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United States Patent [19]

Nakagawa et al.

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[54] **SUBBAND ACOUSTIC ECHO CANCELLER**

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[21] Appl. No.: **695,446**

[22] Filed: **Aug. 12, 1996**

[30] **Foreign Application Priority Data**

Aug. 14, 1995 [JP] Japan 7-206929

[51] **Int. Cl.**[6] **H04B 3/20**

[52] **U.S. Cl.** **381/66**; 381/94.1; 379/406; 379/410

[58] **Field of Search** 381/66, 94.1, 71.1, 381/71.11; 379/406, 408, 410, 407, 411

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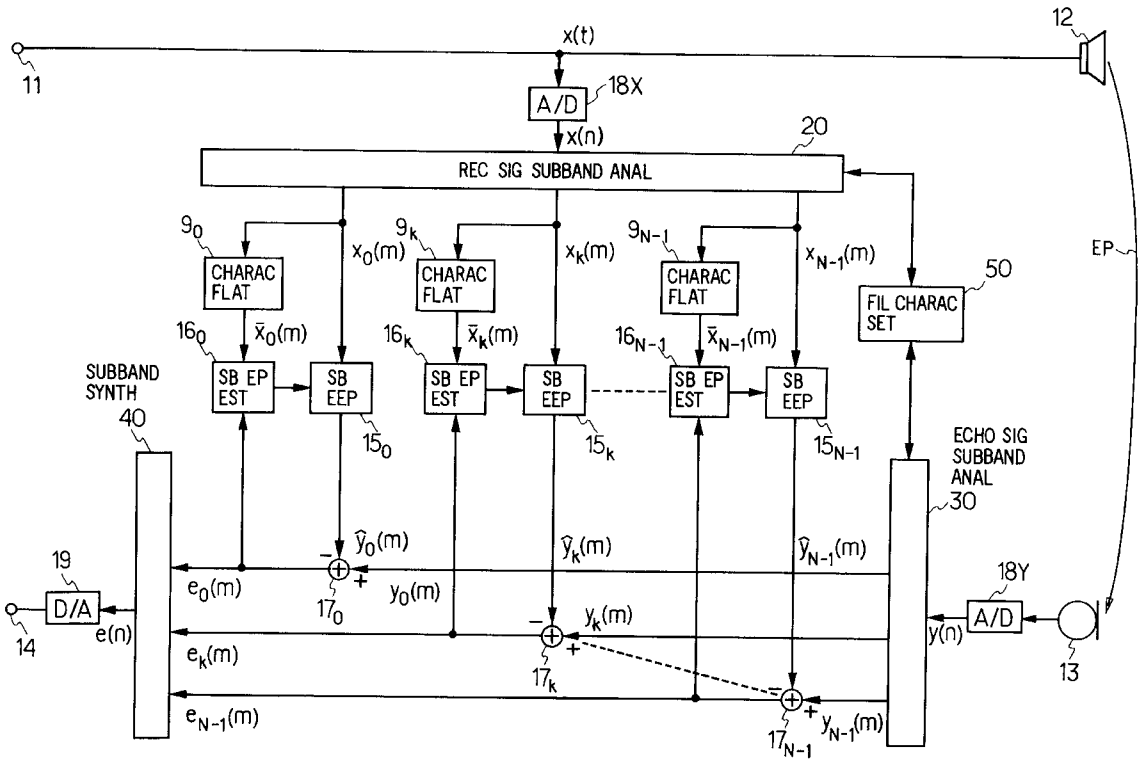
Attorney, Agent, or Firm—Pollock, Vande Sande & Priddy

[57] **ABSTRACT**

In a subband acoustic echo canceller which generates an echo replica from a subband received signal $x_k(m)$ by an estimated echo path in each subband, subtracts the echo replica from a subband echo signal $y_k(m)$ by a subtractor to generate a subband error signal $e_k(m)$ and uses an adaptive algorithm in an echo path estimation part to estimate the transfer function of the estimated echo path from the subband error signal $e_k(m)$ and the subband received signal $x_k(m)$ so that the subband error signal $e_k(m)$ approaches zero, the stop-band attenuation of each band-pass filter of a received signal subband analysis part for generating the subband received signal $x_k(m)$ is set to be smaller than the stop-band attenuation of each band-pass filter of an echo subband analysis part for generating the subband echo signal $Y_k(m)$ to thereby flatten the frequency characteristics of the subband received signals relative to the subband echo signals.

