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(12) **United States Patent**  
**Haartsen et al.**

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(54) **CENTRAL MULTIPLE ACCESS CONTROL FOR FREQUENCY HOPPING RADIO NETWORKS**

6,246,677 B1 \* 6/2001 Nap et al.

**FOREIGN PATENT DOCUMENTS**

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WO 97/48216 12/1997

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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 0 days.

(57) **ABSTRACT**

(21) Appl. No.: **09/210,594**

A system comprises a wireless master unit and one or more wireless slave units, each having a unique identifier. When a wireless slave unit is active, it is addressed by one of a limited number of temporary addresses. A PARK mode enables a wireless slave unit to be in an idle state during which its temporary address is deallocated, enabling that address to be assigned to another wireless slave unit. To page a parked slave, a paging beacon packet is broadcast to, and received by, each of the wireless slave units at fixed intervals during a master-to-slave time slot. Each wireless slave unit determines whether the received paging beacon packet includes its unique identifier. If so, the wireless slave unit retrieves a temporary address from the paging beacon packet. The wireless unit transmits a response to the wireless master unit during a subsequent slave-to-master time slot if the received paging beacon packet included the unique identifier belonging to the wireless slave unit. Parked wireless slave units are also assigned a unique response number by the master. The master broadcasts a polling beacon packet during a master-to-slave time slot. If the parked slave unit desires access to the channel, it transmits a response in an N:th slave-to-master time slot following the polling beacon packet, where N is a function of the slave's unique response number.

(22) Filed: **Dec. 15, 1998**

**Related U.S. Application Data**

(60) Provisional application No. 60/071,262, filed on Jan. 13, 1998.

(51) **Int. Cl.**<sup>7</sup> ..... **H04J 3/24**

(52) **U.S. Cl.** ..... **370/312; 370/328; 370/349; 370/432**

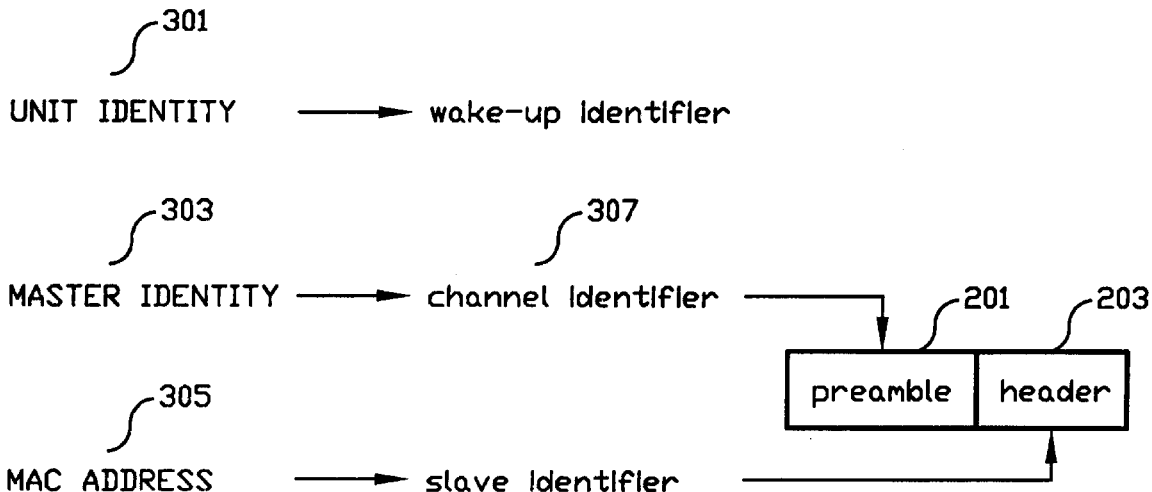
(58) **Field of Search** ..... 370/322, 328-329, 370/337, 345-350, 431, 442, 449-450, 312-313, 338, 475, 375, 443, 468, 432, 321, 323

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**24 Claims, 5 Drawing Sheets**



