United States Patent [19]

Bach et al.

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[54] **METHOD AND APPARATUS FOR RECEIVING A PLURALITY OF SIGNALS HAVING DIFFERENT FREQUENCY BANDWIDTHS**

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[21] Appl. No.: **09/065,313**

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[51] **Int. Cl.^{7}** **H04H 1/00**

[52] **U.S. Cl.** **455/3.1**; 348/7; 455/207; 455/249.1; 455/307; 455/313; 455/339; 455/340

[58] **Field of Search** 348/7, 12, 13, 348/731; 455/5.1, 4.2, 3.1, 307, 314, 339, 340, 350, 315, 295, 249.1, 313, 207, 266; H04N 7/173

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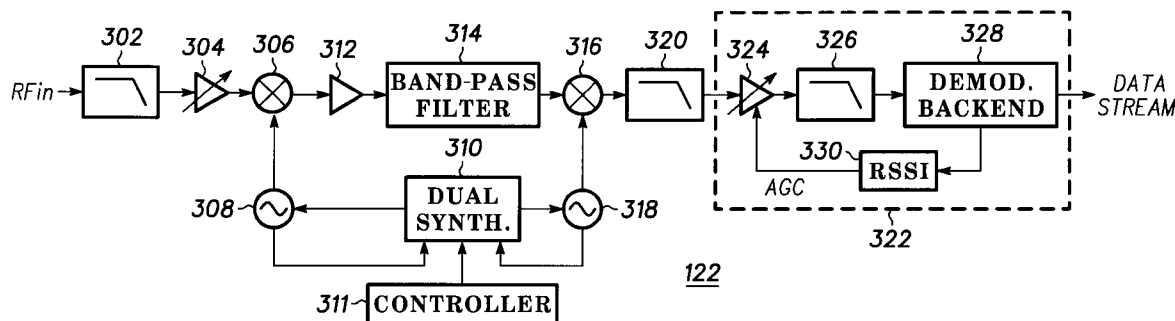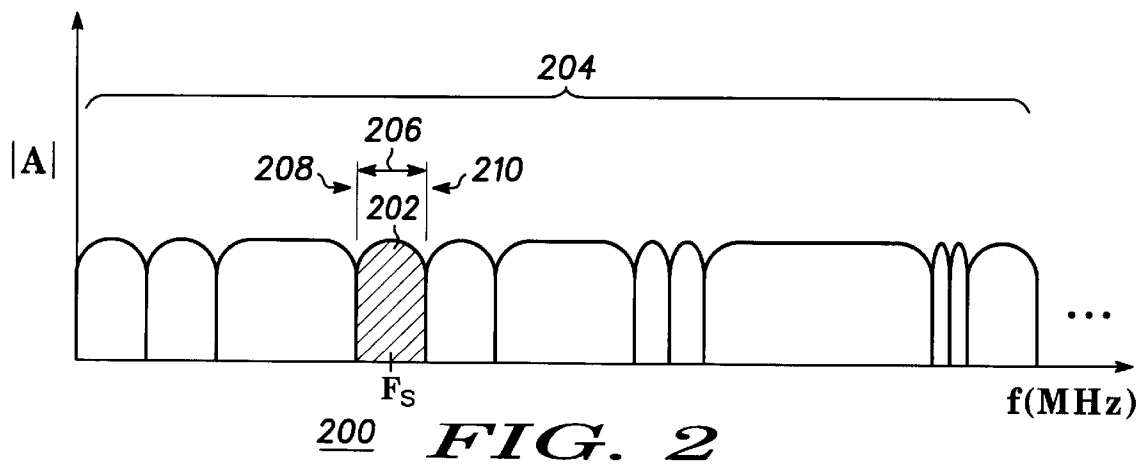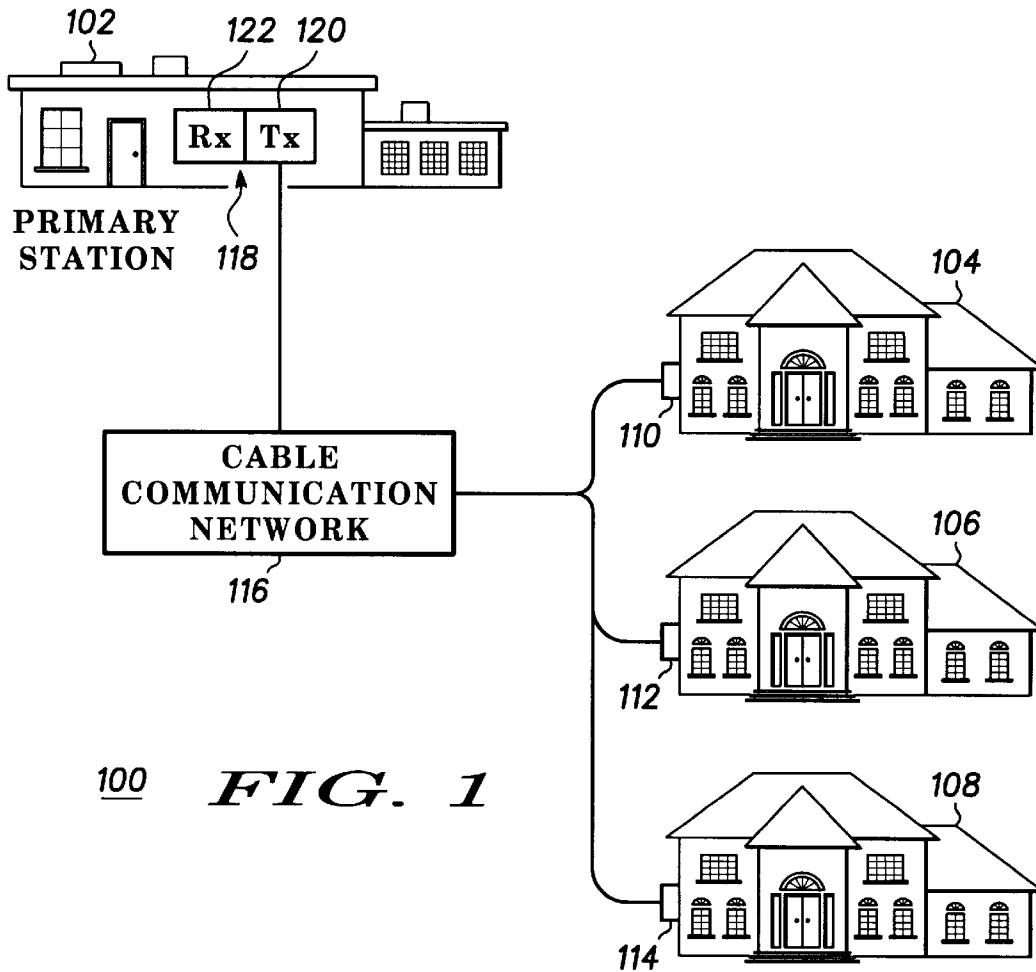### U.S. PATENT DOCUMENTS

