States Patent [19]

Cellier et al.

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[54] **LOSSLESS COMPRESSION/ DECOMPRESSION OF DIGITAL AUDIO DATA**

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[73] Assignee: **Merging Technologies**, Puidoux, Switzerland

[21] Appl. No.: **422,457**

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[51] **Int. Cl.**[6] **G10L 7/00**; G10L 3/02

[52] **U.S. Cl.** **704/501**; 704/504; 371/37.8; 341/64

[58] **Field of Search** 395/2.38, 2.39, 395/2.3–2.32; 375/242, 243, 254; 371/30, 37.1, 37.2, 37.7, 37.8; 382/56; 358/246, 261.1, 261.2, 427; 704/200, 500, 501, 503, 504; 341/50, 51, 64, 65

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Assistant Examiner—Ricky Q. Ngu
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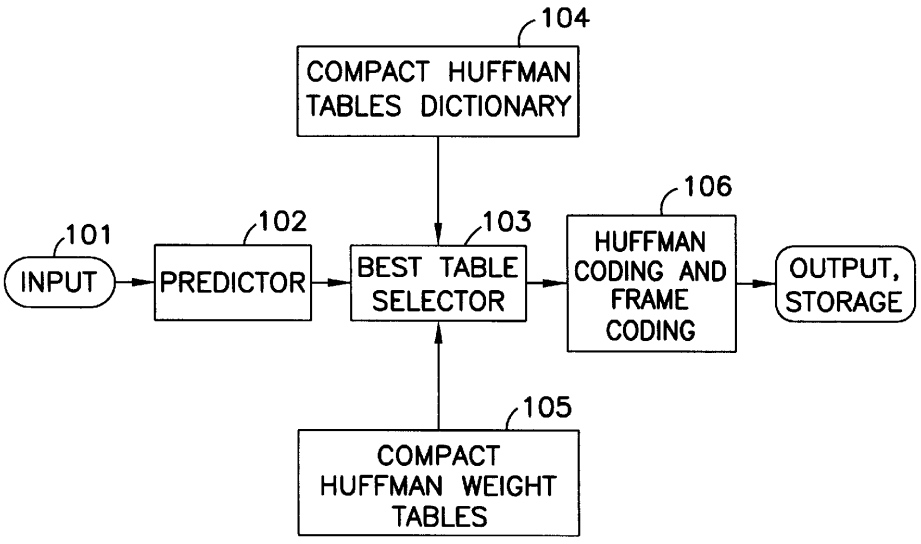
[57] **ABSTRACT**

An audio signal compression and decompression method and apparatus that provide lossless, realtime performance. The compression/decompression method and apparatus are based on an entropy encoding technique using multiple Huffman code tables. Uncompressed audio data samples are first processed by a prediction filter which generates prediction error samples. An optimum coding table is then selected from a number of different preselected tables which have been tailored to different probability density functions of the prediction error. For each frame of prediction error samples, an entropy encoder selects the one Huffman code table which will yield the shortest encoded representation of the frame of prediction error samples. The frame of prediction error samples is then encoded using the selected Huffman code table. A block structure for the compressed data and a decoder for reconstructing the original audio signal from the compressed data are also disclosed.

