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**Li et al.**

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(54) **CLOSED LOOP FEEDBACK IN MIMO SYSTEMS**

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**H04B 1/38** (2006.01)  
**H04M 1/00** (2006.01)

(52) **U.S. Cl.** ..... **455/69; 455/562.1**

(58) **Field of Classification Search** ..... 455/69,  
455/562.1, 561, 101, 103, 272-273, 276.1,  
455/277.1, 277.2; 375/299, 347; 370/208  
See application file for complete search history.

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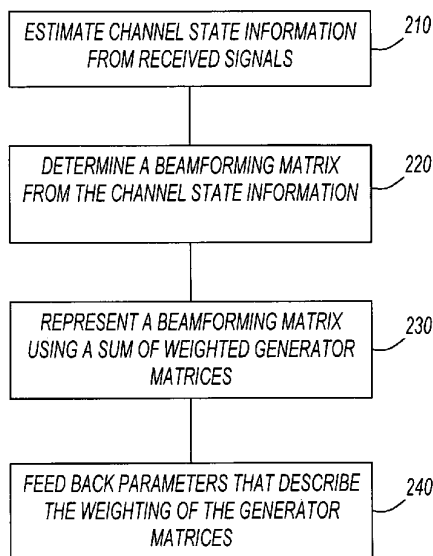
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(57) **ABSTRACT**

Feedback bandwidth may be reduced in a closed loop MIMO system by representing a beamforming matrix using orthogonal generator matrices.