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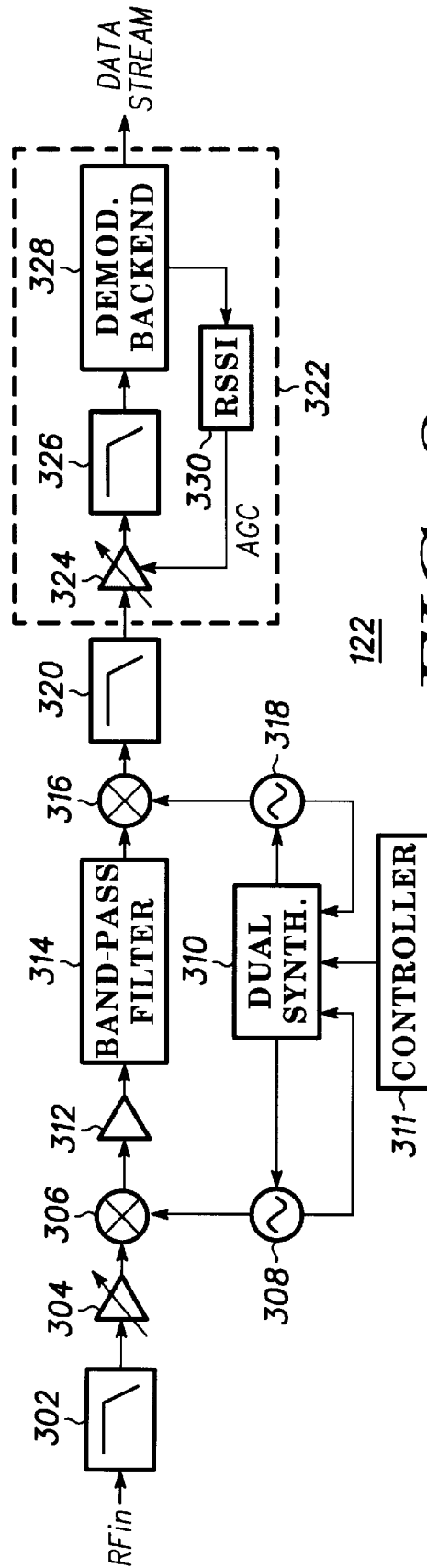*Attorney, Agent, or Firm*—Romi N. Bose

