

## EXHIBIT 3



US008280072B2

(12) **United States Patent**  
**Burnett**

(10) **Patent No.:** **US 8,280,072 B2**  
(45) **Date of Patent:** **Oct. 2, 2012**

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

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(73) Assignee: **AliphCom, Inc.**, San Francisco, CA (US)

(\*) 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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\* cited by examiner

*Primary Examiner* — Wai Sing Louie

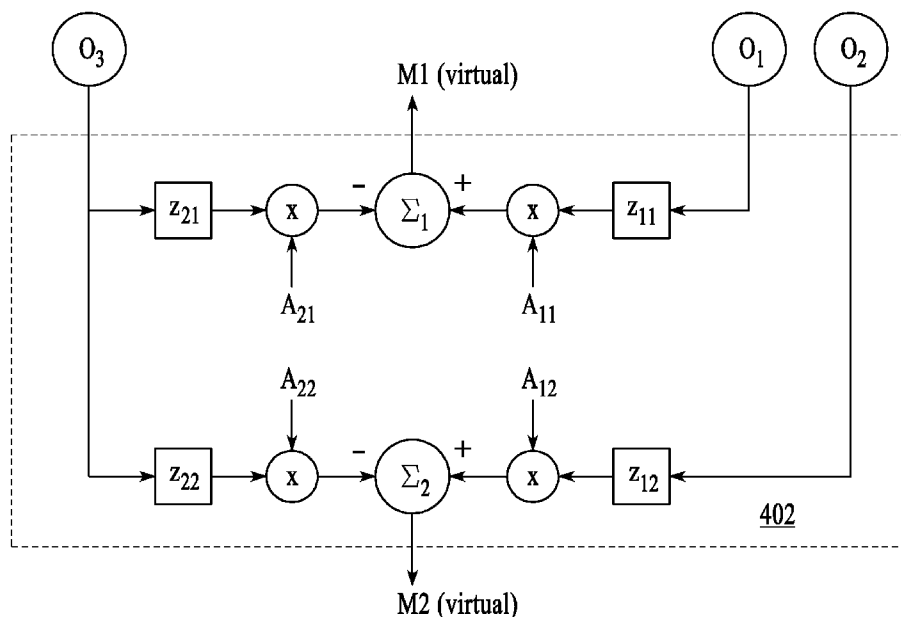
(74) *Attorney, Agent, or Firm* — Kokka & Backus, PC