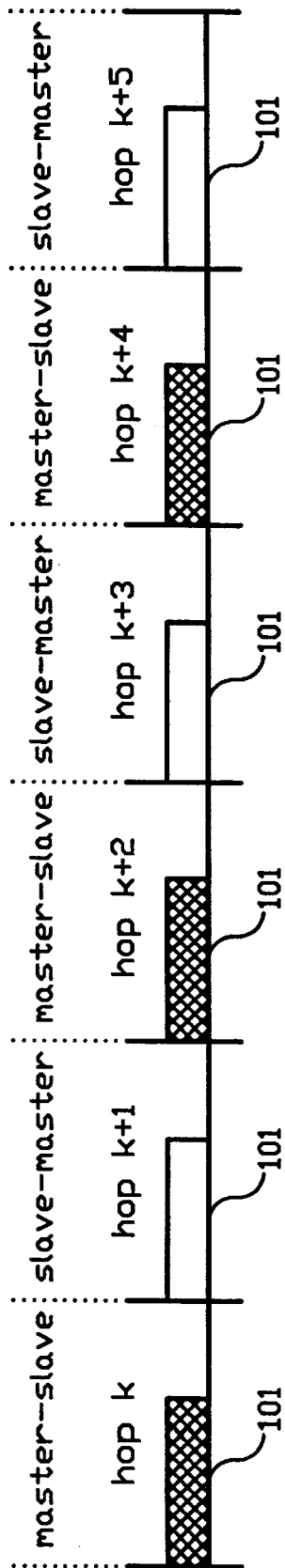


FIG. 1

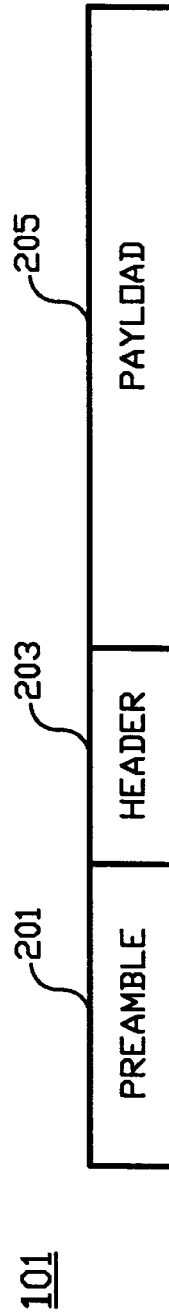


FIG. 2