[57] **ABSTRACT**

A first mixer **(306)** shifts a first end **(208)** of a desired signal frequency bandwidth **(206)** of a desired signal **(202)** to an edge **(508)** of a first filter frequency bandwidth **(502)** of a first filter **(312)**, wherein the first filter frequency bandwidth **(502)** is greater than the desired signal frequency bandwidth **(206)**. Signals within a first undesired frequency spectrum **(504)** are attenuated by the first filter **(314)**. A second mixer **(316)** shifts a second end **(210)** of the desired signal frequency bandwidth **(206)** to an edge **(608)** of a second filter frequency bandwidth **(602)** of a second filter **(320)** to receive the desired signal **(202)**.
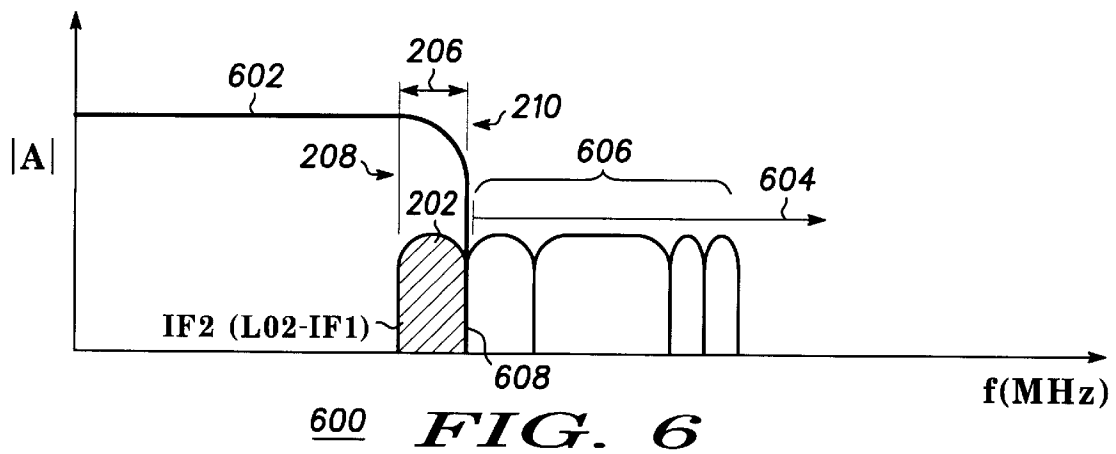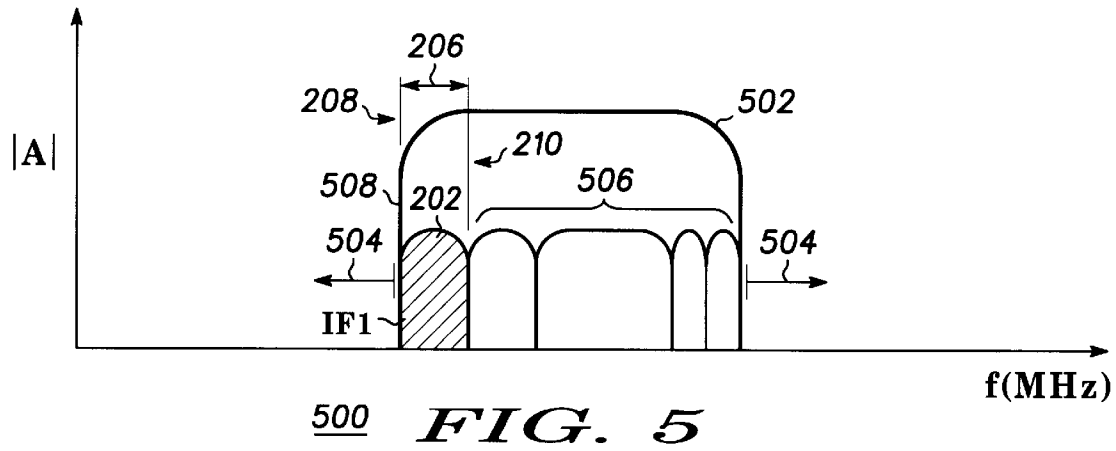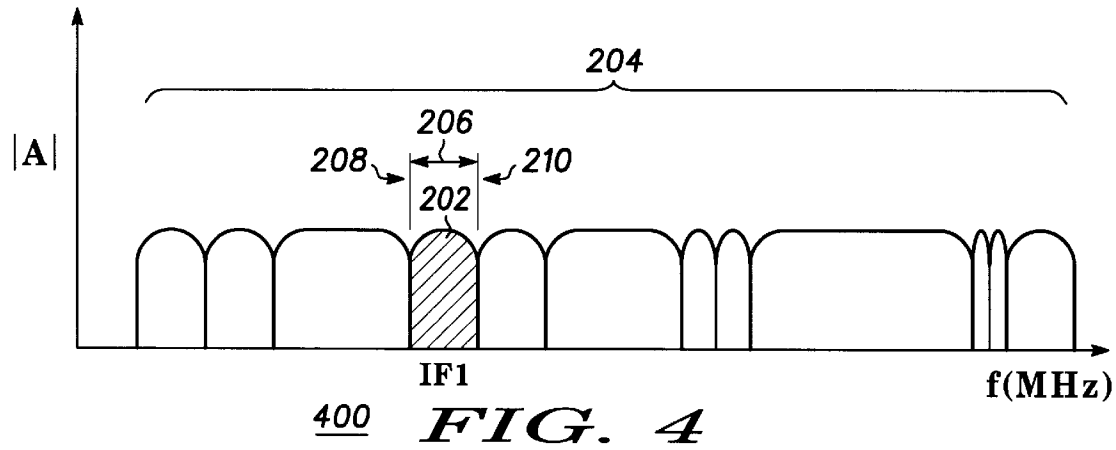
17 Claims, 4 Drawing Sheets