16 Claims, 21 Drawing Sheets



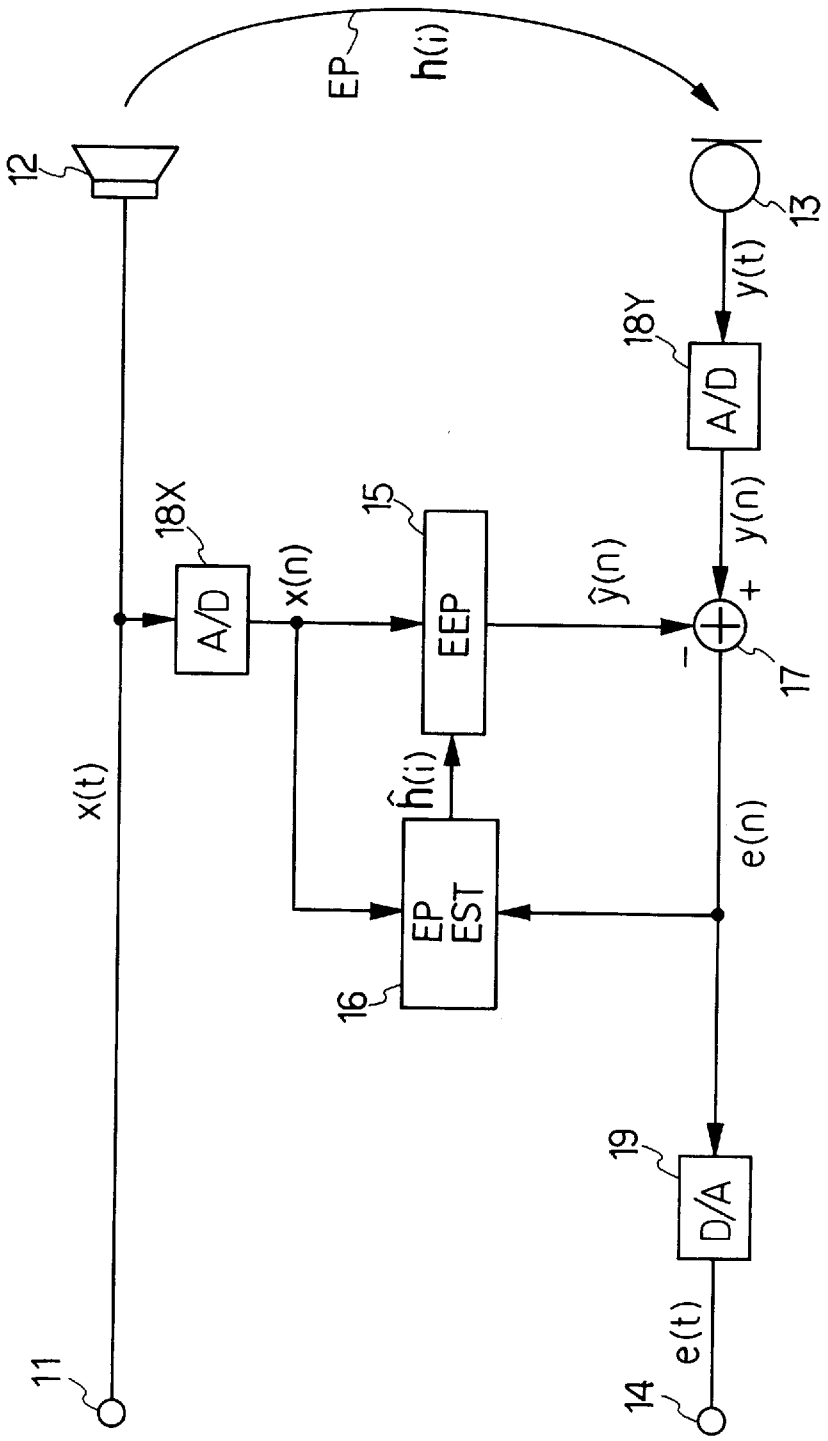