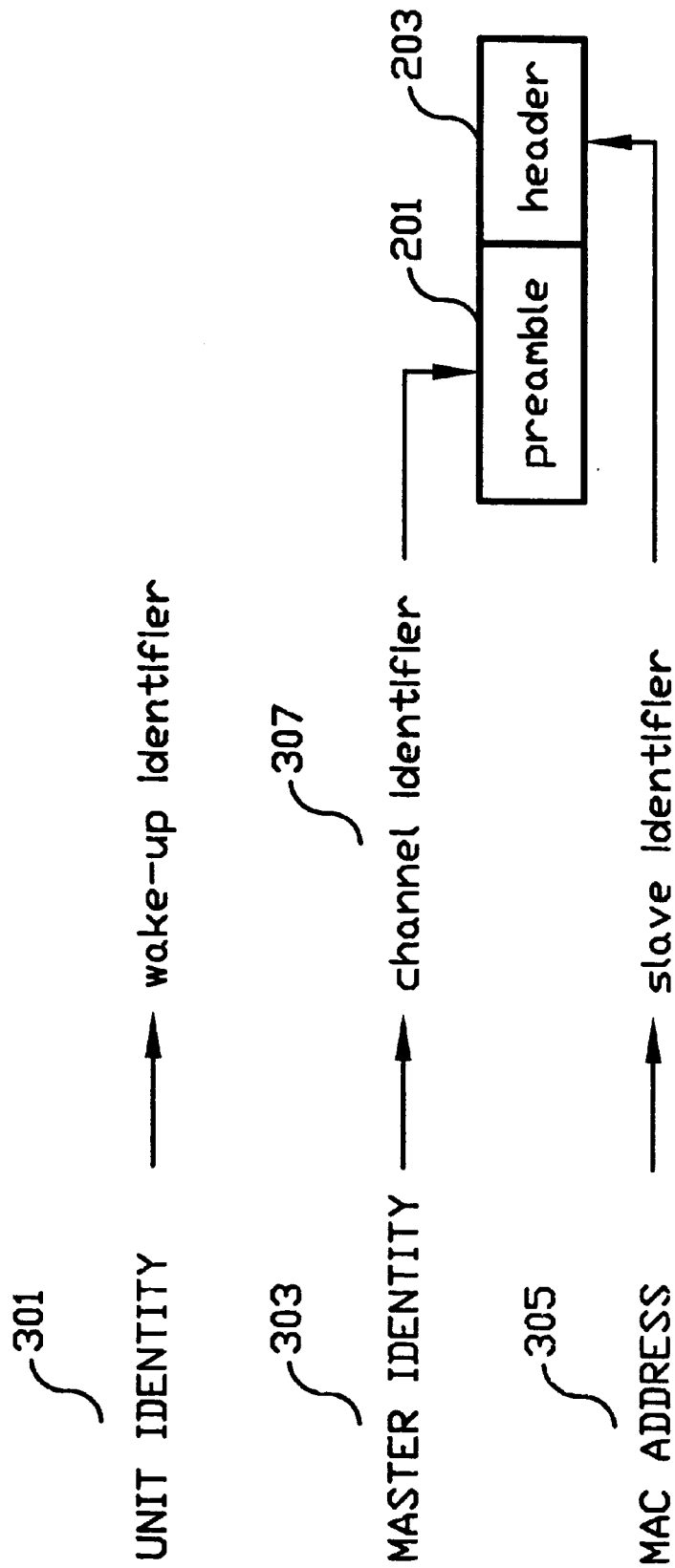


FIG. 3

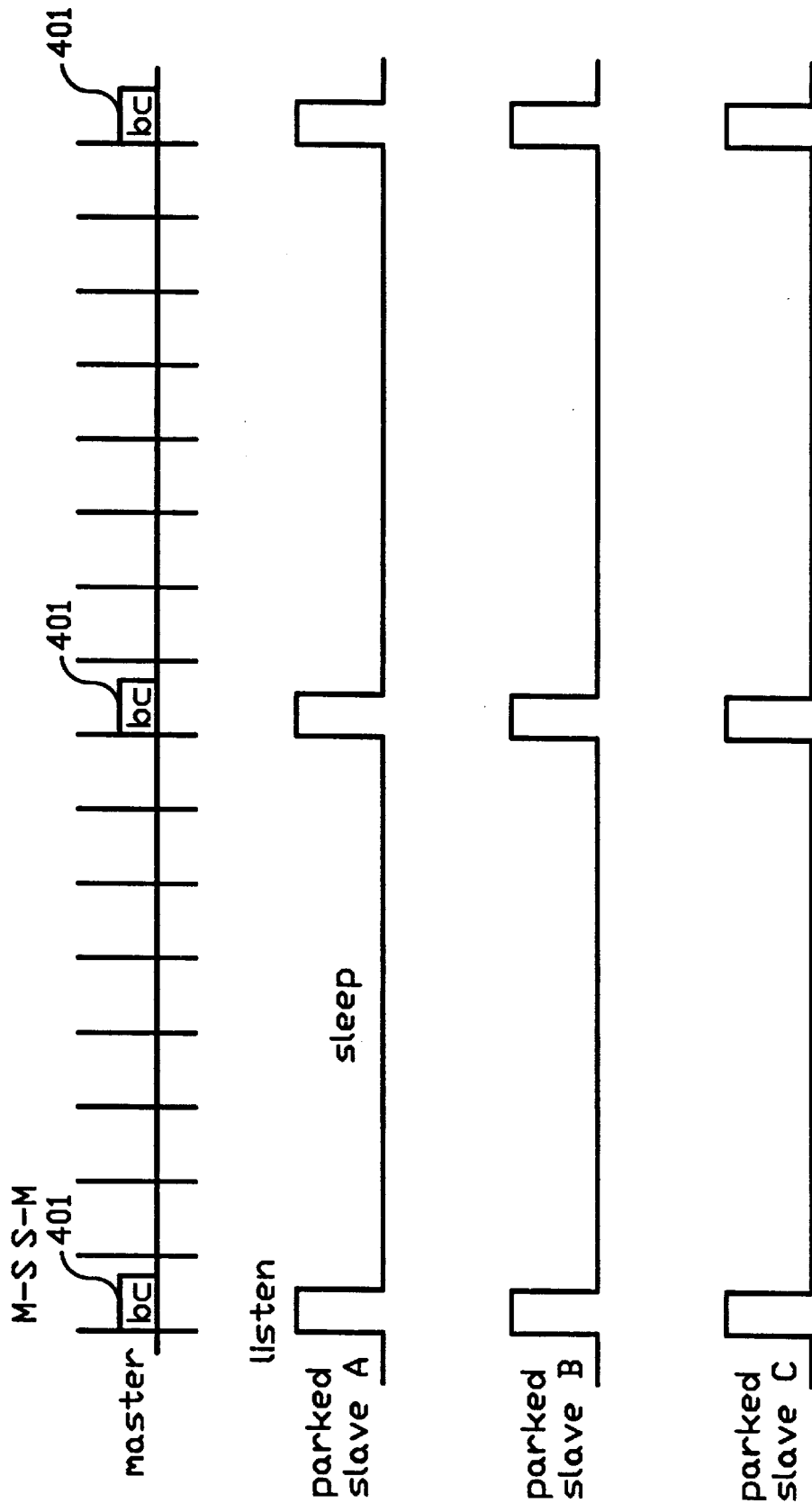


FIG. 4

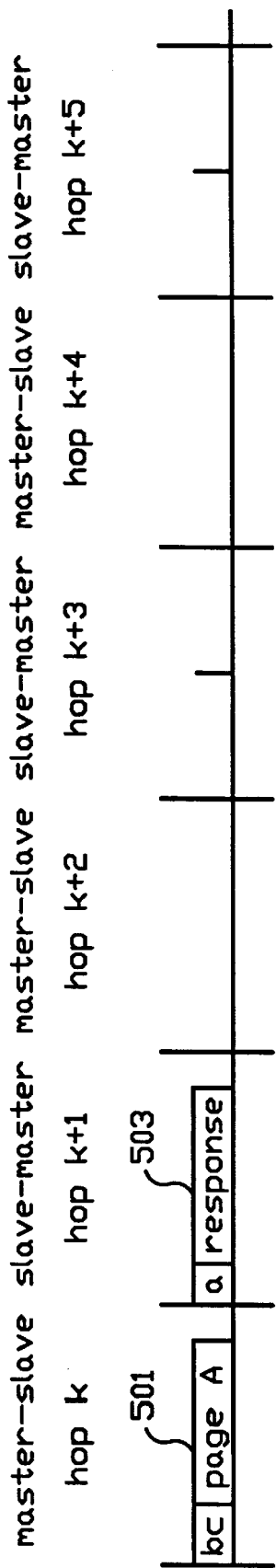


