

EXHIBIT C



(12) **United States Patent**
Burnett

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(54) **MICROPHONE ARRAY WITH REAR VENTING**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1041 days.

(21) Appl. No.: **12/163,617**

(22) Filed: **Jun. 27, 2008**

(65) **Prior Publication Data**
US 2009/0010449 A1 Jan. 8, 2009

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/139,333, filed on Jun. 13, 2008, and a continuation-in-part of application No. 11/805,987, filed on May 25, 2007, now abandoned, and a continuation-in-part of application No. 10/667,207, filed on Sep. 18, 2003, now Pat. No. 8,019,091, and a continuation-in-part of application No. 10/400,282, filed on Mar. 27, 2003.

(60) Provisional application No. 60/937,603, filed on Jun. 27, 2007.

(51) **Int. Cl.**
H04R 3/00 (2006.01)
(52) **U.S. Cl.** **381/92**; 381/94.1; 381/94.7
(58) **Field of Classification Search** 381/92, 381/94.1, 94.7
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

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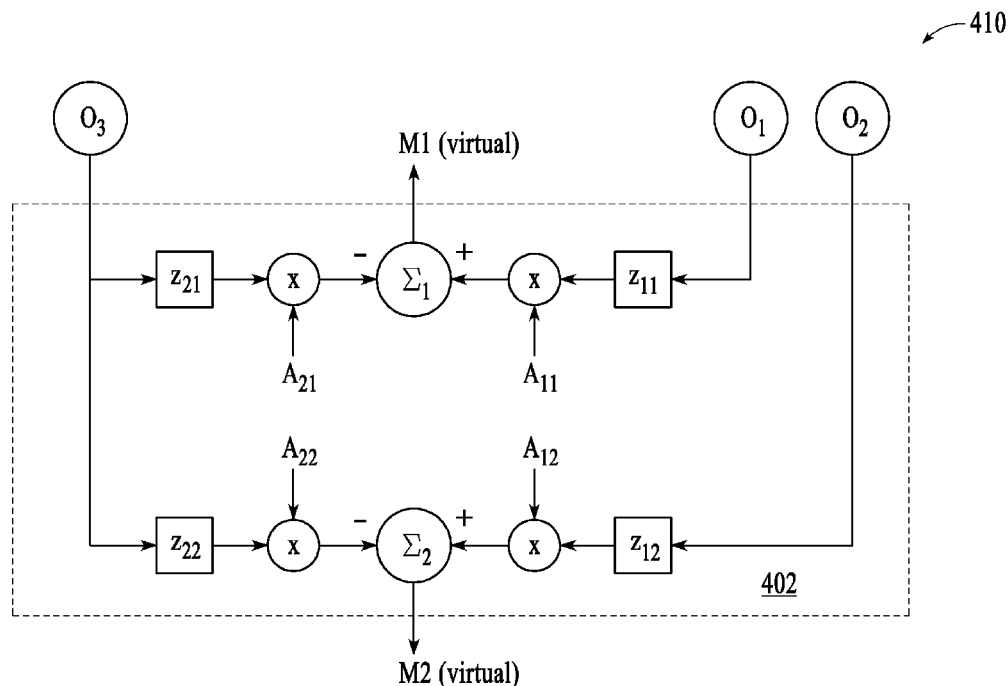
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(57) **ABSTRACT**

Microphone arrays (MAs) are described that position and vent microphones so that performance of a noise suppression system coupled to the microphone array is enhanced. The MA includes at least two physical microphones to receive acoustic signals. The physical microphones make use of a common rear vent (actual or virtual) that samples a common pressure source. The MA includes a physical directional microphone configuration and a virtual directional microphone configuration. By making the input to the rear vents of the microphones (actual or virtual) as similar as possible, the real-world filter to be modeled becomes much simpler to model using an adaptive filter.