FIG.1 PRIOR ART

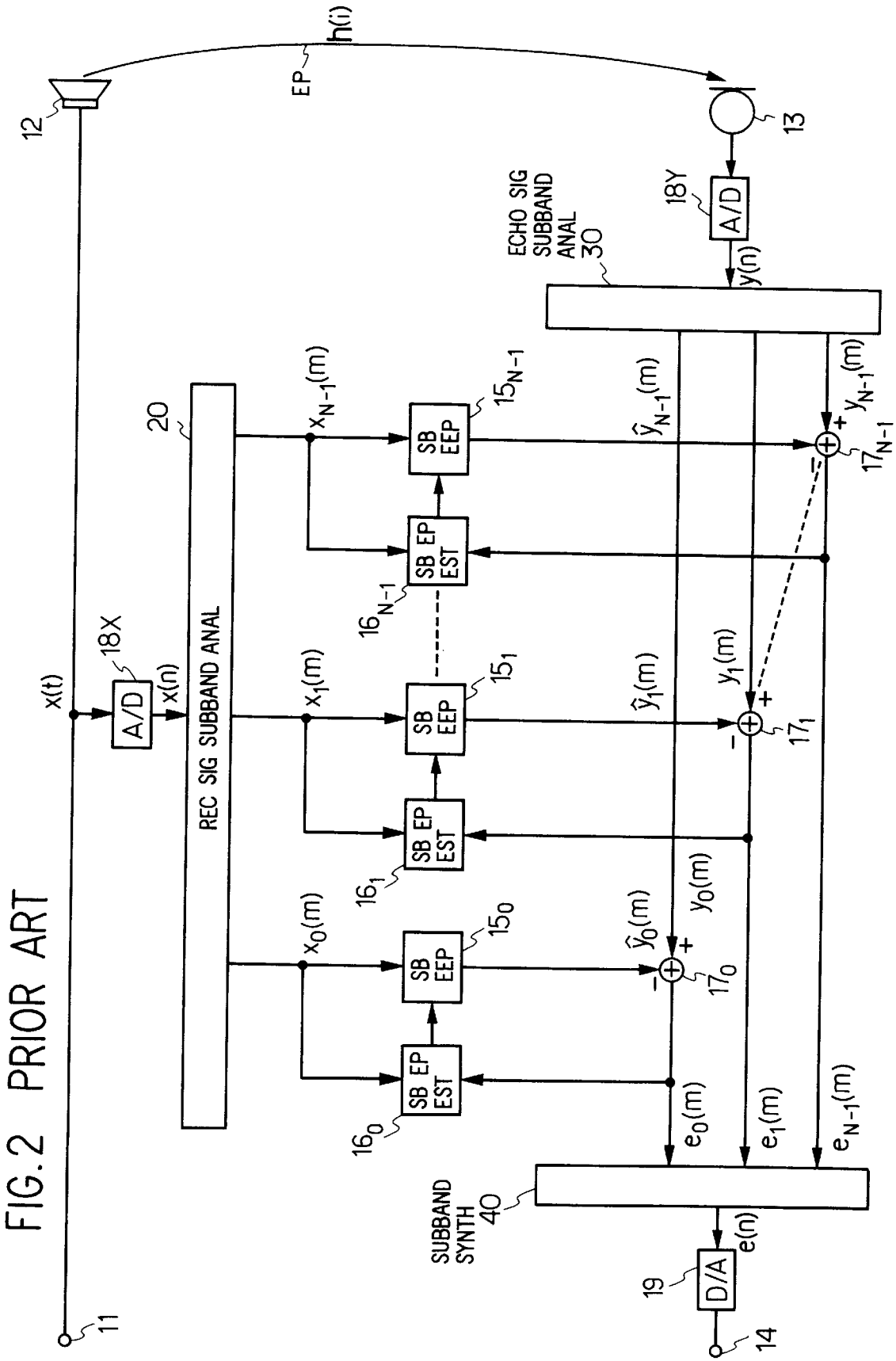


FIG. 2 PRIOR ART

