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Berdugo

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(54) **SUB-BAND EXPONENTIAL SMOOTHING NOISE CANCELING SYSTEM**

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(58) **Field of Search** 375/285, 296, 375/346, 349; 381/94.1, 71.1; 379/406.01, 406.06, 406.08, 406.12, 406.13, 406.14

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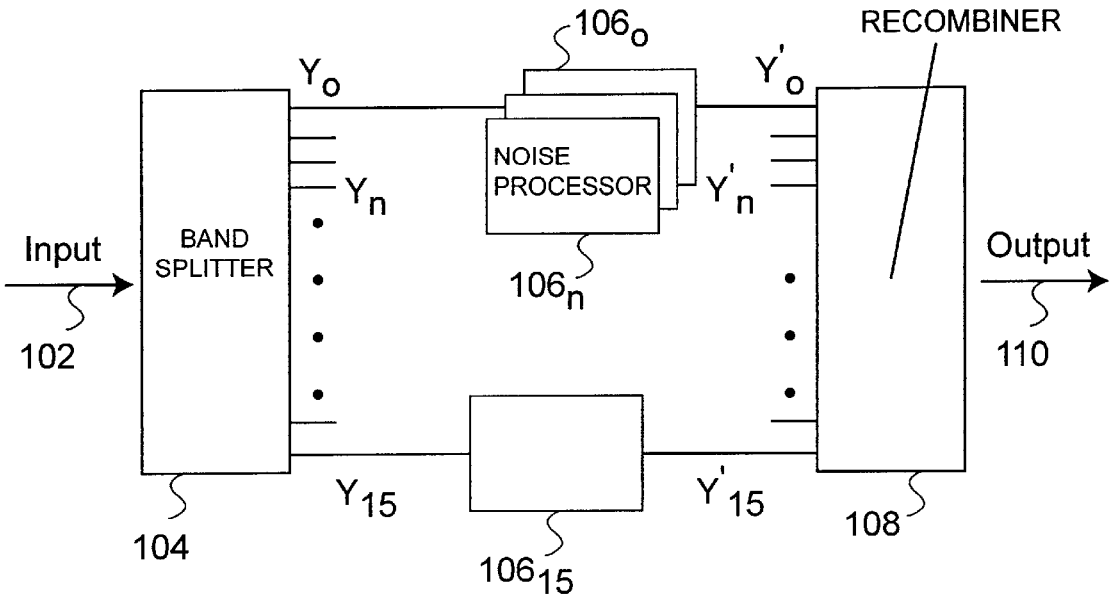
(57) **ABSTRACT**

A noise canceling method and apparatus for canceling noise by time domain processing sub-bands of a digital input signal. The input signal is divided into a number of frequency-limited time-domain sub-bands. Each sub-band is then individually processed to cancel noise present in the signal. The noise processing includes exponential averaging of the input, noise estimation, and subtraction processing. The noise subtraction process is simplified by generating a filter coefficient that is exponentially smoothed, hard limited, and multiplied with the input signal to generate the noise processed output for each sub-band. The noise processed bands are then recombined into a digital output signal. Implementation may be effected in software or hardware and applied to various noise canceling and signal processing applications.

14 Claims, 6 Drawing Sheets



Sub-band Noise Canceling System