9 Claims, 14 Drawing Sheets



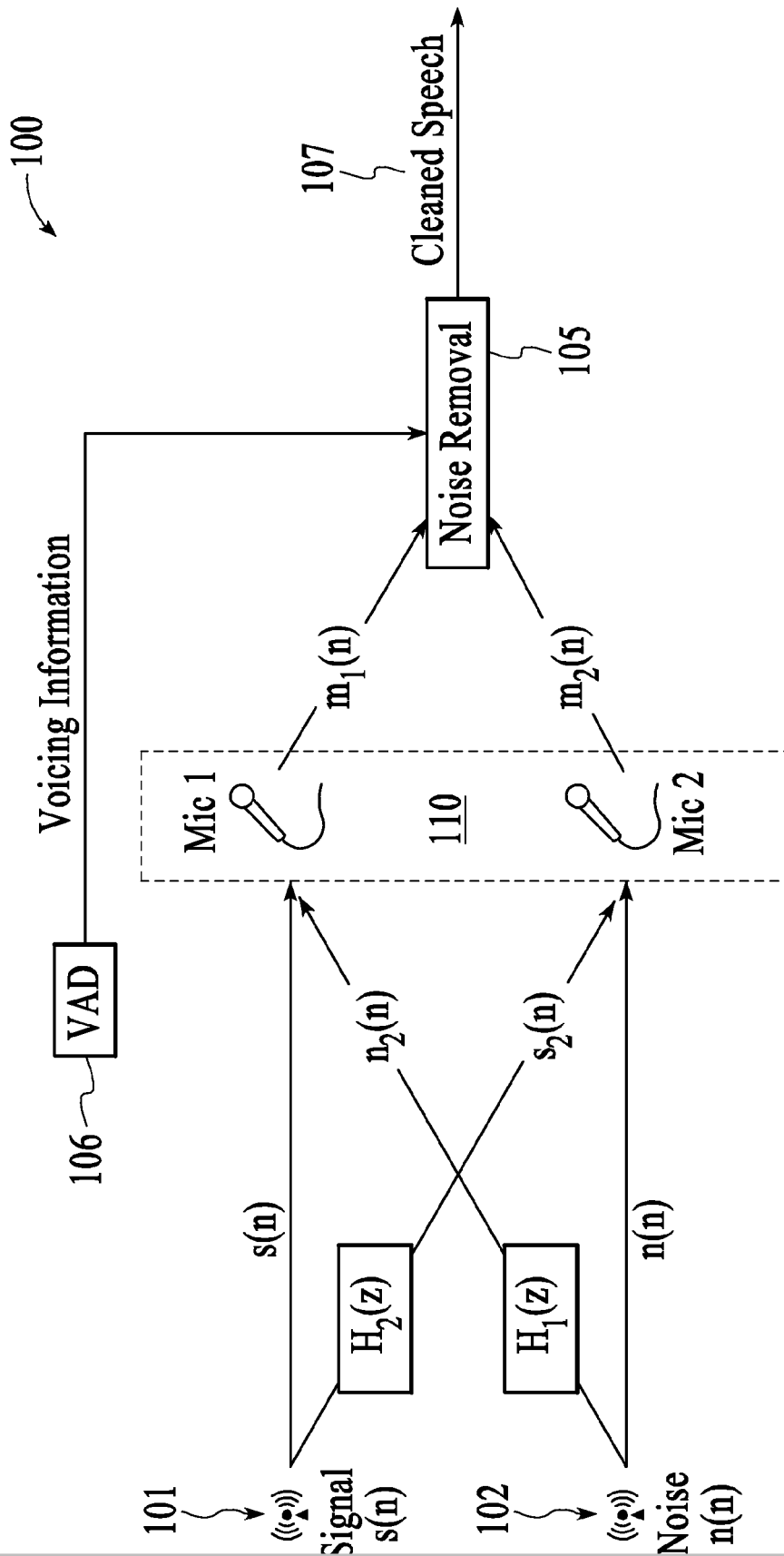


FIG. 1

