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(54) **Title:** SCALABLE SPEECH AND AUDIO ENCODING USING COMBINATORIAL ENCODING OF MDCT SPECTRUM

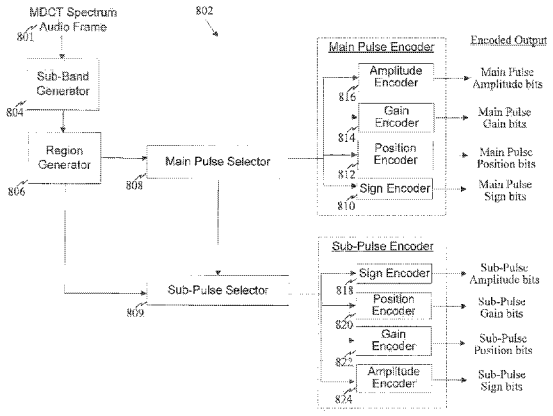


FIGURE 8

(57) **Abstract:** A scalable speech and audio codec is provided that implements combinatorial spectrum encoding. A residual signal is obtained from a Code Excited Linear Prediction (CELP)-based encoding layer, where the residual signal is a difference between an original audio signal and a reconstructed version of the original audio signal. The residual signal is transformed at a Discrete Cosine Transform (DCT)-type transform layer to obtain a corresponding transform spectrum having a plurality of spectral lines. The transform spectrum spectral lines are transformed using a combinatorial position coding technique. The combinatorial position coding technique includes generating a lexicographical index for a selected subset of spectral lines, where each lexicographic index represents one of a plurality of possible binary strings representing the positions of the selected subset of spectral lines. The lexicographical index represents non-zero spectral lines in a binary string in fewer bits than the length of the binary string.

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