**23 Claims, 4 Drawing Sheets**



200

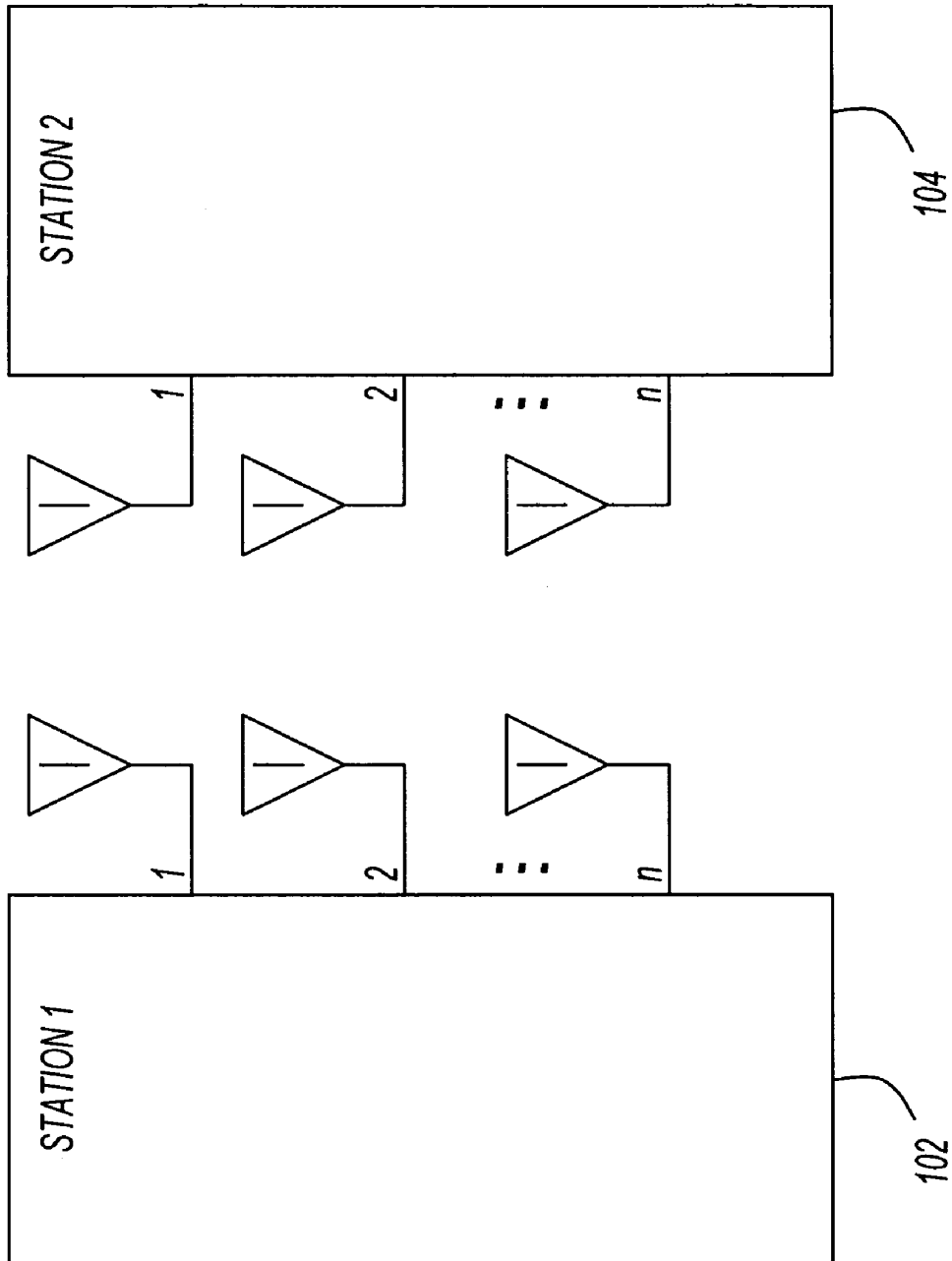


FIG. 1