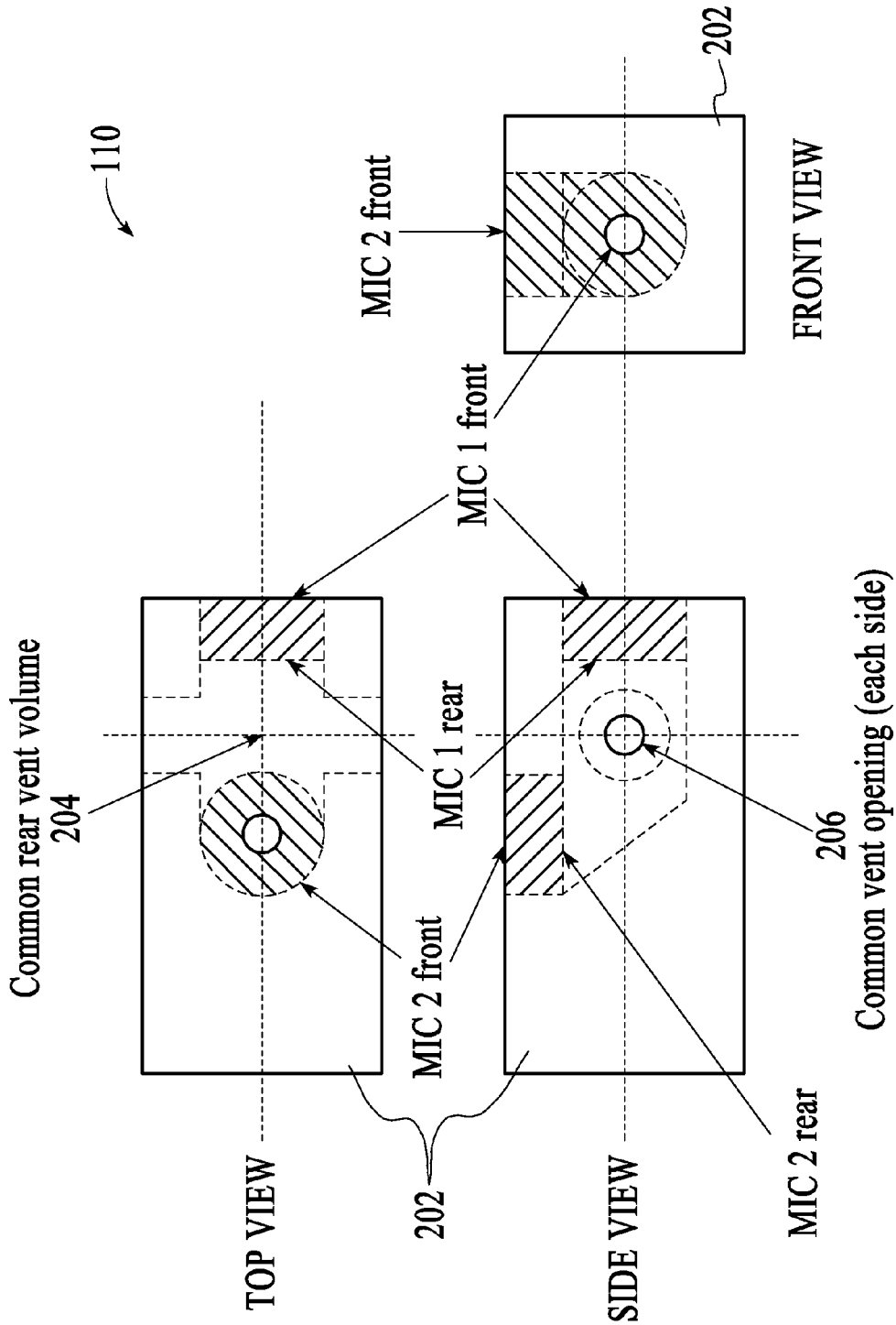


FIG. 2

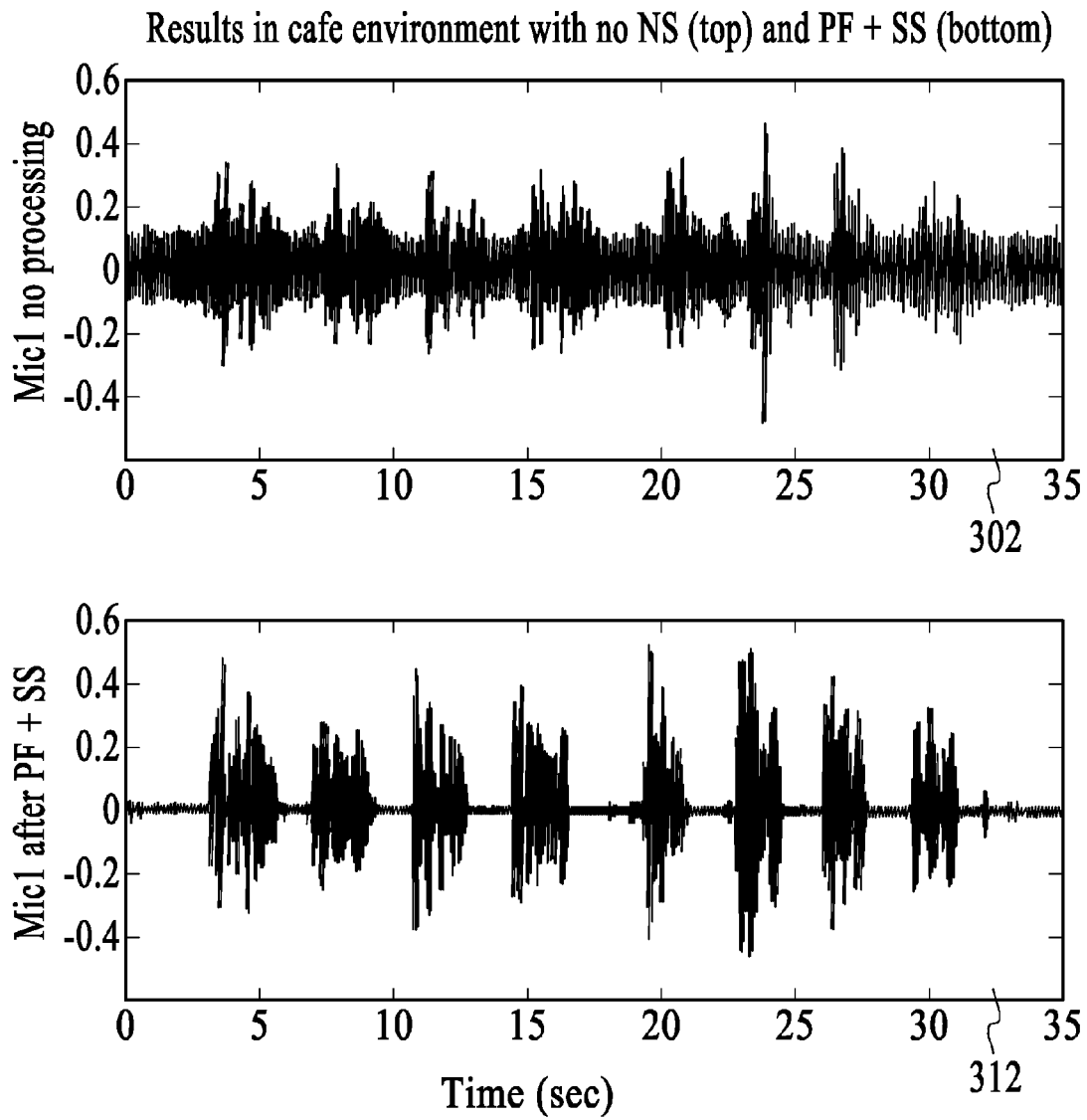


FIG.3

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