14 Claims, 7 Drawing Sheets



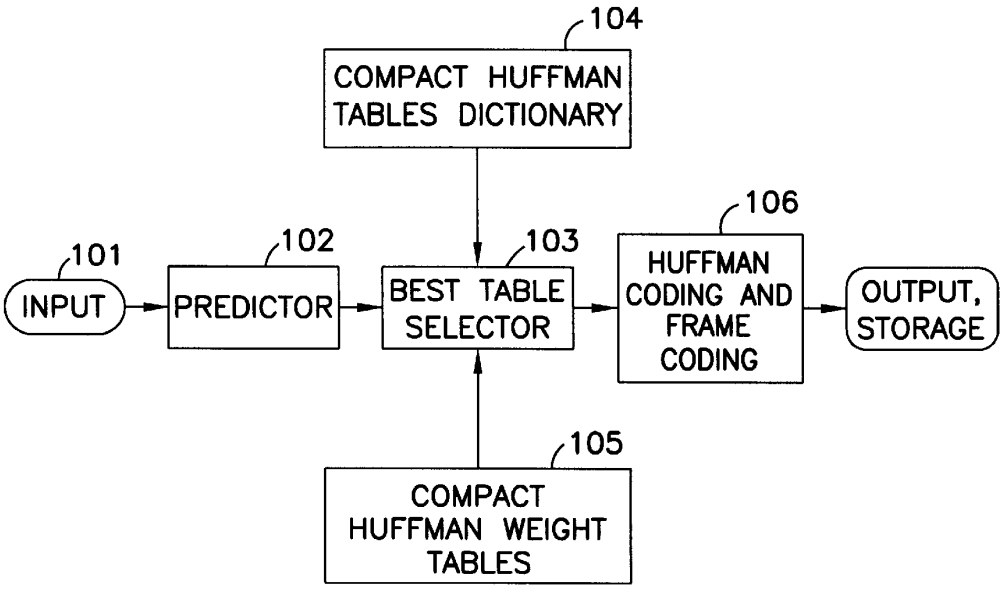


FIG. 1

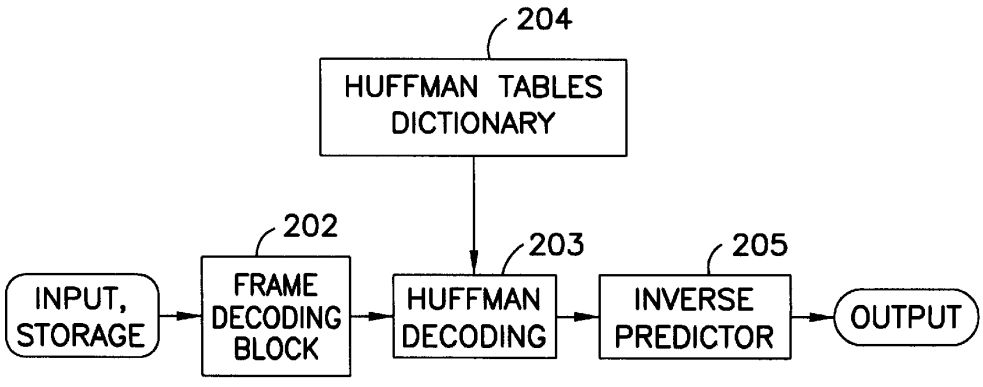