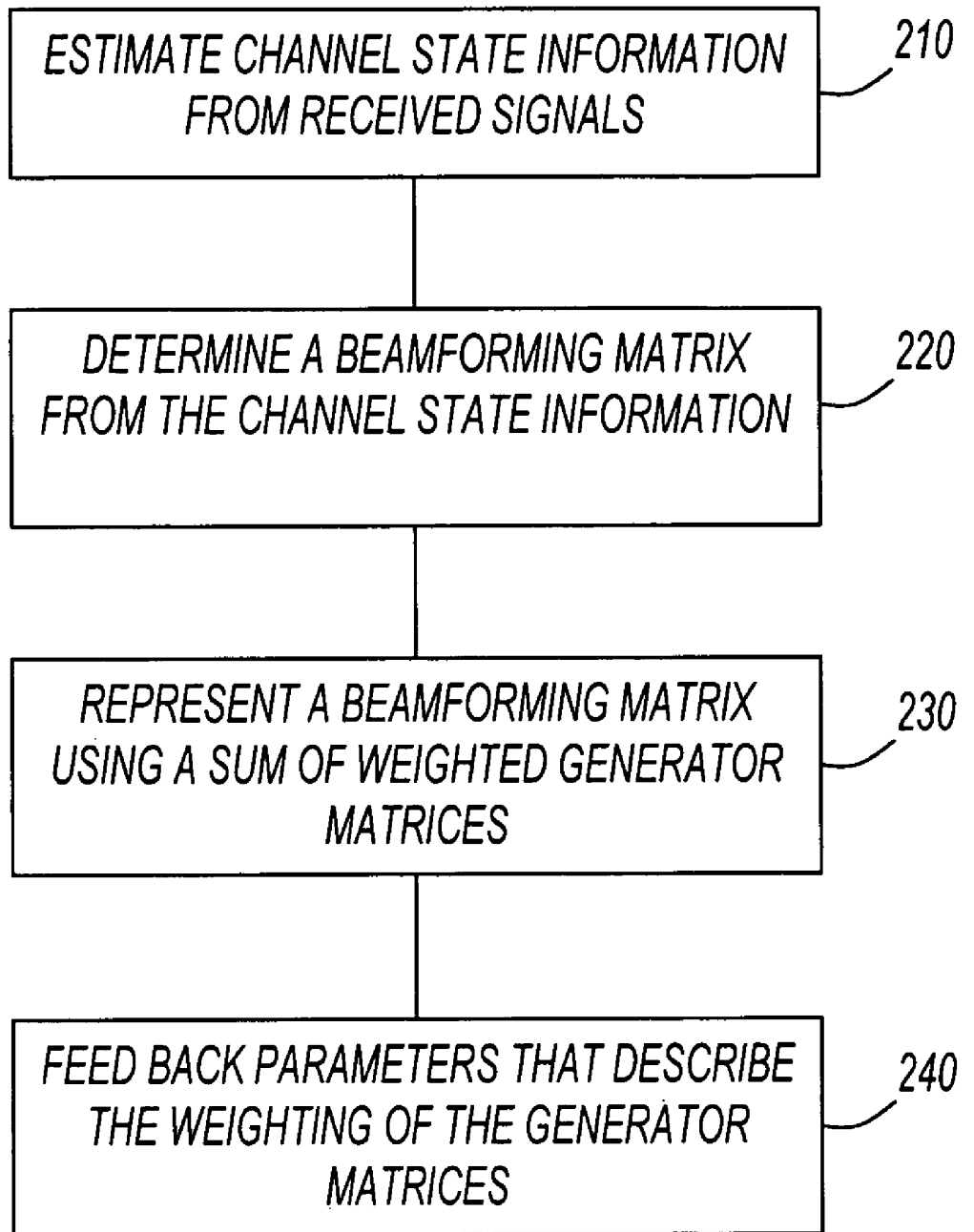


FIG. 2

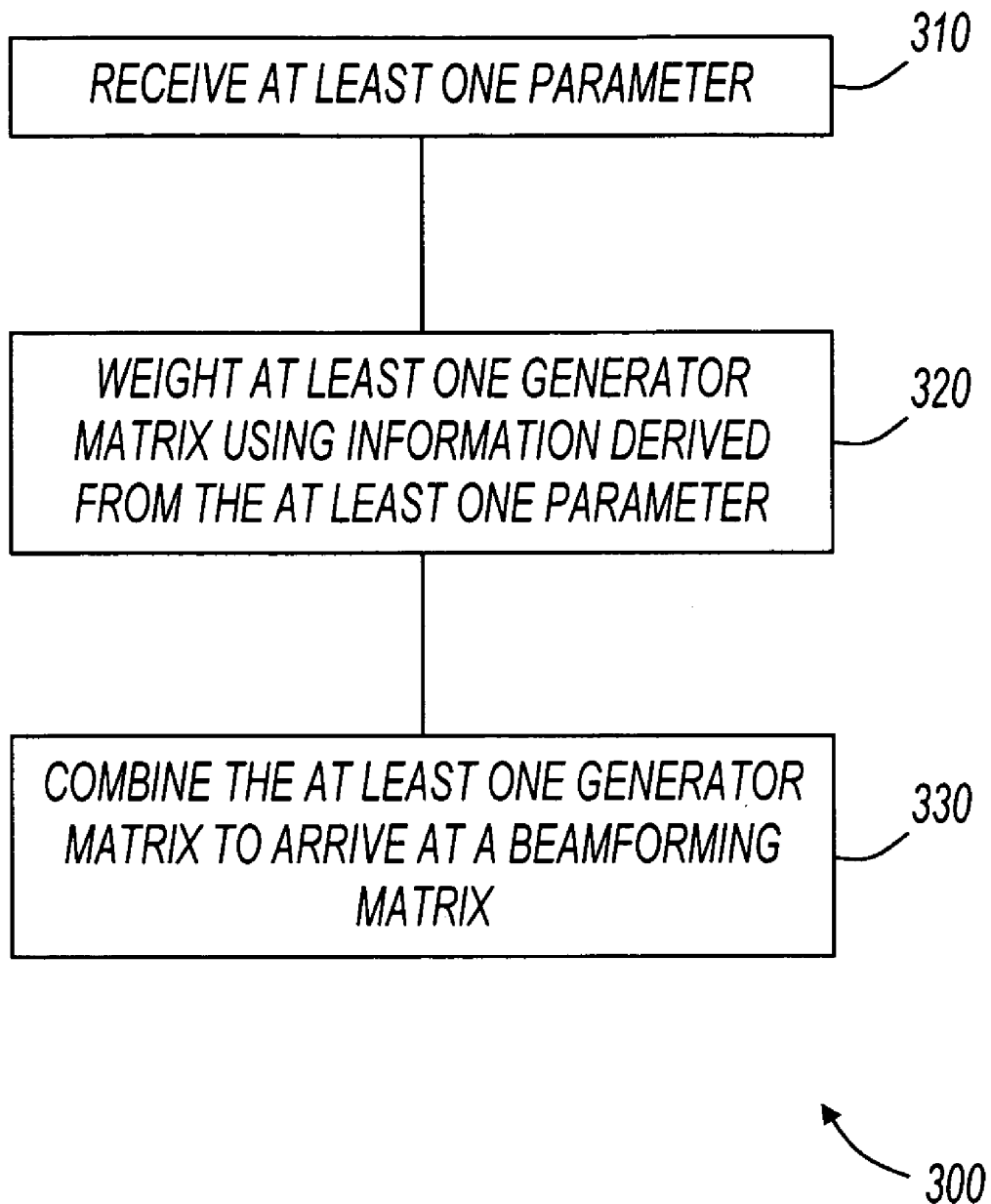


FIG. 3