FIG. 5

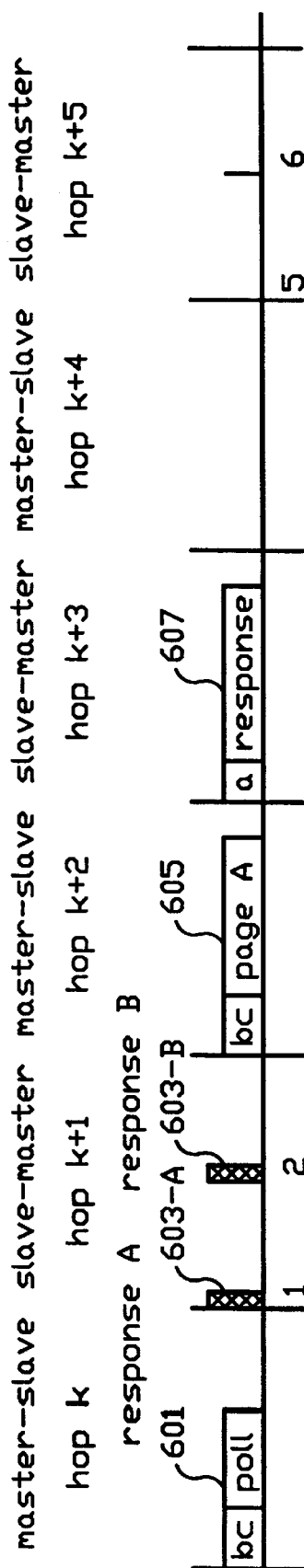


FIG. 6

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