FIG. 1

FIG. 2

FIG. 3

400 *FIG. 4*

500 *FIG. 5*

600 *FIG. 6*

START

RECEIVE UPSTREAM FREQUENCY SPECTRUM ~705

IS DESIRED SIGNAL FREQUENCY BANDWIDTH EQUAL TO FIRST FILTER FREQUENCY BANDWIDTH 710

YES

NO

720~ DETERMINE FIRST INTERMEDIATE FREQUENCY

725

FREQUENCY SHIFT FIRST END OF THE DESIRED SIGNAL FREQUENCY BANDWIDTH OF THE DESIRED SIGNAL TO THE EDGE OF THE FIRST FILTER FREQUENCY BANDWIDTH

ATTENUATE UNDESIRED SIGNALS WITHIN FIRST UNDESIRED FREQUENCY SPECTRUM

730

CENTER DESIRED SIGNAL FREQUENCY BANDWIDTH WITHIN FIRST FILTER FREQUENCY BANDWIDTH

715

735~ DETERMINE SECOND INTERMEDIATE FREQUENCY

FREQUENCY SHIFT SECOND END OF THE DESIRED SIGNAL FREQUENCY BANDWIDTH OF THE DESIRED SIGNAL TO THE EDGE OF THE SECOND FILTER FREQUENCY BANDWIDTH ~740