FIG. 2

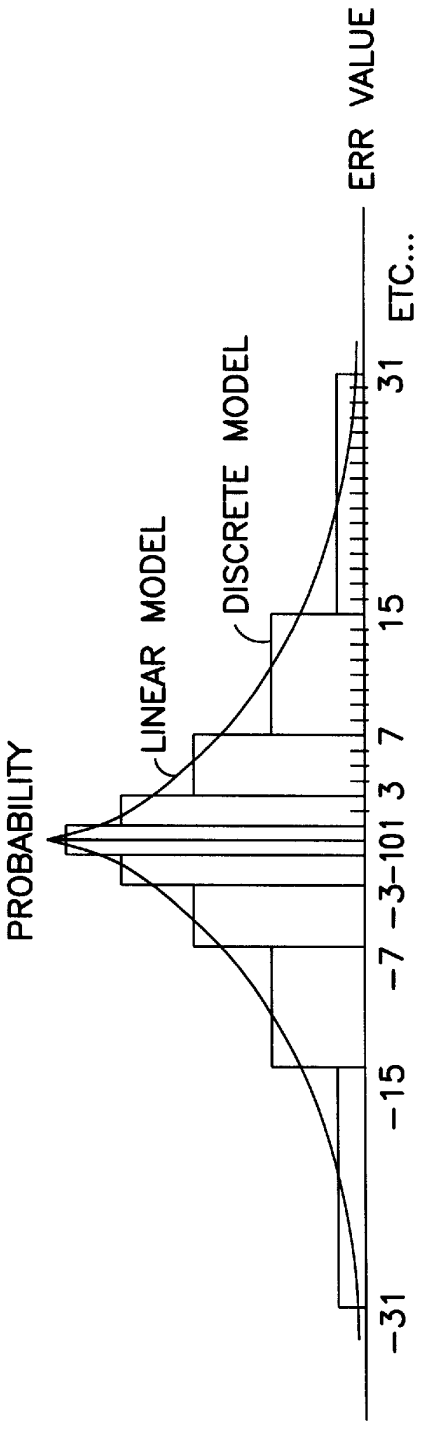


FIG. 3

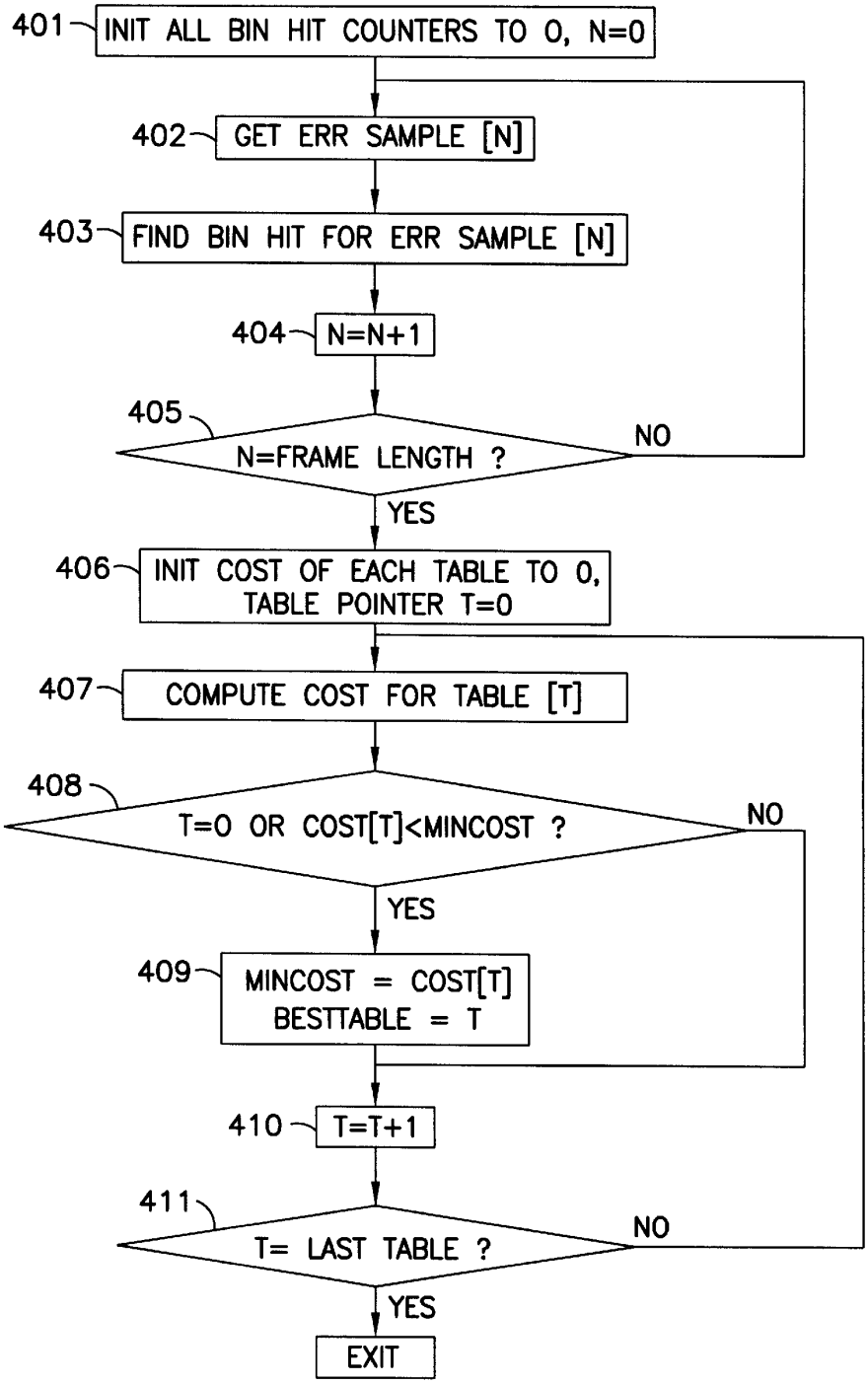
