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# United States Patent [19] Christman

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- [54] **ADAPTIVELY FORMED SIGNAL-FREE REFERENCE SYSTEM**
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- [58] Field of Search ..... **367/901, 124, 136, 135; 381/94, 71; 364/574**

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### [57] ABSTRACT

A method and apparatus are provided to adaptively form an optimum signal-free reference used to cancel near-field noise in an adaptive plate-noise cancellation system. First, second and third pressure sensors are positioned to detect any near-field plate-radiated noise. The first sensor is positioned closest to the plate, the third sensor is positioned furthest from the plate, and the second sensor is positioned between the first and third sensors. An acoustic far-field projector generates a plurality of broadband signals from a plurality of incidence angles. Each broadband signal is projected at an amplitude indicative of a noise-off condition. Outputs from the first and third sensors are combined to form a dipole responsive to each broadband signal). A feedback system is operatively associated with the dipole and the second sensor. The feedback system includes an adaptive filter that converges to generate an optimum signal-free reference for each of the plurality of the broadband signals and stores filter coefficients indicative of the optimum signal-free reference for each of the broadband signals. Switching means are provided to selectively switch the adaptive filter out of the feedback system such that the stored filter coefficients may be used.

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6 Claims, 2 Drawing Sheets