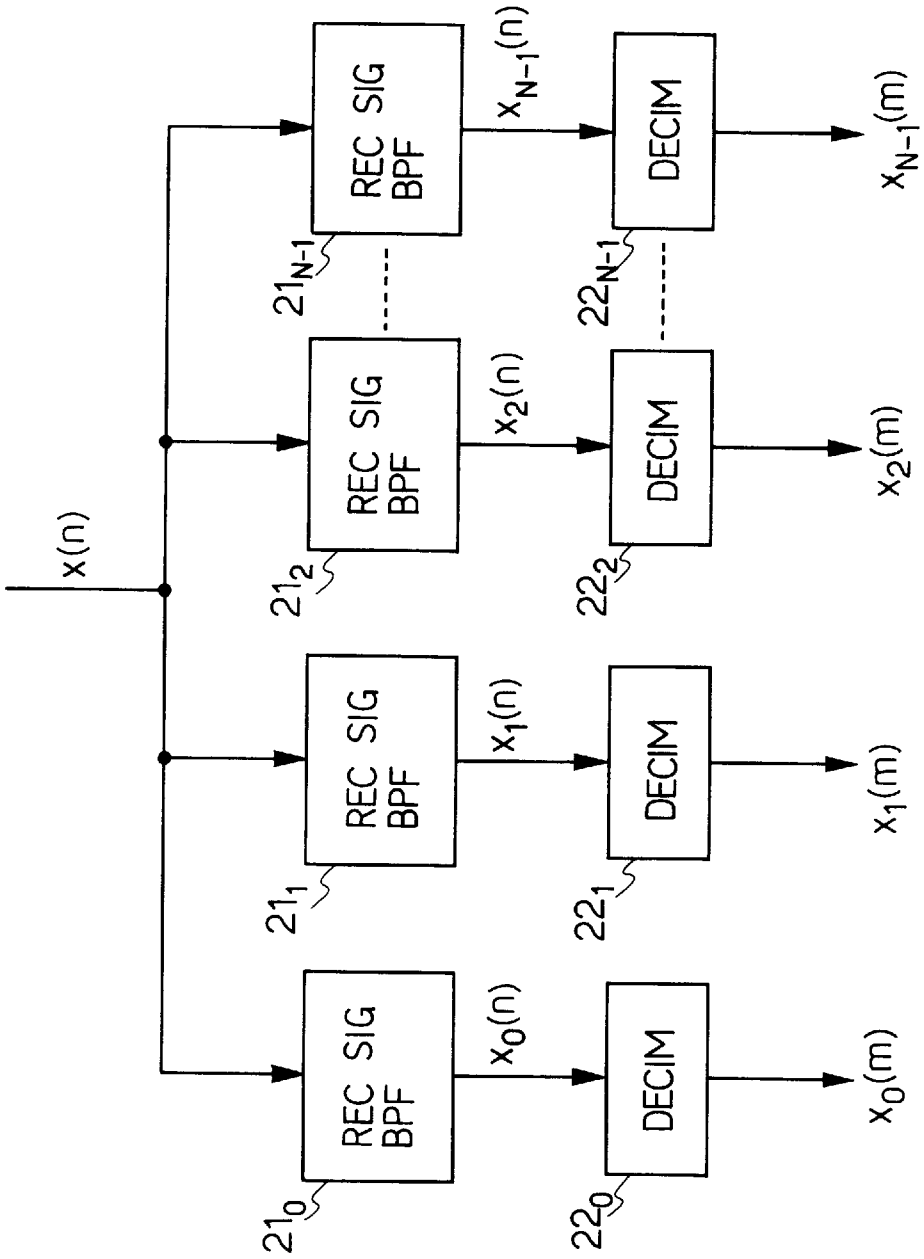


FIG.3 PRIOR ART

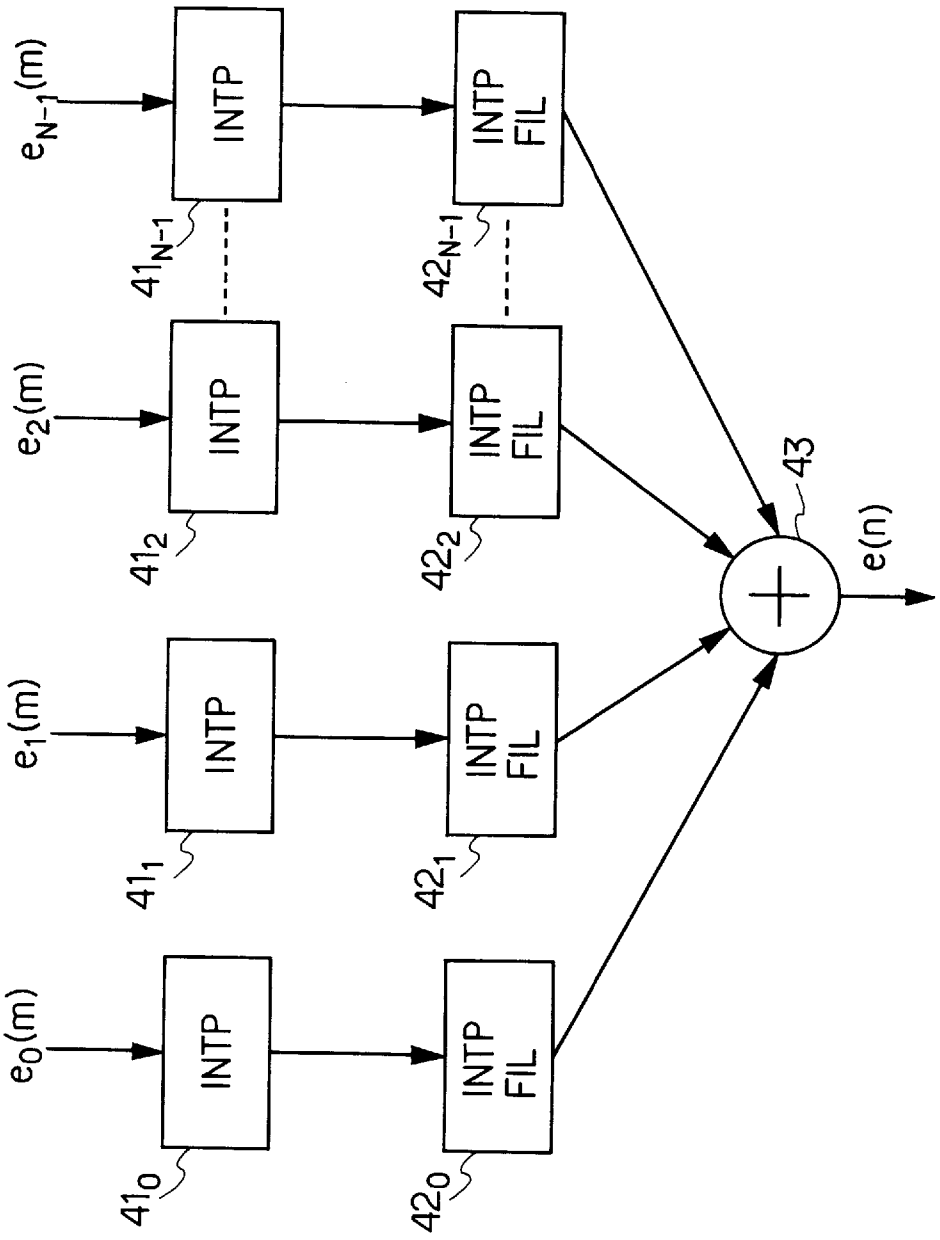


FIG. 4 PRIOR ART

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