ATTENUATE UNDESIRED SIGNALS WITHIN SECOND UNDESIRED FREQUENCY SPECTRUM ~742

745~ DEMODULATE DESIRED SIGNAL

FIG. 7

DOCKET ALARM
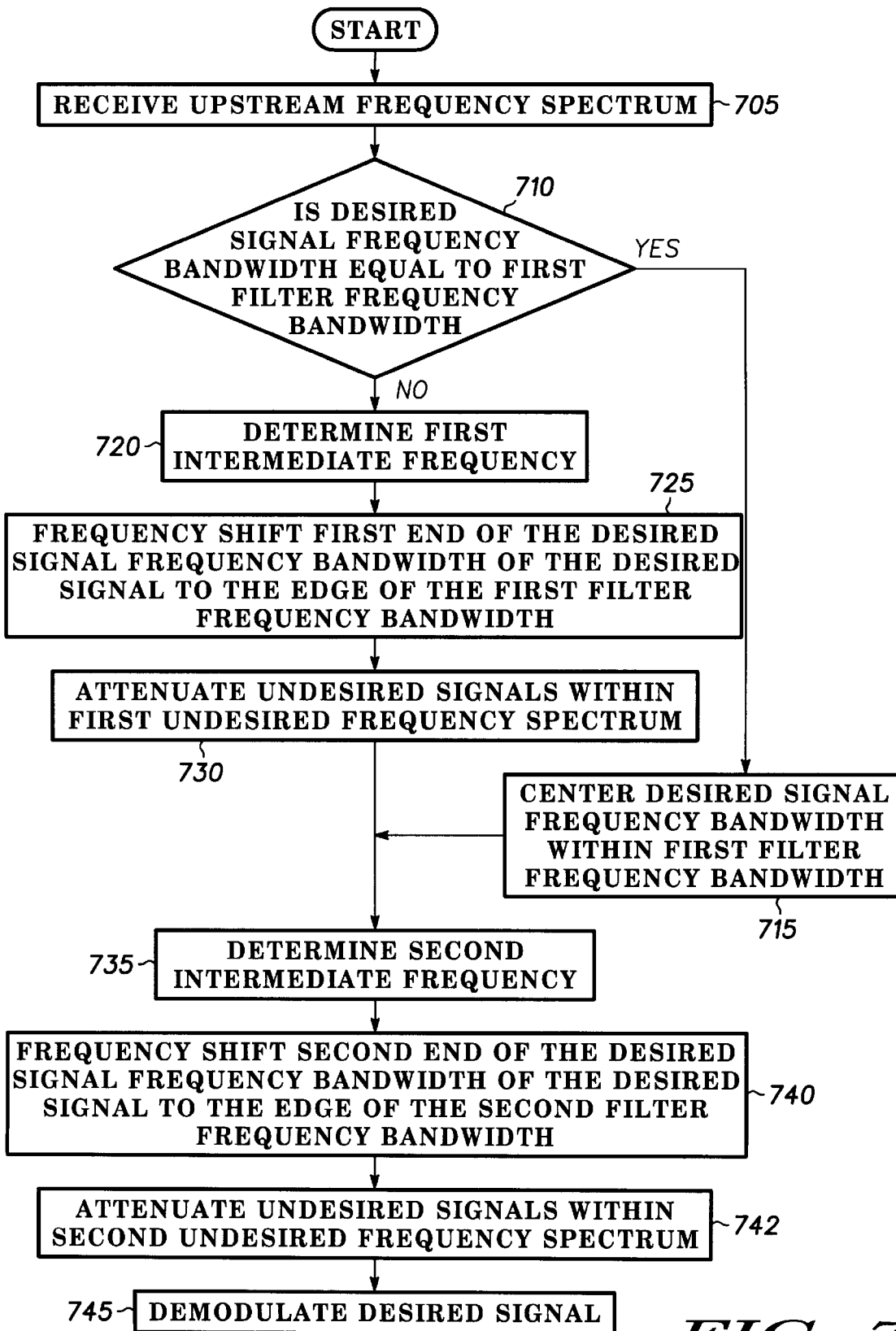
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