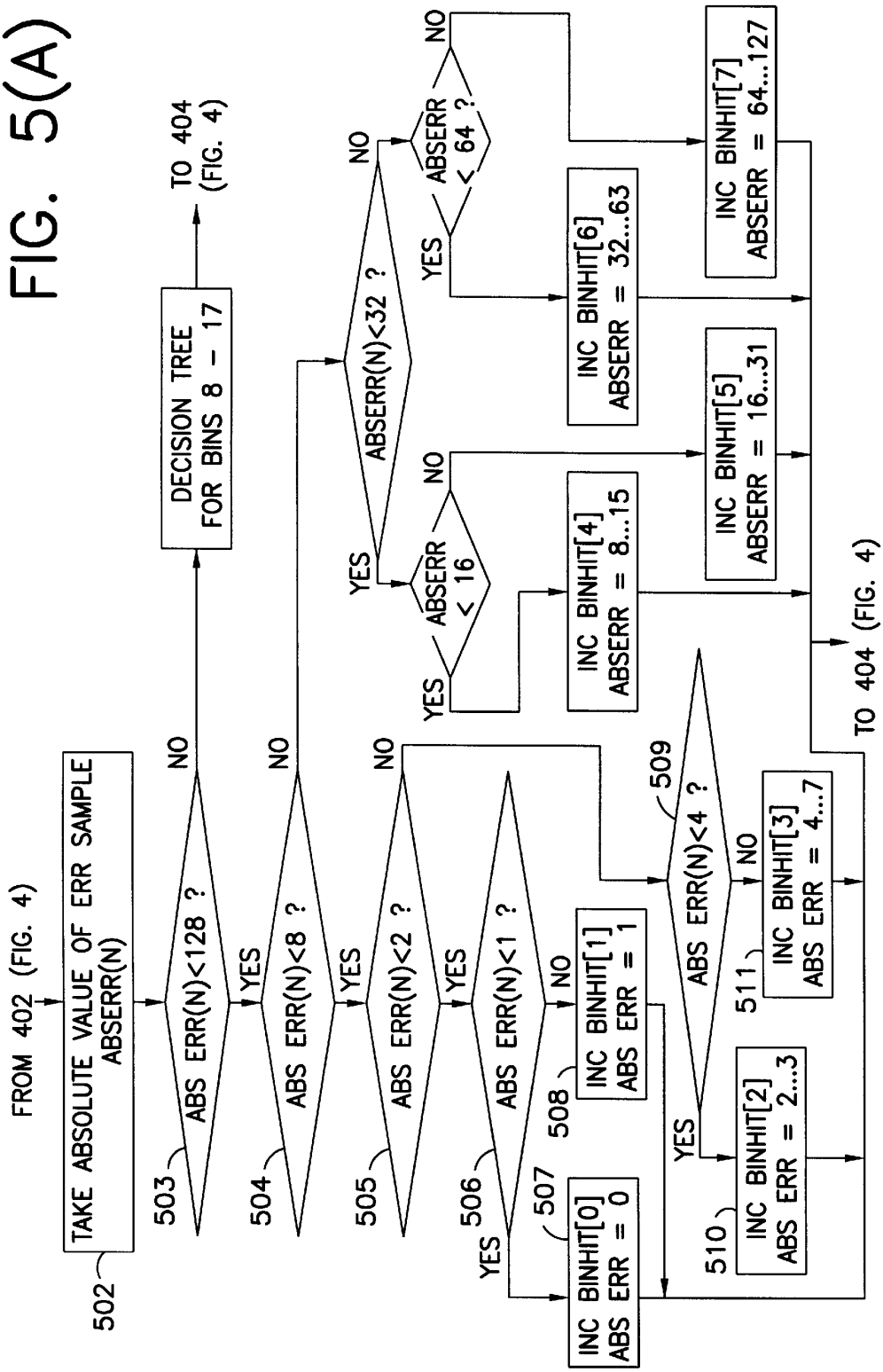


FIG. 4

FIG. 5(A)



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