(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**

410



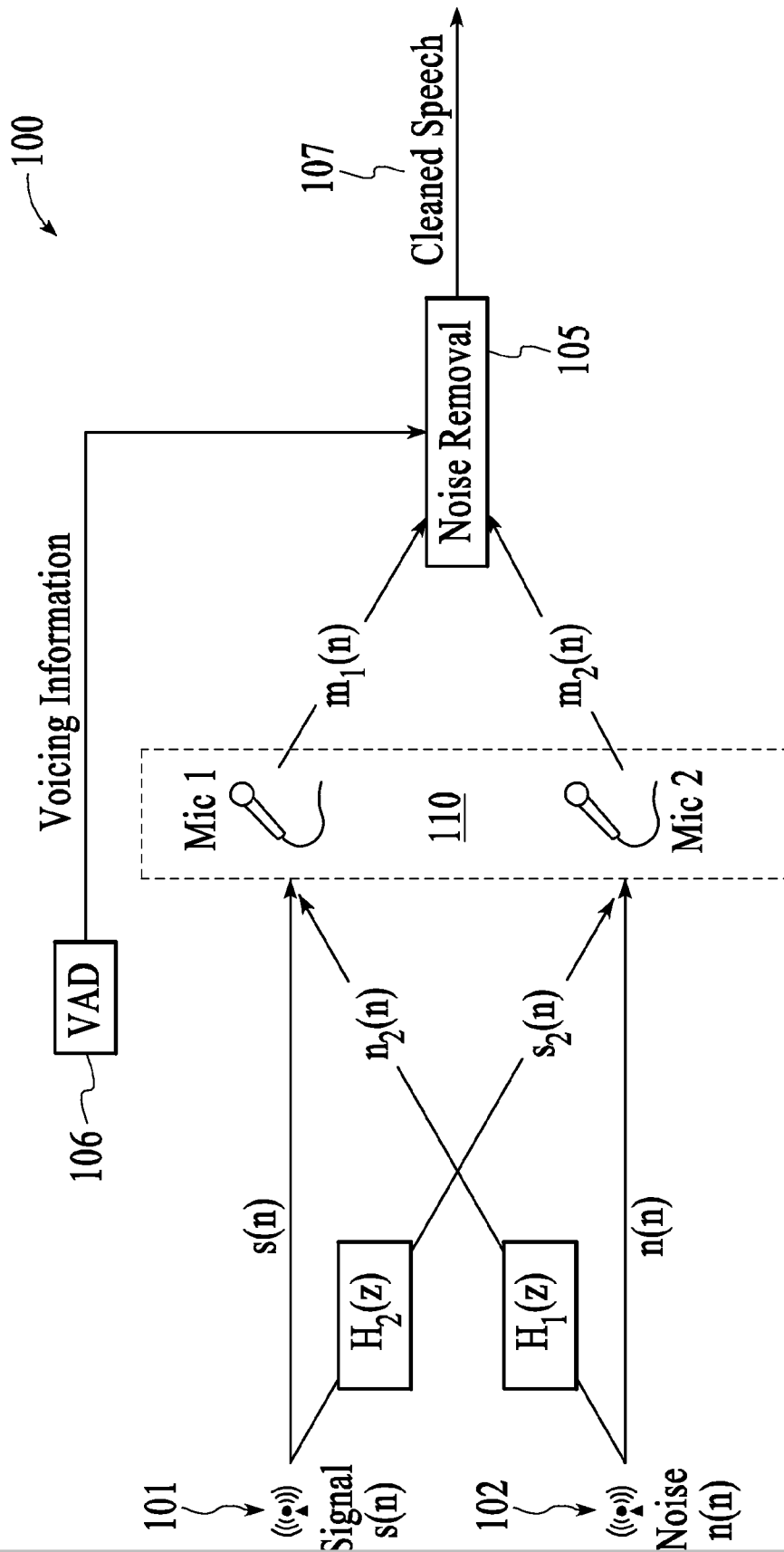


FIG. 1