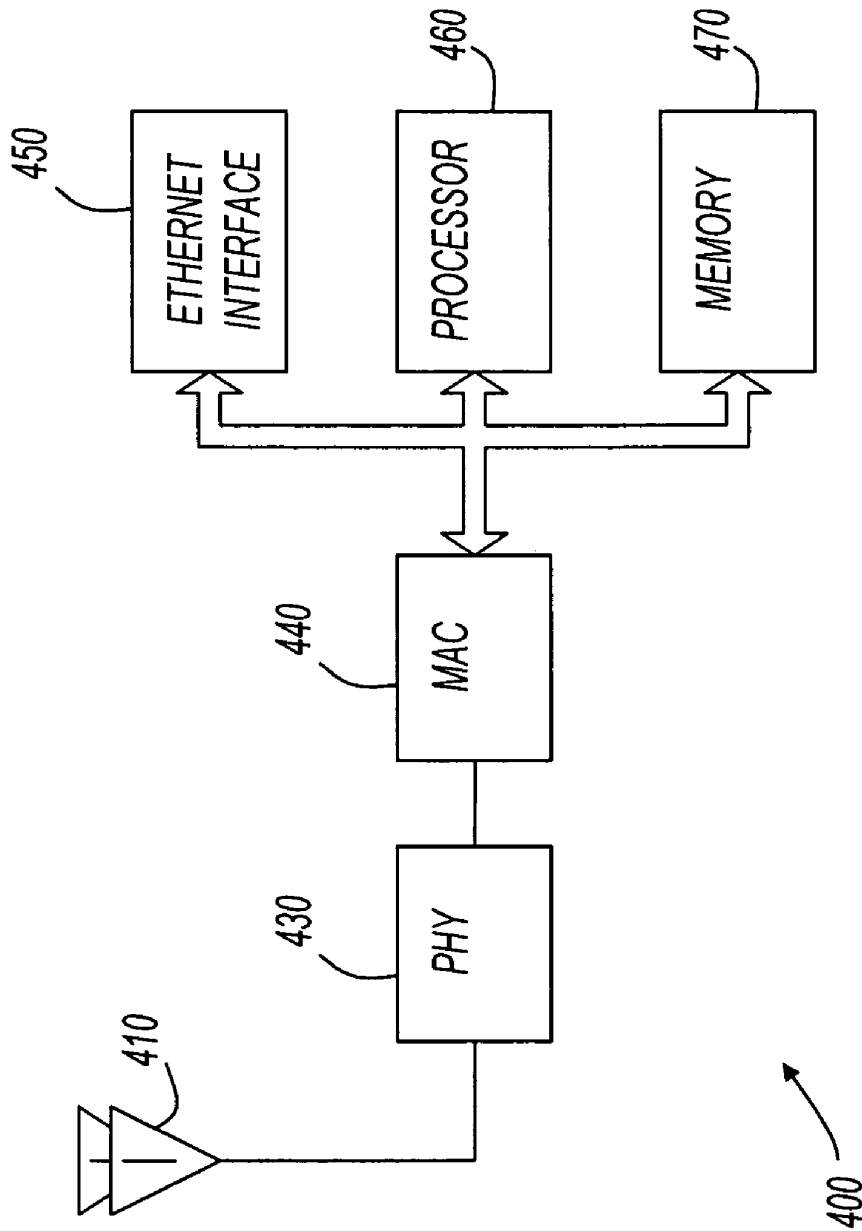


FIG. 4

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