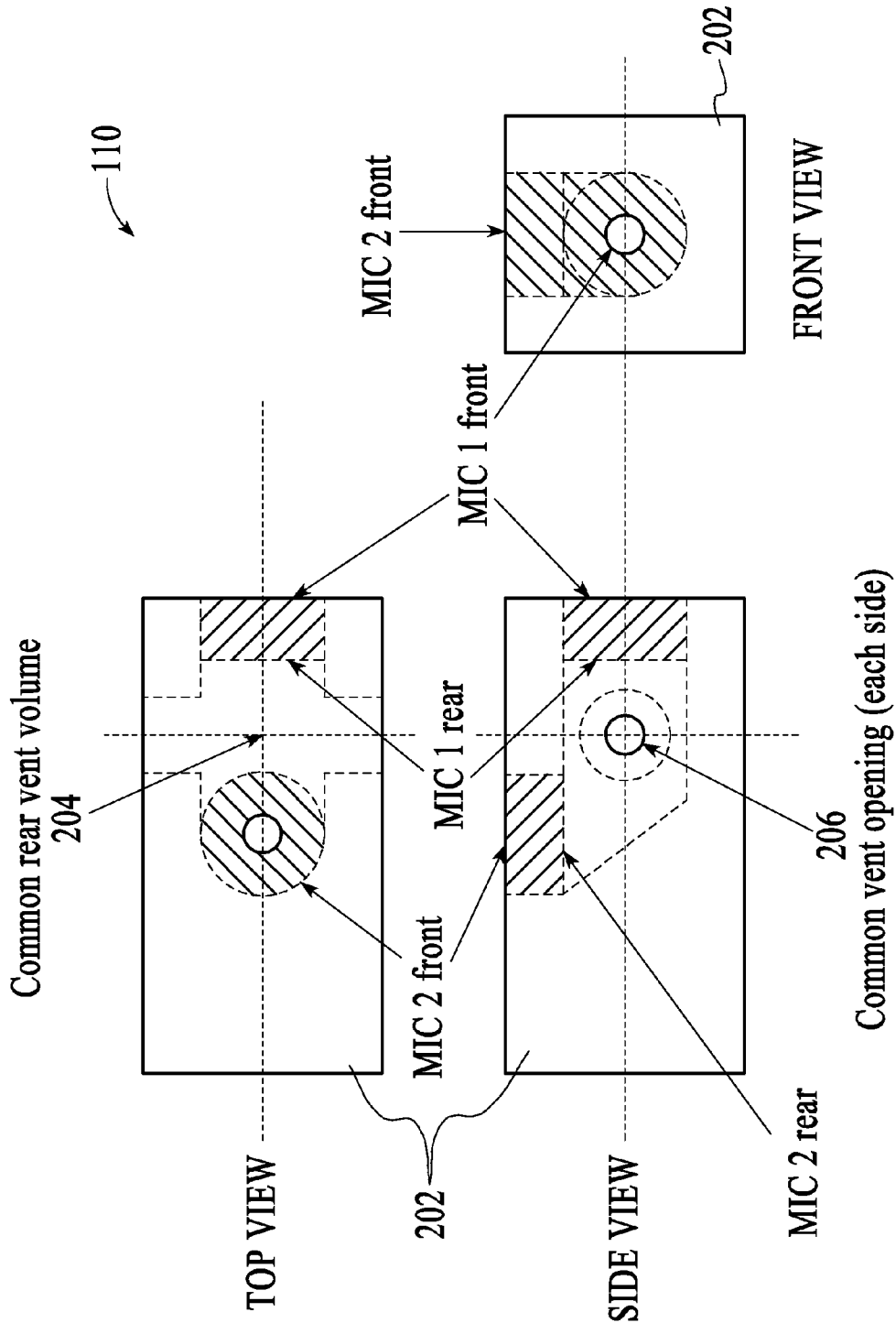


FIG. 2

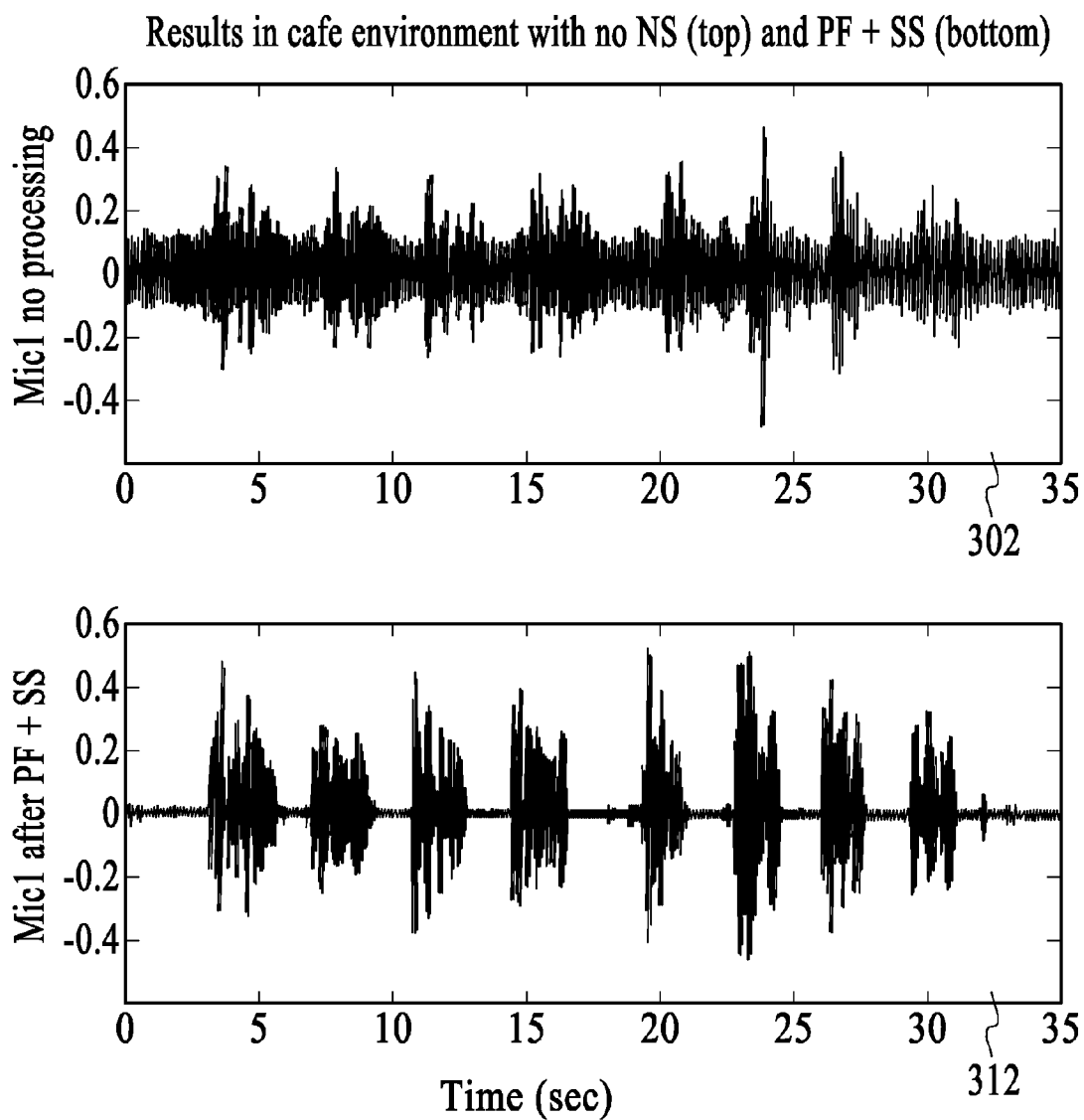


FIG.3

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